PROJECT MANUAL

FOR

CURTAINWALL, STOREFRONT, AND WINDOW REPLACEMENTS AT THE BARNSTABLE HIGH SCHOOL

BARNSTABLE, MASSACHUSETTS

TOWN OF BARNSTABLE

Technical Specifications

January 19, 2018

Prepared by:

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BARNSTABLE HIGH SCHOOL CURTAIN WALL REPLACEMENT **# OF PAGES**

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TECHNICAL SPECIFICATIONS

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END OF SECTION

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DIVISION 01 GENERAL REQUIREMENTS

SECTION 01 10 00 SUMMARY OF WORK

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

A. Include the General Conditions, Modifications to the General Conditions, and applicable parts of Division 01 as part of this Section.

B. Examine all other Sections of the Specifications for requirements which 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 Contract.

D. It is the intent of the Specifications and the Drawings to require that the equipment to be furnished complete in every respect, and that this Contractor shall provide all equipment needed and usually furnished in connection with such systems to provide a complete installation. Equipment, materials, and articles incorporated in the work shall be new and of the best grade of their respective kinds.

1.02 DESCRIPTION OF WORK - GENERAL

A. In general, the Contractor shall supply all material, labor, equipment, insurance, temporary protection, tools and appliances necessary for the proper completion of the work as described in the Plans and Specifications, in accordance with good construction practice, and as required by the materials manufacturers.

B. Supply all shoring and protection necessary to protect the occupants, building area, building systems, and landscape areas. All means and methods are the responsibility of the contractor. The Contractor is solely responsible for safety on the job site.

C. The work includes, but is not limited to:

1. If there is a conflict between or within any part of the plans and the specifications, the more stringent requirement shall apply at the sole discretion of the Architect.

2. This document describes (but is not exclusive of) the replacement of existing curtainwall, storefront, and window assemblies. The work shall be constructed so as to meet all requirements of the Massachusetts State Building Code, current edition, in addition to all other applicable codes and regulations.

3. The School will be occupied by school administration and custodial staff throughout the project.

4. The work will include all operations necessary to deliver the building(s) and ancillary on and off-site amenities in a fully installed and operable condition

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including all utility and site work and obtaining all necessary licenses, permits, and certificates.

5. Cafeteria:

   a. No base bid scope.

6. Library Curtainwall:

   a. Remove and dispose of existing aluminum Curtainwall assemblies in the High School Library in their entirety. Sealants and glazing at storefront is presumed to contain PCB's. Refer to Section 02 84 33 for removal and legal disposal requirements and additional information.

   b. Provide and install CMU block, air and moisture barrier, insulation, and stone veneer at the base of the Curtainwall where indicated on the Drawings.

   c. Provide and install aluminum curtainwall assemblies, including doors and hardware where indicated. Provide sealants for a water-tight assembly.

7. Library Interior Partitions:

   a. Provide and install interior aluminum framed partitions at the Collaboration Space and the Computer Lab. Provide new soffit framing and sheathing as shown on the drawings.

8. **Add Alternate #1:** delete standard glazing at Curtainwall A, instead provide and install electrochromic glazing.

9. **Add Alternate #2:**

   Remove and dispose of existing fixed aluminum windows at the South Elevation of the Cafeteria in their entirety (sealants and glazing at windows is presumed to contain PCB's, Refer to Sections 02 82 13 and 02 84 33 for removal and legal disposal requirements and additional information), and provide and install fixed aluminum windows with thermal breaks. Remove existing brick above the windows, 3 courses high, and install new self-adhered flexible membrane flashing wrapped around the columns between the windows at the column grids, and continuous through-wall flashing at the head of the windows. Prepare and paint existing steel plate lintels above the windows with high-performance coating, and install painted wood stool on plywood sub-sill at all window sills.

   Remove and dispose of aluminum storefront and doors at the East Elevation in its entirety (sealants and glazing at storefront is presumed to contain PCB's. Refer to Sections 02 82 13 and 02 84 33 for removal and legal disposal requirements and additional information), and provide and install new thermally-broken aluminum storefront and door, complete with exit hardware. Patch existing adjacent gypsum wallboard at head of storefront with painted gypsum wallboard to align with existing, and vinyl tile at the floor with new V.C.T. to align with existing.

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10. **Add Alternate #3:** delete standard glazing at Curtainwall B and C, instead provide and install electrochromic glazing.

1.03 INTENT OF THE PROJECT MANUAL

A. Whenever “Furnish”, “Install”, or “Provide” is used in the Contract Documents, it shall mean to erect, install, connect, make operative, and supply all labor and materials, including miscellaneous fittings, hardware, and accessories necessary to complete the installation of the specified item.

B. The scope of work is indicated in the Project Manual. Areas of required work indicated on the drawings are for illustration and are not to be interpreted as representing quantities, exact locations, and/or the extent of work required. The Owner makes no representation of the exact quantities of work required. It shall be the responsibility of the Contractor to do all work to the complete fulfillment of the requirements of the Project Manual.

1.04 ERRORS, OMISSIONS, AND CONFLICTS IN THE PROJECT MANUAL

A. In the case of conflicts in the Drawings and the Specifications noticed by the Contractor, the Architect shall be notified immediately in writing of such errors and/or omissions. In no case shall the Contractor proceed without written authorization from the Architect.

1.05 UNFORESEEN FIELD CONDITIONS

A. In the case of unforeseen field conditions, the Contractor shall notify the Owner and Architect immediately in writing of such conditions. In no case shall the Contractor proceed without written authorization from the Architect. If such unforeseen conditions result in additional expense, the Contractor shall not proceed without the written approval of the Owner.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

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DIVISION 01 GENERAL REQUIREMENTS

SECTION 01 23 00 ALTERNATES

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

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 which 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 Contract.

D. It is the intent of the Specifications and the Drawings to require that all the material, labor, and equipment be furnished complete in every respect, and that this Contractor shall provide all material, labor, and equipment needed and usually furnished in connection with such systems to provide a complete installation including all demolition, disposal, and patching of adjacent surfaces. Materials, equipment, and articles incorporated in the work shall be new and of the best grade of their respective kinds.

1.02 ALTERNATE SCOPE

A. This Section lists the Alternates which appear in the Contract Documents. Consult the individual sections of the detailed requirements of each Alternate.

B. Bid prices for each Alternate shall include overhead, profit, and all other expenses incidental to the Work under each Alternate.

C. The Contractor and Subcontractors shall be responsible for examining the scope of each Alternate generally defined herein and for recognizing modifications to the Work caused by the Alternates and including the cost thereof in the bid price.

1. **Add Alternate #1:** Remove and dispose of existing fixed aluminum windows at the South Elevation in their entirety (sealants and glazing at windows is presumed to contain PCB's, Refer to Sections 02 82 13 and 02 84 33 for removal and legal disposal requirements and additional information), and provide and install fixed aluminum windows with thermal breaks. Remove existing brick above the windows, 3 courses high, and install new self-adhered flexible membrane flashing wrapped around the columns between the windows at the column grids, and continuous through-wall flashing at the head of the windows. Prepare and paint existing steel plate lintels above the windows with high-performance coating, and install painted wood stool on plywood sub-sill at all window sills.

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Remove and dispose of aluminum storefront and doors at the East Elevation in its entirety (sealants and glazing at storefront is presumed to contain PCB's. Refer to Sections 02 82 13 and 02 84 33 for removal and legal disposal requirements and additional information), and provide and install new thermally-broken aluminum storefront and door, complete with exit hardware. Patch existing adjacent gypsum wallboard at head of storefront with painted gypsum wallboard to align with existing, and vinyl tile at the floor with new V.C.T. to align with existing.

END OF SECTION

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DIVISION 01 GENERAL REQUIREMENTS

SECTION 01 24 00 SPECIAL PROJECT PROCEDURES

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

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 which 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 Contract.

D. It is the intent of the Specifications and the Drawings to require that all the material, labor, and equipment be furnished complete in every respect, and that this Contractor shall provide all material, labor, and equipment needed and usually furnished in connection with such systems to provide a complete installation including all demolition, disposal, and patching of adjacent surfaces. Materials, equipment, and articles incorporated in the work shall be new and of the best grade of their respective kinds.

1.02 BIDDERS EXAMINATION AND INSPECTION OF EXISTING BUILDING AND SITE

A. All bidders must inspect the existing site and make their own assessment of the work required to achieve the complete, finished conditions specified in the Contract Documents.

B. Failure to adequately inspect the site and/or correctly assess existing conditions shall not be cause for additional payment.

C. Every contractor will be bound by the scope of work of the Contract Documents and shall make the inspections necessary to assure that the bid price includes the complete scope.

1.03 HOURS OF WORK

A. Work may commence after the last day of the 2017-2018 academic year at 7:00 A.M. and continue until 7:00 P.M., Monday through Friday. If work is to be performed after hours, or on Saturday and/or Sunday (with advance approval of the Owner), the General Contractor shall make arrangements and shall pay time and a half for a Barnstable Public Schools employee to be on site.

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B. The contractor shall be completely and fully responsible for the security and safety of the job site at all times.

1.04 CONTRACTOR USE OF THE BUILDINGS, ACCESSIBILITY AND SCHEDULES FOR WORK

A. The work of the Contractor and all Subcontractors shall be performed during the hours of operation as specified herein and in and around areas of the building and site used while occupied by the Owner and the public. The building will remain occupied during the entire duration of the project. The Contractor shall execute the Work with the least possible disturbance to the use and continuous functioning of the site and building. The Contractor and each Subcontractor take all necessary measures to assure the safety of the staff, visitors, and the general public. The General Contractor is solely responsible for safety on the job site including securing and making safe all construction areas during construction hours as well as during non-construction hours.

B. Schedule of Work and Site Use

1. The Contractor shall schedule the work of this Contract so as to perform and complete the Work of the Contract according to the following schedule. The Contractor shall within seven (7) days of the Notice of Contract Award, submit a schedule to the Owner and Architect for review.

2. It is expected that the Contractor utilize the time period between the Notice of Award and construction start date to schedule and coordinate the work and work sequence with their own forces and their subcontractors, prepare shop drawings and submittals for approval and order materials. The Owner shall issue a Notice to Proceed.

3. The Contractor shall be responsible for providing any and all measures and/or temporary construction required to control the transmission of dust, particles, and fumes from construction activities.

4. The Contractor shall be responsible on a daily basis for informing the designated Owner's representative of all persons on-site that day associated with the Work. The Contractor shall establish a daily reporting system of all activities which is acceptable to the Owner.

5. The Construction schedule shall indicate the dates for start and completion of each work item or task required with all milestones using a Bar Chart subject to approval by the Architect.

6. The Awarding Authority's review of the project construction schedule shall not extend to the accuracy or other matters dealt with in the schedule, including but not limited to whether work is omitted, whether duration of activity is reasonable, the level of labor, materials or equipment, the Contractor's means, methods, techniques, procedures or

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sequence of construction, or whether the sequence and timing for work remaining are practical. The accuracy, correctness of all work, sequencing, and schedules shall remain the sole responsibility of the Contractor. Neither the Awarding Authority's review of a schedule nor a statement of resubmittal not required shall relieve the Contractor for the responsibility for complying with the contract schedule, adhering to sequences of work, or from completing any omitted work with the Contract Time.

7. The Contractor shall provide, erect and maintain barricades with any required egress, access doors, lighting, ventilation, guard rails and all other appurtenances required to protect the general public, visitors, staff, and workers while construction is in progress. Safety is the sole responsibility of the Contractor on the job site.

1.05 HOUSEKEEPING AND PROTECTION OF EXISTING CONDITIONS

A. Maintain the premises in a safe, orderly condition at all times. Protect construction, furnishings, equipment and other items.

B. Property Protection: The General Contractor shall take all measures necessary to protect the Owner's property.

C. Security: The General Contractor shall take every possible precaution to maintain the security of the buildings and site. The Contractor shall cooperate with the Owner fully and follow the Owner's directions as issued. The Contractor shall control and restrict access to areas of work to prevent injury to persons and property.

D. The Contractor shall properly cover, protect and maintain floor and finished surfaces to prevent damage. Replace protective coverings which become wet, torn or ineffective.

E. Finished Surfaces Protection:

1. The Contractor shall restrict traffic on finished surfaces to that required to perform the work of this Contract and permit traffic only required to properly complete the Work.

2. Effectively protect surfaces to prevent damages to existing substrates, new finishes, and to finished roofing work. Provide temporary walkways and work platforms as needed.

3. Load distribution: The Contractor and any Subcontractor shall not load or permit any part of the structure to be loaded in any manner that will damage the existing structure or endanger the safety of persons or property. Such loads shall include live and dead loads and all moving, vibratory, temporary, and impact loads.

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F. Correction by the Contractor

1. At no additional cost to the Owner, the General Contractor shall immediately correct all deficiencies, including damages to the building, site and site surfaces, damages to furnishings, damages to equipment or systems, damage to adjacent properties, and all other damage caused by the General Contractor or its Subcontractors during the execution of the Work of this Contract. Any and all damages resulting from inadequate, insufficient or defective temporary protections installed by the Contractor during the work of this Contract, shall be corrected by the General Contractor at no additional cost to the Owner.

1.06 REQUIREMENTS RELATED TO BUILDING USERS' FURNISHINGS, EQUIPMENT AND OTHER ITEMS

A. The General Contractor is responsible for protecting all furnishings, equipment and items from damage (including construction generated dust) during the entire construction period.

B. The General Contractor shall be responsible for moving and re-setting up all furniture, fixed and movable equipment, file and storage cabinets, recreation equipment, boxes, and all other items to accomplish the work of both the General Contractor and the Subcontractors in its entirety.

1.07 DUST, DIRT, AND FUME CONTROL

A. The Contractor shall take all necessary precautions and provide all necessary temporary construction to effectively contain dust, dirt and fumes within the areas of work and within the work limits. Temporary construction shall be provided to effectively prevent dust and dirt from entering areas of the buildings or adjacent buildings, satisfying all Municipal, State and Federal laws, codes, and requirements.

1.08 RUBBISH REMOVAL

A. The Contractor shall remove all rubbish, waste, tools, equipment and appurtenances caused by and used in the execution of the Work; but this shall in no way be construed to relieve the Contractor of his primary responsibility for maintaining the building and Project site clean and free of debris, leaving all work in a clean condition and satisfactory to the Official.

B. Immediately after unpacking, the Contractor shall collect and remove from the building and Project site all packing materials, case lumber, excelsior, wrapping and other rubbish.

C. Rubbish removal shall occur so that trash and debris are contained in closed and secured waste containers.

1.09 CLEANING

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A. The Contractor shall at all times keep the building and Project site free from accumulation of waste materials or rubbish.

B. Immediately prior to final inspection, the entire building and surrounding Project areas shall be thoroughly cleaned by the Contractor including, without limitation:

1. All construction facilities, tools, equipment, surplus materials, debris and rubbish shall be removed from the Project site and the entire Work shall be left broom clean.

2. All finished surfaces shall be left in perfect condition, free of stains, spots, marks, dirt, and other defects. The Contractor shall be responsible for the cleaning of the Work of all trades, whether or not cleaning by such trades is included in their respective Selection of the Specifications.

3. Plenums, duct spaces and furred spaces shall be protected at all times from fumes, particles and other air-borne construction effects. These building spaces shall be left clean of debris and decayable materials.

4. Equipment and building systems located in areas of construction shall be cleaned and tested and made perfectly operational to the satisfaction of the Owner prior to Substantial Completion or partial Substantial Completion of that area of work.

C. In cleaning items having manufacturer's finish, or items previously finished by a Subcontractor, care shall be taken not to damage such finish. In cleaning glass and finish surfaces, care shall be taken not to use cleaning agents which may stain or damage any finish materials. Any damage to finishes caused by cleaning operations shall be corrected and repaired by the Contractor at no increase in Contract Price.

1.10 OR-EQUAL

A. Where materials, equipment, apparatus, or other products are specified by Manufacturer, brand name, type or catalog number, such designation is to establish standards or performance, quality, type and style.

B. If the General or Subcontractor wishes to use materials or equipment other than these specifically designated herein, as being equal to those so specifically designated, he shall submit the proposed substitution before purchasing and/or fabrication in accordance with the requirement of the General Conditions for approval.

C. It is the responsibility of the Contractor to submit all back-up material and data needed to prove that the proposed product is an "or-equal". The Architect will not review an alternative product without proper documentation. Alternative products and assemblies will be rejected immediately without proper documentation.

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D. The schedule of the project is not subject to the availability of products submitted as "or approved equal" or the review needed to certify an "or approved equal" product.

1.11 PERMITS AND POLICE DETAILS

A. The contractor is responsible for procuring and paying for all applicable permits and police details throughout the entire project.

B. The Contractor is responsible for all Town permit fees. Please note that the Town will **NOT** waive permit fees for this project.

1.12 COORDINATION

A. The Contractor shall coordinate locations of all items to be installed with the Architect. If an item is not dimensioned, for height or location, contact the Architect for the installation information. Installation of items without the proper dimensional information may result in reinstallation at no additional charge by the contractor.

1.13 CORI REQUEST FORM

A. All personnel working at the sites will be required to fill out a Barnstable Public Schools CORI request form.
   1. All forms shall be submitted to Barnstable Public Schools one week prior to the applicant being on site.
   2. The General Contractor will update the list as required to reflect current workers on site.
   3. All workers must pass the CORI background check in order to work on this site.

B. The General Bidder, and all the sub-contractors are hereby notified that CORI checks are required for all personnel that will be working on site at any of the Town of Barnstable School properties. It is each individual contractor's responsibility to submit the required paperwork to the State, in advance of the work, so as not to delay the schedule for any possible employee that will access the site. Approval by the state for must be delivered to the Owner in advance of the work. Payments will be withheld to the contractor if he/she fails to submit the proper CORI certifications in advance of the work.

1.14 GENERAL NOTES

A. CONTRACTOR SHALL BE RESPONSIBLE FOR CHECKING AND COORDINATING ALL DIMENSIONS WITH ARCHITECTURAL DRAWINGS. IN CASE OF CONFLICT, THE ARCHITECT SHALL BE NOTIFIED AND SHALL RESOLVE THE CONFLICT.

B. IN ANY CASE OF CONFLICT BETWEEN OR WITHIN THE DRAWINGS AND THE PROJECT SPECIFICATIONS, THE MORE STRINGENT REQUIREMENTS SHALL GOVERN.

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C. THE CONTRACTOR SHALL MAKE NO DEVIATION FROM DESIGN DRAWINGS WITHOUT PRIOR REVIEW BY THE ARCHITECT.

D. WORK NOT INDICATED ON A PART OF THE DRAWINGS BUT REASONABLY IMPLIED TO BE SIMILAR TO THAT SHOWN AT CORRESPONDING PLACES SHALL BE REPEATED.

E. ALL WORK SHALL COMPLY WITH APPLICABLE CODES AND LOCAL LAWS AND REGULATIONS.

F. GENERAL CONTRACTOR SHALL COORDINATE LOCATIONS OF OPENINGS, PITS, BOXES, SUMPS, TRENCHES, SLEEVES, DEPRESSIONS, GROOVES, AND CHAMFERS, WITH MECHANICAL, ELECTRICAL AND PLUMBING TRADES.

G. THE STRUCTURAL DESIGN OF THE BUILDING IS BASED ON THE FULL INTERACTION OF ALL ITS COMPONENT PARTS. NO PROVISIONS HAVE BEEN MADE FOR CONDITIONS OCCURRING DURING CONSTRUCTION. IT IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO MAKE PROPER AND ADEQUATE PROVISIONS FOR STABILITY OF, AND ALL STRESSES TO THE STRUCTURE DUE TO ANY CAUSE DURING CONSTRUCTION.

H. CONTRACTOR SHALL NOT SCALE DRAWINGS. CONTRACTOR SHALL REQUEST ALL DIMENSIONS OR INFORMATION REQUIRED TO PERFORM THE WORK FROM THE ARCHITECT. WORK COMPLETED BY THE CONTRACTOR WITHOUT DIMENSIONS OR INFORMATION SHALL BE DONE AT THEIR OWN RISK AND, IF DEEMED INCORRECT BY THE ARCHITECT, SHALL BE REMOVED AND REINSTALLED TO THE SPECIFICATIONS OF THE ARCHITECT AT NO ADDITIONAL COST TO THE OWNER.

I. CODES: THE PROJECT IS BASED ON THE REQUIREMENTS OF THE MASSACHUSETTS STATE BUILDING CODE - NINTH EDITION.

J. THE PLANS WERE COMPILED FROM VARIOUS SOURCES. THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING ALL EXISTING CONDITIONS AND DIMENSIONS.

K. FOR ALL ITEMS THAT ARE TO BE REUSED AND/OR REINSTALLED AS PART OF THE WORK:

ALL ITEMS THAT ARE TO REMAIN ARE TO BE PROTECTED FROM DAMAGE. IF ANY DAMAGE OCCURS THE CONTRACTOR SHALL REPAIR THE ITEM SO IT IS IN A LIKE NEW CONDITION OR REPLACE IT WITH A NEW ITEM THAT FUNCTIONS THE SAME OR BETTER THAN THE ORIGINAL ITEM.

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ALL ITME THAT ARE TO BE TEMPORARILY REMOVED AND REINSTALLED ARE TO BE CAREFULLY REMOVED AND MOVED TO A PROTECTED AREA ON SITE OR TO AN OFF-SITE FACILITY. THE ITEM IS TO BE CLEANED AND PREPARED FOR REINSTALLATION. ALL FITTINGS AND CONNECTION POINTS ARE TO BE INSPECTED AND REPAIRED. PROVIDE NEW FASTENERS AND CAREFULLY TRANSPORT THE ITEM BACK TO ITS ORIGINAL LOCATION AND CAREFULLY REINSTALL. IF ANY DAMAGE OCCURS THE CONTRACTOR SHALL REPAIR THE ITEM SO ITI IS IN A LIKE NEW CONDITION OR REPLACE IT WITH A NEW ITEM THAT FUNCTIONS THE SAME OR BETTER THAN THE ORIGINAL ITEM.

1.15 INSURANCE

A. Barnstable Public Schools, The Town of Barnstable, and CBI Consulting Inc. shall be listed as Additional Insured with a Waiver of Subrogation on the insurance policy for this project.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

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DIVISION 01 GENERAL REQUIREMENTS

SECTION 01 25 00 COORDINATION

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

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 which 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 Contract.

D. It is the intent of the Specifications and the Drawings to require that all the material, labor, and equipment be furnished complete in every respect, and that this Contractor shall provide all material, labor, and equipment needed and usually furnished in connection with such systems to provide a complete installation including all demolition, disposal, and patching of adjacent surfaces. Materials, equipment, and articles incorporated in the work shall be new and of the best grade of their respective kinds.

1.02 COORDINATION WITH THE BARNSTABLE HIGH SCHOOL BUILDING AND SCHOOL BUILDING PROCEDURES

A. The safety and welfare of the employees and guests are the utmost concern of the project. All work by the Contractor, his Sub-Contractors, Sub-Bidders, suppliers, and employees shall be performed in a way that will safeguard this concern. Safety is the sole responsibility of the Contractor on the jobsite. Extraordinary care must be taken throughout the project to coordinate work activities with the School Department schedules, procedures, and activities.

B. All construction activities, including, but not exclusive of scheduling and deliveries to the school are to be coordinated with the Owner's Project Manager.

C. Pre-construction meetings shall be held with the Owner's Project Manager, the Contractor and Architect, to coordinate locations for dumpsters and chutes, deliveries, worker parking, material storage, as well as to discuss safety, and scheduling, procedures.

D. Contractor shall restrict hazardous items and activities to locations that will have the least impact on the daily operations of the school activities. All material storage, locations of cranes, dumpsters, workers access, etc. will be only in areas approved by the Barnstable Public Schools.

E. Install, at a minimum, when work is performed overhead, covered walkway protection at all entrance and exit doors, at areas of construction, to the facility during construction

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activities, (10'-0") minimum length, of pipe scaffolding, plywood, planking, orange plastic fencing, and yellow safety tape. Safety is the sole responsibility of the contractor, regardless of the information in this specification.

F. Contractor shall cover all interior spaces where work will occur, with minimum 6-mil poly tarps before operations commence above to protect interior surfaces and equipment from debris and dust. All protections shall be removed immediately upon completion of the work. Dust and debris not contained by the tarps shall be immediately vacuumed to the satisfaction of the Owner's Project Manager. Damage as a result of the work will be repaired to the satisfaction of and at no additional cost to the owner.

G. Contractor shall provide signage and other safety barriers at the site adequate to support their safety program and to properly identify building entrances and exits.

H. Contractor shall update the Construction schedule monthly. Requisitions for payment must be accompanied by an updated schedule. The on-site superintendent shall meet with the Owner's Project Manager daily at to inform them of the daily progress and review the schedule for the next three (3) days.

1.03 SCHEDULING

A. Time is of the essence in this project.

B. Temperature is a critical factor in the construction work. Adhere to manufacturer's specifications.

C. Within five (5) days after the Contractor has received the Owner's Notice to Proceed, and before the commencement of any work, the Contractor shall transmit the proposed construction schedule to the Owner and Architect for review. If any change in the work will alter agreed upon schedules, the Contractor shall immediately notify the Owner and Architect in writing.

D. The Contractor shall confine his/her apparatus, storage of materials, and operation of his/her workmen to limits as required by the Owner, and shall not unreasonably encumber the premises with these materials. He/she shall keep all access roads and walks clear of construction equipment, materials, and debris of any kind. He/she shall repair any and all damage to access roads, walks, the building facade and roof caused by construction operations, and leave them in at least as good condition as originally found. All operations shall be confined within the property. All delivery and construction operations shall be conducted so as to avoid all possible obstruction of the work and building operations. The Contractor shall meet regularly with the Owner to coordinate the use of the Site.

E. The Contractor must request approval from the Barnstable Public Schools to work after hours, or on Saturdays or Sundays with paid Barnstable Public Schools staff, at no additional expense to the Owner.

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1.04 SUBCONTRACTORS

A. Subcontractors are subject to approval by the Owner.

1.05 CONSTRUCTION REVIEW

A. All materials and workmanship shall be subject to review by the Architect and all designated representatives of the Owner. Such review may take place at any time during the construction, and wherever work relating to this project is underway. The Contractor shall notify the Architect of any approaching stage of the work likely to require his/her attention, and the Architect shall have the right to reject all defective or non-conforming workmanship and material, and to require its replacement.

B. If any un-reviewed work is covered up without approval, the Contractor shall bear the costs of uncovering it upon request.

1.06 CODES

A. Codes, standards, and publications of private and public bodies mentioned in these specifications, and other such standards and specifications, refer to the latest edition thereof at the time of taking bids unless a specific edition is designated, and shall be considered and integral part of the Contract Documents.

1.07 COORDINATION OF WORK

A. Contractor shall coordinate all construction work with David Kanyock, Director of Facilities for the Barnstable Public Schools.

B. Contractor is responsible for all building and sidewalk permits, police details as required as well as any other requirements that may be imposed by the Town of Barnstable.

C. The Contractor shall be responsible for maintaining required building egress at all existing building egress locations simultaneously during the work.

1.08 SPECIFICATION DISTRIBUTION TO WORKMEN

A. A complete copy of the Project Manual, including Plans and Specifications shall be kept at the construction site at all times.

B. At the direction of the Architect, the Contractor shall photocopy various parts of pertinent Sections of the Project Manual to be handed out to each tradesman.

1.09 DELIVERY AND STORAGE

A. Materials shall be delivered dry, in their original, unopened containers, clearly labeled with manufacturer's name, brand name, and such identifying numbers as are appropriate. Materials shall be stored as required by the Manufacturer's specifications.

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1. All materials shall be stored flat, or in the case of rolls, standing on end, elevated from the ground or deck, and protected with approved waterproof covers to keep the materials dry and protected from sunlight and moisture, and ventilated to prevent excessive temperature.

2. Flammable materials shall be stored in a cool, dry area away from sparks and open flames.

3. Damaged or deteriorated materials shall not be used and shall be removed from the job site.

4. All cardboard containers shall be stored in dry areas or on pallets. Packing materials shall be collected so as not to blow around the site.

5. All materials shall be stored in temperatures specified by the manufacturer. Submit proposed storage arrangements regarding temperature to the Architect and the materials manufacturer for review.

6. All fire stopping shall be performed by each respective trade.

1.10 JOB CONDITIONS

A. Do not deliver to site or install any material or system that has not been approved. Materials installed without approval may be required to be removed and replaced at no additional cost to the Owner.

B. Materials which have a temperature other than the application temperature of the manufacturer shall not be applied.

C. All materials shall be installed according to manufacturer's specifications and shall be compatible with the existing materials used on site.

1.11 FIELD MEASUREMENTS

A. Before ordering any materials or performing any work, the Contractor or his/her subcontractors shall inspect all existing conditions and perform all measurements at the building. No extra charge or compensation will be allowed because of differences between the drawings and the actual dimensions. Any differences between the Project Manual and the actual conditions found shall be submitted to the Architect for his/her decision before proceeding with the work.

1.12 CONDITIONS, DIMENSIONS AND QUANTITIES

A. All conditions, dimensions and quantities shall be determined or verified by the Contractor. The Plans and details have been compiled from various sources and may not reflect the actual condition at the moment of construction. The Contractor is cautioned to take all precautions and make all investigations necessary to install the proposed work. The Owner will not consider unfamiliarity with the job conditions as a basis for additional compensation.

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1.13 CUTTING AND PATCHING

A. The work to be performed under this Contract shall include all cutting and patching necessary to accommodate new work.

1.14 PERMITS

A. All fees and procurement of building permits shall be the responsibility of the Contractor. Requests for inspections by the Building Inspector and the obtaining of required signatures by Inspection on permits, is the responsibility of the Contractor. Permit fees will **not** be waived.

1.15 DUMPING

A. The contractor shall submit an affidavit certifying legal and proper dumping and disposal (including locations) of all materials from the project.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

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DIVISION 01 GENERAL REQUIREMENTS

SECTION 01 30 00 SUBMITTALS

PART 1 - GENERAL

1.01 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 which 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 Contract.

D. It is the intent of the Specifications and the Drawings to require that all the material, labor, and equipment be provided complete in every respect, and that this Contractor shall provide all material, labor, and equipment needed and usually provided in connection with such systems to provide a complete installation including all demolition, disposal, and patching of adjacent surfaces. Materials, equipment, and articles incorporated into the work shall be new and of the best grade of their respective kinds.

E. Consult the individual sections of the specifications for the specific submittals required under those sections and for further details and descriptions of the requirements.

1.02 GENERAL PROCEDURES FOR SUBMITTALS

A. Timeliness - The Contractor shall transmit each submittal to the Designer sufficiently in advance of performing related Work or other applicable activities so that the installation is not delayed by processing times, including disapproval and resubmittal (if required), coordination with other submittals, testing, purchasing, fabrication, delivery, and similar sequenced activities. No extension of time will be authorized because of the Contractor's failure to transmit submittals to the Architect in advance of the Work.

B. Sequence - The Contractor shall transmit each submittal in a sequence which will not result in the Architect’s approval having to be later modified or rescinded by reason of subsequent submittals which should have been processed earlier or concurrently for coordination.

C. The Contractor's Review - Only submittals received from and bearing the stamp of approval of the Contractor will be considered for review by the Architect. Submittals shall be accompanied by a transmittal notice stating name of Project, date of submittal, "To", "From" (Contractor, Subcontractor, Installer, Manufacturer, Supplier), Specification Section, or Drawing No. to which the submittal refers, purpose (first submittal, resubmittal), description, remarks, distribution record, and signature of transmitter.

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D. Architect's Action - The Architect will review the Contractor's submittals and return them with one of the following actions recorded thereon by appropriate markings:

1. Final Unrestricted Release: Where marked "Approved" the Work covered by the submittal may proceed provided it complies with the requirements of the Contract Documents.

2. Final-But-Restricted Release: When marked "Approved as Noted" the Work may proceed provided it complies with the Architect's notations or corrections on the submittal and complies with the requirements of the Contract Documents. Acceptance of the Work will depend on these compliances.

3. Returned for Resubmittal: When marked "Revise and Resubmit" or "Disapproved" the Work covered by the submittal (such as purchasing, fabrication, delivery, or other activity) should not proceed. The submittal should be revised or a new submittal resubmitted without delay (no limit to number of resubmissions), in accordance with the Designer's notations stating the reasons for returning the submittal.

E. Processing - All costs for printing, preparing, packaging, submitting, resubmitting, and mailing, or delivering submittals required by this contract shall be included in the Contract Sum.

1.03 OR EQUALS

A. Definition - Whenever a specification section names one or more brands for a given item, and the Contractor wishes to submit, for consideration, another brand, the submission shall be considered an "or-equal" or a "material substitution". For the purposes of this Contract, the terms "or-equal" and "material substitution" shall be considered synonymous.

B. In no case may an item be provided on the Work other than the item named or described, unless the Architect, with the Owner's written concurrence, shall consider the item equal to the item so named or described, as provided by M.G.L. c.149.

C. The equality of items offered as "equal" to items named or described shall be proved to the satisfaction of the Architect, including all research and full documentation, at the expense of the Contractor submitting the substitution.

D. The Designer and/or the Owner may require that full size samples of both the specified and proposed products be submitted for review and evaluation. The Contractor shall bear full cost for providing, delivering, and disposal of all such samples.

E. The Contractor shall assume full responsibility for the performance of any item submitted as an "Or-Equal" and assume the costs of any changes in any Work which may be caused by such substitution.

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F. Or Equal Approval Process - On the transmittal or on a separate sheet attached to the submission, the Contractor shall direct attention to any deviations, including minor limitations and variations, from the Contract Documents.

1. The Contractor shall submit to the Architect for consideration of any or-equal substitution a written point-by-point comparison containing the name and full particulars of the proposed product and the product named or described in the Contract Documents.

2. Such submittal shall in no event be made later than ten (10) calendar days prior to the incorporation of the item into the Work. In any case in which the time period specified in the Contract Documents from the Notice to Proceed to Substantial Completion is less than 30 days, this requirement can be waived by the Architect.

3. Upon receipt of a written request for approval of an or-equal substitution, the Architect shall investigate whether the proposed item shall be considered equal to the item named or described in the Contract Documents. Upon conclusion of the investigation, the Architect shall promptly advise the Contractor that the item is, or is not, considered acceptable as on Or-Equal substitution. Such written notice must have the concurrence of the Owner.

1.04 SUBMISSION OF SHOP DRAWINGS

A. Shop Drawings shall be complete, giving all information necessary or requested in the individual section of the specifications. They shall also show all adjoining Work, other work affected, and details of connection thereto, including hardware, flashing, waterproofing, and all utilities.

B. Shop Drawings shall be for whole systems. Partial submissions will not be accepted.

C. The Architect reserves the right to review and approve shop drawings only after approval of related product data and samples.

D. Shop drawings shall be properly identified and contain the name of the project, name of the firm submitting the shop drawings, shop drawing number, date of shop drawings and revisions, Contractor's stamp of approval, and sufficient spaces near the title block for the Architect's stamp.

E. The Contractor shall submit to the Architect seven (7) black line prints of each shop drawing. Transparency and prints shall be mailed or delivered in roll form. Each submittal shall be accompanied by a transmittal notice.

F. When the transparency is returned by the Architect with the stamp "Revise and Resubmit" or "Disapproved", the Contractor shall correct the original drawing or prepare a new drawing and resubmit seven (7) prints thereof to the Architect for approval. This procedure shall be repeated until the Architect’s approval is obtained. No limit.

G. The Contractor shall maintain one full set of approved shop drawings at the site.

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H. Photo copies of the bid documents are not acceptable as shop drawings.

I. Provide shop drawings for every item to be installed or repaired in the entire project, whether or not indicated in the spec section.

1.05 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES (SUBMITTALS AND DISTRIBUTION)

A. The General Contractor, within ten (10) working days after the commencement of work shall prepare and submit for the Architect's approval a schedule of Shop Drawings, Product Data and Samples required to be submitted for the work. 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 the work, subject to Architect's approval. The schedule of Shop Drawings shall correspond to the Construction Schedule so that the submissions relate to the time when the products and/or systems will be required on the site. The Architect will not approve a Schedule which calls for out of sequence submittals.

B. General Contractor shall submit Shop Drawing, product data and samples accompanied by the General Contractor's Shop Drawing, Product Data and Sample Transmittals form.

C. Preparation of Submittal Form: Fill out transmittal form in the following manner using a typewriter or word processor, and retain one copy – General Contractor's first file:

1.	General Contr. Job No.	General Contractor's name and job number.
2.	Spec. Section	The Specification Section number where item is specified – do not submit items from more than one Specification Section on the same form.
3.	Submitted by	Name of General Contractor's employee responsible for the General Contractor's review.
4.	Project/No.	Project name and Architect's project number.
5.	Transmittal No.	Transmittal numbers shall be consecutive for the project.
6.	Date Submitted	Date leaving General Contractor's office.
7.	Subcontractor	Name of firm preparing original documents (shop drawings or sample).
8.	Submission No.	1st, 2nd, 3rd, etc. depending on previous submission for same item (see Resubmittal procedure).
9.	Spec. Sec. Para.	Specific paragraph number which item as Specified.

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10.	Copies & Type	Number of copies submitted and type of material submitted (sepia, print, brochure or sample, etc.).
11.	Contr.'s Remarks	Note exceptions or deviations from the Contract Documents and reasons for them.

D. Resubmissions: Resubmittal shall follow the same procedures as the initial submittal with the following exceptions:

1. Transmittal shall contain the same information as the first transmittal except that transmittal numbers shall run consecutively and the submission number shall indicate 2nd, 3rd, etc. submission. The drawing number/description shall be identical to the initial submission and the date shall be the revised date for that submission.

2. Unless otherwise approved by the A, no new material shall be included on the same transmittal for a resubmission.

3. Where Resubmittal has not been required by the Architect, but corrections have been noted on a shop drawing, seven (7) prints of the drawings after the noted corrections have been made shall be submitted to the Architect for record purposes but not for action. Shop Drawings reviewed by the Designer's Architects will have three prints returned.

E. Submittal Procedures by General Contractor for Approval

1. General: All submittals shall be made to Architect's office.

2. Shop Drawings: Seven (7) black line prints (maximum sheet size shall be 30 x 42.

F. Architect's Review Procedures:

1. The Architect's review, including Architect's review period will not exceed fourteen (14) calendar days from the established date of each submission indicated on the Schedule of Shop Drawings, Product Data, and Samples plus the additional time, if any, for distribution by the General Contractor and receipt of submissions by the Architect. The General Contractor is required to strictly adhere to the established Schedule dates.

2. The Architect will process the submission and indicate the appropriate action on the submission and the transmittal. Incomplete or erroneous transmittals will be returned without action.

3. The Architect will fill out transmittal in the following sequence:

a.	Date Received	Date arriving in the Architect's office.
b.	Date Return	Date leaving the Architect's office to the General Contractor.

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c.	To/Date	Name of architect to whom submission is sent for review and date leaving the Architect's office.
d.	From/Date	Name of architect reviewing submission and date arriving in the Architect's office.
e.	Action	Indicate action taken on submission.
f.	Distribution	Number of copies distributed and type of material distributed (sepia, print, brochure or samples, etc.).
g.	Architect's Remarks	Note major deviations from the Contract Documents.

4. The Architect will return two (2) of Shop Drawings, one Sample or two brochures with copies of transmittal forms to the General Contractor.

5. The Architect will keep a copy and send one copy to the Owner.

1.06 SUBMISSION OF PRODUCT DATA

A. The Contractor shall submit seven (7) copies of Product Data to the Architect. All such data shall be specific and identification of material or equipment submitted shall be clearly marked in ink. Data of general nature will not be accepted.

B. Product Data shall be accompanied by a transmittal notice. The Contractor's stamp of approval shall appear on the printed information itself, in a location which will not impair legibility.

C. Product Data returned by the Designer as "Disapproved" shall be resubmitted in seven (7) days until the Architect's approval is obtained.

D. When the Product Data are acceptable, the Architect will stamp them "Approved" or "Approved as Corrected", distribute to the team 3 copies, and return two (2) copies to the Contractor. The Contractor shall provide and distribute additional copies as may be required to complete the Work.

E. The Contractor shall maintain one full set of approved, original, Product Data at the site.

F. Provide product data for all items to be installed whether or not noted in the specification section.

1.07 SUBMISSION OF SAMPLES

A. Unless otherwise specified in the individual section, the Contractor shall submit three specimens of each sample.

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B. Samples shall be of adequate size to permit proper evaluation of materials. Where variations in color or in other characteristics are to be expected, samples shall show the maximum range of variation. Materials exceeding the variation of approved samples will not be approved on the Work.

C. Samples of items of interior finishes shall be submitted all at once to permit a coordinated selection of colors and finishes.

D. Samples which can be conveniently mailed shall be sent directly to the Designer, accompanied by a transmittal notice. All transmittals shall be stamped with the Contractor's approval stamp of the material submitted.

E. All other samples shall be delivered at the field office of the Project Representative with sample identification tag attached and properly filled in. Transmittal notice of samples so delivered with the Contractor's stamp of approval shall be mailed to the Architect.

F. If a sample is rejected by the Architect, a new sample shall be resubmitted in the manner specified hereinabove. This procedure shall be repeated until the sample is approved by the Architect.

G. Samples will not be returned unless return is requested at the time of submission. The right is reserved to require submission of samples whether or not particular mention is made in the specifications, at no additional cost to DCAM.

H. Samples shall not be installed as part of the work.

I. Provide color and finish samples of every item to be installed.

1.08 CONSTRUCTION SCHEDULE

A. The Proposed Construction Schedule shall be based on an orderly progression of the work, allowing adequate time for each operation, and leading to a reasonable certainty of Substantial Completion by the date established in the Agreement. The Proposed Construction Schedule will be reviewed by the Owner/Architect for compliance with the requirements of this Article and will be accepted or returned to the Contractor for revision and resubmittal. Unless specifically required by law, no payment under this Contract shall be due until the Proposed Construction Schedule has been approved by the Owner/Architect.

B. The Proposed Construction Schedule in **critical path method form** which shall include the following with such other details as Owner/Architect may require:

1. Indicate complete sequence of construction by activity, with dates for beginning and completion of each element and stage of construction.

2. Identify each item by major Specification Section number.

3. Submittal and Approval Dates for all Shop Drawings and Samples.

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4. A chart showing Critical Delivery Dates for Material and Equipment to be incorporated into the Work.

5. Provide sub-schedules to define critical portions of entire Schedule.

6. Coordinate content with Schedule of Values and provide the cost of each activity as identified in the Construction Schedule.

B. During the progress of the Work, any changes in the original schedule desired by the General Contractor which affect Contract completion dates shall be approved by the Owner before being put into effect.

C. When changes in the Work are required, the original Proposed Construction Schedule shall be revised without delay to incorporate such changes or new work and indicate the effect hereof on the Project as a whole.

D. Provide updated critical path method (CPM) chart each month. Submit chart for review with Contractor's Application for Payment.

1.09 SCHEDULE OF VALUES

A. Prior to the first request for payment, the General Contractor shall submit to the Architect and Owner, a Schedule of Values of the various portions of the work in sufficient detail to reflect various major components of each trade, including quantities when requested, aggregating the total contract sum, and divided so as to facilitate payments for work under each Section in accordance with Article VII of the Contract Form. The Schedule shall be prepared in such form as specified or as the Architect or Owner may approve, and it shall include data to substantial its accuracy. Each item in the Schedule of Values shall include its proper share of overhead and profit in this schedule, including breakdown of values, requires the approval of the Architect and Owner and shall be used only as a basis for the Contractor's request for payment.

1.10 MANUFACTURER'S INSTRUCTIONS

A. Submit manufacturer's printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, in quantities specified for all products.

1.11 CERTIFICATES OF COMPLIANCE

A. Submit certificates of compliance together with the associated Shop Drawings, Product Data and Samples required for the Product.

B. Submit on 8-1/2 in. x 11 in. white paper.

C. Submit one (1) copy.

D. The Architect will retain the certificates of compliance; no approval reply is intended.

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1.12 PATTERNS AND COLORS

A. Submit accurate color charts and pattern charts to the Architect for his/her review and selection whenever a choice of color or pattern is available in a specified product, unless the exact color and pattern of a product are indicated in the Contract Documents. Submit actual cured samples of all materials for color approval.

1.13 RECORD DRAWINGS

A. At the completion of the project, the Contractor shall prepare a complete set of reproducible record drawings and AutoCAD Files, latest version on compact discs showing all systems as actually installed, and PDF files submitted on a CD.

1.14 SUBMITTAL TRANSMITTAL FORM

A. All submittals shall be presented with the submittal transmittal form attached, completely filled out. Submittals without the attached form will be returned without review.

END OF SECTION

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DIVISION 01 GENERAL REQUIREMENTS

SECTION 01 40 00 QUALITY CONTROL

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

A. Include the General Conditions, Modifications to the General Conditions, and applicable parts of Division 01 as part of this Section.

B. Examine all other Sections of the Specifications for requirements which 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 Contract.

D. It is the intent of the Specifications and the Drawings to require that the equipment to be furnished complete in every respect, and that this Contractor shall provide all equipment needed and usually furnished in connection with such systems to provide a complete installation. Equipment, materials, and articles incorporated in the work shall be new and of the best grade of their respective kinds.

1.02 PULL-OUT TESTS

A. The Contractor shall perform pull-out tests to determine the length and type of fastener required to provide adequate withdrawal resistance from every substrate.

B. A minimum of two pull out tests shall be performed per section to be fastened. More tests shall be performed if required by the structural engineer or the material manufacturer.

C. Submit a report from the fastener supplier and the product manufacturer describing the pull out tests, the recommend fasteners, and that they are covered under the warranty.

1.03 INSPECTION AND TESTING

A. An independent inspector and/or testing laboratory may be engaged and paid for by the Owner to perform the inspection and testing of the new work.

B. The Contractor shall cooperate with the inspector and/or testing laboratory, furnish materials and labor as may be required and provide for convenient access to all parts of the work for purposes of inspection and testing.

C. The Contractor shall accept as final the results of all such inspection and testing.

D. The inspector shall have the authority to delay the commencement of work, or to stop the work at any time, for any reason which he deems necessary.

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E. The inspector and/or testing laboratory reserves the right to require the Contractor to perform removal of materials installed by the Contractor. Make all cuts in accordance with the recognized standard practices. Remove materials only in the presence of the inspector.

1. Immediately after removing each material sample identify each by number and exact location by gummed label attached to a smooth surface of the cut sample.

2. Submit the cut samples directly to the inspector after applying identification.

3. Replace the cut with new materials, matching those removed, immediately after each removal, and insure that the replacement is completely watertight.

F. The removal cuts shall be subjected to various tests, including moisture content, density, thickness, compressive strength, composition, conformance with ASTM specifications where applicable, conformance with the recommendations of the manufacturers whose materials were used.

G. Bear all costs for tests where materials or systems have been found unacceptable and all costs for replacement required due to such unacceptability.

H. If any replacement work is required, such work will also be subject to the terms of this SPECIFICATION.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

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DIVISION 01 GENERAL REQUIREMENTS

SECTION 01 42 16 DEFINITIONS & STANDARDS

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

A. Include the General Conditions, Modifications to the General Conditions, and applicable parts of Division 01 as part of this Section.

B. Examine all other Sections of the Specifications for requirements which 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 Contract.

D. It is the intent of the Specifications and the Drawings to require that the equipment to be furnished complete in every respect, and that this Contractor shall provide all equipment needed and usually furnished in connection with such systems to provide a complete installation. Equipment, materials, and articles incorporated in the work shall be new and of the best grade of their respective kinds.

1.02 DELIVERY AND STORAGE

A. Materials shall be delivered dry, in their original, unopened containers, clearly labeled with manufacturer's name, brand name, and such identifying numbers as are appropriate. Materials shall be stored as required by the Manufacturer's specifications.

1. All materials shall be stored flat, or in the case of rolls, standing on end, elevated from the ground or deck, and protected with approved waterproof covers to keep the materials dry and protected from sunlight and moisture, and ventilated to prevent excessive temperature.

2. Flammable materials shall be stored in a cool, dry area away from sparks and open flames.

3. Damaged or deteriorated materials shall not be used and shall be removed from the job site.

4. All cardboard containers shall be stored in dry areas or on pallets. Packing materials shall be collected so as not to blow around the site.

5. All materials shall be stored in temperatures specified by the manufacturer. Submit proposed storage arrangements regarding temperature to the Architect and the materials manufacturer for review.

6. All firestopping shall be performed by each respective trade. All File Sub-Bidders shall firestop their own work.

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1.03 JOB CONDITIONS

A. Do not deliver to site or install any material or system that has not been approved. Materials installed without approval may be required to be removed and replaced at no additional cost to the owner.

B. Materials which have a temperature other than the application temperature of the manufacturer shall not be applied.

C. All materials shall be installed according to manufacturer's specifications and shall be compatible with the existing materials used on site.

D. Remove only as much existing roofing as can be replaced and made weathertight each day, including all flashing work.

E. All surfaces to receive the new materials shall be thoroughly dry. Should surface moisture such as dew exist, the Contractor shall provide the necessary equipment to dry the surface prior to application.

1.04 CONDITIONS, DIMENSIONS AND QUANTITIES

A. All conditions, dimensions and quantities shall be determined or verified by the Contractor. The Plans and details have been compiled from various sources and may not reflect the actual condition at the moment of construction. The Contractor is cautioned to take all precautions and make all investigations necessary to install the proposed work. The Owner will not consider unfamiliarity with the job conditions as a basis for additional compensation.

1.05 DEFINITION OF "ARCHITECT"

A. Any reference to "Architect, "Engineer" or "Designer" in this Project Manual, Specification or on the drawings shall refer to CBI Consulting LLC, 250 Dorchester Avenue., Boston, Massachusetts 02127, (617) 268-8977, Steven Watchorn, Project Manager.

1.06 DEFINITION OF "OWNER"

A. Any reference to the Owner shall be Town of Barnstable. Contact shall be Mark Marinaccio, Project Architect.

1.07 MINIMUM REQUIREMENTS

A. It is the intent of these contract documents to, in some cases, exceed the minimum requirements of the manufacturer. The new work shall be bid and installed as detailed.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

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DIVISION 01 GENERAL REQUIREMENTS

SECTION 01 50 00 TEMPORARY FACILITIES

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

A. Include the General Conditions, Modifications to the General Conditions, and applicable parts of Division 01 as part of this Section.

B. Examine all other Sections of the Specifications for requirements which 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 Contract.

D. It is the intent of the Specifications and the Drawings to require that the equipment to be furnished complete in every respect, and that this Contractor shall provide all equipment needed and usually furnished in connection with such systems to provide a complete installation. Equipment, materials, and articles incorporated in the work shall be new and of the best grade of their respective kinds.

1.02 GENERAL

A. The Contractor shall be responsible for providing and maintaining all temporary facilities until Substantial Completion. Removal of such prior to Substantial Completion must be with the concurrence of the Architect. The Contractor bears full responsibility for reproviding any facility removed prior to Substantial Completion

B. Removal of all temporary facilities shall be a condition precedent to Substantial Completion unless directed otherwise by the Architect or specifically noted in the specifications.

C. The Contractor must comply with all safety laws and regulations of the Commonwealth of Massachusetts, the United States Government, and local government agencies applicable to Work under this contract. The Contractor's attention is directed to the Commonwealth of Massachusetts, Department of Labor and Industries Regulation 454 CMR.

D. Safety is the sole responsibility of the contractor on the job site. Contractor is notified that the building will be occupied during construction. The Architect does not have control of the job site in any way.

1.03 UTILITIES

A. The contractor will be able to use without charge, electrical power and water. It is the responsibility of the Contractor to make provisions to extend the utility from the nearest service outlet designated by the Owner to the point of use. Any misuse will be cause for

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discontinuance of the utility whereupon the Contractor shall provide the service at his/her own expense. Electrical energy shall not be used for temporary heating purposes. Do not include any cost for use of electric power or water that may be supplied by the Owner in the Basic Construction Proposal.

1. Where heavy duty electric equipment drawing current in excess of fifteen (15) amperes is involved, the Contractor shall provide temporary service to supply the power.

2. The temporary electric service shall include, but not be limited to labor, materials, and equipment necessary to supply temporary power of adequate capacity for the project.

3. Transformers and meters, when required by the power company, will be furnished by the power company and the contractor shall pay the costs thereof.

B. Temporary electrical Work shall be performed under the direct supervision of at least one master electrician, who will be present on the project at all times when such work is being performed.

C. The Contractor shall furnish, install, and maintain lamps in operating condition. The Contractor, and each Subcontractor, shall furnish their own extension cords and additional lamps as may be required for their work. Temporary work of a special nature, not otherwise specified hereunder, shall be provided, maintained, and paid for the trade requiring same.

D. All lamps installed in permanent lighting fixtures and used as temporary lights during the construction period shall be removed and replaced shortly before Substantial Completion by the set of lamps required to be provided under the Electrical section of the specifications.

E. All temporary work shall be provided in conformity with the National Electric Code, State laws, and requirements of the power company. Particular attention is called to Commonwealth of Massachusetts, Department of Labor and Industries Regulation, 454 CMR.

1.04 SANITARY FACILITIES

A. The Contractor shall NOT have use of sanitary toilet facilities within the building and must provide portable sanitary toilets for the use of their forces for the entire duration of the work. Toilets shall be cleaned and emptied twice weekly (minimum) and as directed by the Owner.

B. Portable, temporary toilets shall be provided by the Contractor and shall be located as directed by the Owner.

C. The Contractor:

1. Assumes full responsibility for the use of the temporary toilets

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2. Pays all costs for operation, maintenance and cleaning.

1.05 TEMPORARY STRUCTURES AND MATERIAL HANDLING

A. The Contractor shall provide such secure storage sheds, temporary buildings, or trailers as required for the performance of the Contract.

B. Materials shall be handled, stored, installed, cleaned, and protected in accordance with the best practice in the industry and, except where otherwise specified in the Contract Documents, in accordance with manufacturer's specifications and directions.

C. The Contractor must obtain the permission of the Owner for the placement of any storage facilities on site, and the Owner assumes no responsibility for articles stored.

1.06 TEMPORARY STAGING, STAIRS, CHUTES

A. Except as otherwise specified, the Contractor shall furnish, install, maintain in safe condition, and remove all scaffolds, staging, and planking over 8 ft. in height, required for the use of all trades for proper execution of the Work, except as noted.

B. The Contractor shall furnish, install, maintain in safe condition, and remove all temporary ramps, stairs, ladders, and similar items as required for the use of all trades for the proper execution of the Work.

C. The Contractor shall furnish, install, maintain, and remove covered chutes from the work area. Such shall be in convenient locations and permit disposal of rubbish directly into trucks or disposal units.

D. Debris shall not be allowed to fall freely from upper levels of the building. Materials shall not be thrown or dropped from open windows or the roof.

E. The General Bidder is responsible for erecting and maintaining, in safe condition, all scaffolding or staging required on the job, as well as all hoisting, to perform all the work in their scope, for the use of all Sub-Contractors, and for use by the Architect who will need to review the work or mark or verify quantities on the project. Any scaffolding shall include a protective screen securely attached to the scaffold for the entire height of the scaffold.

F. Provide any and all additional protection required to keep the building from being damaged by the staging, hoisting, or any construction work. Protect parapets and roof edges with plywood at all swing staging. Protect landscaping from mechanical lifts, scaffolding, and all construction activities.

1.07 HOISTING FACILITIES

A. Except as otherwise specified, the Contractor shall provide, operate, and remove material hoists, cranes, and other hoisting as required for the performance of the Work by all trades. All such hoisting service shall be without cost to the Subcontractors and Sub-Bidders.

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1.08 WEATHER PROTECTION

A. The Contractor shall provide temporary enclosures and heat to permit work to be carried on during the months of November through March in compliance with MGL c.149 §44G (d). Without limitation this includes such items as excavation, pile driving, steel erection, erection of certain exterior wall panels, masonry, sealants, waterproofing, sheet metal work, roofing, and similar operations.

B. "Weather Protection" means 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 Owner and consistent with the construction schedule to permit the continuous progress of all Work necessary to maintain an orderly and efficient sequence of construction operations. The Contractor shall furnish and install "Weather Protection" material and be responsible for all costs, including heating required to maintain a minimum of 40 degrees F. at the working surface. This provision does not supersede any specific requirements for methods of construction, curing of materials, or the applicable conditions set forth in the Contract Documents with added regard to performance obligations of the Contractor.

C. Within thirty (30) calendar days after award of the Contract, the Contractor shall submit in writing, to the Architect for approval, three (3) copies of the proposed methods for "Weather Protection".

D. The Contractor shall assume the entire responsibility for weather protection during construction (until Substantial Completion), and shall be liable for any damage to any Work caused by failure to supply proper weather protection and proper ventilation.

E. Work damaged by frost shall be removed and replaced by and at the Contractor's expense and as directed by the Architect.

F. It is to be specifically understood that the Contractor shall do no work under any conditions deemed unsuitable by the Contractor to the execution of the Work. This provision shall not constitute any waiver, release, or lessening of the Contractor's obligation to bring the Work to Substantial Completion within the period of time set forth in the Contract Documents.

1.09 PROTECTION

A. Weather protection shall be provided for; weather conditions occurring or anticipated, the extent of the existing structure exposed, or any other possible hazard.

B. Dust control, pedestrian protection, and traffic control measures shall be provided during the course of the work.

C. Schedule and execute all work without exposing the sensitive building areas to the effects of inclement weather. Protect the existing structure and its contents against all risks, and repair or replace all damage to the Owner's satisfaction. Protect all exterior building surfaces, roofing, lighting, landscape areas, and pavement from damage.

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D. All new and temporary construction, including equipment and accessories, shall be secured from wind damage or blow-off.

E. The Contractor shall provide all necessary temporary protection and barriers to segregate the work area and to prevent damage to adjacent areas. Also provide plywood protection for roofing adjacent to construction. Areas damaged because of inadequate protection will be repaired at no additional cost to the owner, as per these specifications and the recommendations of the Architect.

F. Provide temporary barricades and other forms of protection as required to protect Owner's personnel, students, and general public from injury due to the work.

G. Any deteriorated substrate which is discovered shall be promptly reported to the Architect.

H. Safety on the job site is the sole responsibility of the contractor. The Contractor shall ensure that all Local, State, Federal, OSHA or other applicable safety requirements are strictly accorded to. All OSHA safety requirements regarding items such as scaffolding, temporary protections, lift trucks, cranes, removal of debris, dust control, cleaning solvents, and high pressure water washing, sandblasting and equipment shall be ensured by the Contractor.

1.10 DEBRIS

A. The Contractor will be responsible for the removal of all construction debris from the job site.

B. Upon completion of each day and each phase of the work the Contractor shall leave the premises free of all debris and waste, in broom-clean condition. Overnight storage of material on site will be as approved by the Owner. The Contractor shall be responsible for keeping the site free of rubbish and debris, and in a neat and orderly condition at all times. The Contractor shall clean up and remove all accumulated rubbish and debris daily.

C. The Owner's representative shall inspect the site daily. If it is determined that the site has not been cleaned of construction debris on a particular day the Contractor may be assessed $100.00 for that day to be used to have the site cleaned by in house personnel. This shall be prepared by the Architect as a deduct change order to the contract.

D. Debris resulting from the new work shall be placed in covered containers provided by the Contractor and legally disposed of. Burning will not be permitted on site. Dumpster locations shall be approved by the Owner.

1.11 TEMPORARY NOISE AND POLLUTION CONTROL

A. All work performed under the Contract shall conform to the requirements of Chapter 111, Sections 31C and 142D of the General Laws, Commonwealth of Massachusetts and Department of Public Health.

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1.12 CONSTRUCTION PARKING CONTROL

A. The Contractor shall control trucks and worker's vehicles to prevent unnecessary congestion in the neighborhood of the project. See Site Plan for allowable on site parking area.

B. The schedule and location of all deliveries of materials must be coordinated and approved by the Owner.

C. All on-site parking will be at the direction of the Owner.

1.13 TEMPORARY SITE STORAGE

A. The Owner shall designate an area for temporary site storage on the site. All materials shall be stored in locked storage trailers or container boxes.

B. Storage of materials will not be permitted within any building in the scope of work.

1.14 TEMPORARY CONSTRUCTION FENCE

A. The Contractor shall be responsible for providing and maintaining temporary fencing and barricades around the construction as may be necessary to assure the safety of all persons authorized or unauthorized. Such protective measures shall also be located and constructed as required by local, state, and federal ordinances, laws, codes, or regulations.

1.15 FIELD OFFICES AND SHEDS

A. The Owner will provide a space within the buildings for use by the Contractor as an office.

B. Weekly job meetings shall be held at the job site.

D. The following furniture and equipment shall be provided in good condition. The furniture and equipment shall remain the property of the Contractor after Substantial completion of the Work.

1. One desk and four chairs.

2. One coat rack and 12 wall coat hooks.

3. One plan rack and shelves for samples.

4. One 4-drawer metal file cabinet with lock and key.

5. One laptop computer for the exclusive use of the Owner’s Representative with the following specs:

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PROCESSOR	Intel® Core™ i5-2430M processor (2.40GHz, 3M cache,with Turbo BoostTechnology 2.0))
OPERATING SYSTEM	Genuine Windows® 7 Professional,w XP Mode, No Media, 64-bit, English
PRODUCTIVITY SOFTWARE	Microsoft™ Office® Basic 2007
WARRANTY & SERVICE	1 Year Basic Limited Warranty and 1 Year NBD On-Site Service
LCD PANEL	15.6" HD (1366x768) Anti-Glare LED-backlit
MEMORY	8.0GB, DDR3-1333MHz SDRAM, 2 DIMMS
OPTICAL DRIVE	8X DVD+/-RW with double-layer DVD+/-R write capability, with Roxio Creator
VIDEO CARD	Intel® HD Graphics 3000
HARD DRIVE	320GB 7200RPM SATA Hard Drive
WI-FI WIRELESS CARD	Dell Wireless™ 1530 802.11a/g/n Draft Mini Card
WEBCAM	Light Sensitive Webcam and Noise Cancelling Digital Array Mic
BATTERIES	6-cell Lithium Ion Primary Battery
TOP SELLING SOFTWARE	Trend Micro Titanium Internet Security, 15 Month
DELL PRINTER	Dell 1135n Multifunction Laser Printer
SERVICE & SUPPORT	1 Year Basic Limited Warranty and 1 Year Advanced Exchange
DELL V305 ALL IN ONE PRINTER	Dell 1135n Laser Printer
ADOBE SOFTWARE	Adobe® Reader
SECURITY	Trend Micro Titanium Internet Security, 15 Month
ON-SITE SYSTEM SET-UP	Onsite System Setup
DELL DATASAFE™ ONLINE BACKUP	Online Data Back Up
SOUND OPTION	High Definition Audio 2.0
Customized Pictaflex LCD Back	No Customization LCD Option
Processor Branding	Intel Core i5 Duo Label

6. One accurate outside mercury thermometer

7. Two wall calendars

8. One Conference table, 4' x 10', with benches both sides

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9. One facsimile machine with copying capability and a dedicated phone line for the FAX machine

10. One 12.1 megapixel digital camera with software and 8GB memory card. Contractor shall supply all batteries needed.

11. Two 4’ x 8’ white marker boards, with two (2) boxes of assorted dry erase markers.

E. The equipment, and furnishings shall be maintained by the **Contractor** in a clean and orderly condition, and be removed upon receipt of written direction of the **Owner’s Representative**.

F. Provide wireless internet service in the office.

1.16 TELEPHONES

A. No telephone service will be provided by the Owner.

B. A site telephone shall be provided by the Contractor and may be a cellular type for each site under construction. All telephone numbers shall be available to the project team. Provide pager for the project superintendent at the job site.

C. Provide twenty-four (24) hour emergency phone numbers for the Contractor’s Project Manager and Superintendent.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

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DIVISION 01 GENERAL REQUIREMENTS

SECTION 01 51 00 PROTECTION

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

A. Include the General Conditions, Modifications to the General Conditions, and applicable parts of Division 01 as part of this Section.

B. Examine all other Sections of the Specifications for requirements which 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 Contract.

D. It is the intent of the Specifications and the Drawings to require that all the material, labor, and equipment be furnished complete in every respect, and that this Contractor shall provide all material, labor, and equipment needed and usually furnished in connection with such systems to provide a complete installation including all demolition, disposal, and patching of adjacent surfaces. Materials, equipment, and articles incorporated in the work shall be new and of the best grade of their respective kinds.

1.02 PROTECTION OF PERSONS & PROPERTIES

A. The site will be occupied during construction. The contractor shall have complete control of the job site. The Contractor shall take all necessary precautions to ensure the public safety and convenience of visitors during construction. Safety is the sole responsibility of the contractor, regardless of what is set forth in this document. The architect does not have control of the job site, or means and methods, in any way.

B. Any damage to buildings, roads, (public and private), concrete walks, bituminous concrete areas, fences, rails, lawn areas, trees, shrubbery, poles, underground utilities, etc. shall be made good by and at the Contractor's own expense, all to the satisfaction of the Owner.

C. The Contractor shall patch, repair and/or replace all adjacent materials and surfaces damaged after the installation of new work to the complete satisfaction and at no expense to the Owner. All repair and replacement work shall match the existing in kind and appearance.

1.03 TEMPORARY PROTECTION

A. The Contractor shall:

1. Protect excavations, trenches, buildings, and materials at all times from rain water, ground water, backing-up, or leakage of sewers, drains, or other piping, or from water damage of any origin. Provide all pumps, piping, coverings, and other

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materials and equipment as required by job conditions to accomplish this requirement.

2. In addition to the weather protection during the months of November to March specified elsewhere, provide temporary watertight enclosures for openings in exterior walls and in roof decks when and as required to protect the Work from damage by inclement weather. Temporary enclosures shall be provided with adequate means of ventilation to prevent accumulation of moisture in the buildings.

3. Provide temporary wood doors for exterior entrances and elsewhere when required. Permanent door enclosures shall not be used as temporary enclosures.

4. Protect sills, jambs, and heads of openings through which materials are handled.

5. Protect decks and slabs to receive work by other trades from any soiling which will prevent proper adhesion of subsequent Work. Decks and slabs shall be left clean and free of blemishes at the time other trades begin the application of their work.

6. Protect concrete slabs to remain exposed and finished floors against mechanical damage, plaster droppings, oil, grease, paint, or other material which will stain the floor finish. Install and maintain adequate strips of building paper or other protection on finished floors in rooms where future Work will be done by other trades.

7. Protect all surfaces to receive work by other trades from any soiling which will prevent proper execution of subsequent work

8. Protect other areas, furniture, and private property of the resident and the Owner. Any areas damaged by the Contractor shall be restored to the original condition or compensated at the Contractor's expense.

B. Roof surfaces and waterproofed surfaces shall not be subjected to traffic nor shall they be used for storage of materials. Where some activity must take place in order to carry out the Work, adequate protection must be provided.

C. After the installation of the Work by any Subcontractor is completed, the Contractor shall be responsible for its protection and for repairing, replacing, or cleaning any such Work which has been damaged by other trades or by any other cause, so that all Work is in first class condition at the time of Substantial Completion.

1.04 ACCESS

A. The Contractor shall, at all times, leave an unobstructed way along walks and roadways, and shall maintain barriers and lights for the protection of all persons and property in all locations where materials are stored or work is in progress.

1.05 SECURITY

A. The Contractor shall be responsible for providing all security precautions necessary to protect the Contractor's and Owner's interests.

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B. Where excavation is involved, the Contractor shall be responsible for providing continuous watchmen service as necessary, to insure adequate protection of the general public.

1.06 NOISE AND DUST CONTROL

A. The Contractor shall take special measures to protect the residents, neighbors, and general public from noise, dust, and other disturbances by:

1. Keeping common pedestrian and vehicular circulation areas clean and unobstructed;

2. Insulating work area from occupied portions as far as possible; and

3. Sealing dust and fumes from contaminating occupied spaces.

1.07 FIRE PROTECTION

A. The Contractor shall take necessary precautions to insure against fire during construction. The Contractor shall be responsible to insure that the area within contract limits is kept orderly and clean and that combustible rubbish and construction debris is promptly removed from the site.

B. Installation of equipment suitable for fire protection shall be done as soon as possible after commencement of the Work. The Contractor's attention is directed to the requirements of the Commonwealth of Massachusetts, Department of Labor and Workforce Development Regulation 454 CMR.

1.08 WIND PROTECTION

A. Should high wind warnings be issued by the U.S. Weather Bureau, the Contractor shall take every precaution to minimize danger to persons, to the Work, and to the adjacent property.

1.09 WEATHER PROTECTION

A. The Contractor shall provide Weather Protection as required by Specification Section 01 50 00 Temporary Facilities and any other specific requirements of the Contract Documents.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

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DIVISION 01 GENERAL REQUIREMENTS

SECTION 01 52 00 CLEANING UP

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

A. Include the General Conditions, Modifications to the General Conditions, and applicable parts of Division 01 as part of this Section.

B. Examine all other Sections of the Specifications for requirements which 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 Contract.

D. It is the intent of the Specifications and the Drawings to require that all the material, labor, and equipment be furnished complete in every respect, and that this Contractor shall provide all material, labor, and equipment needed and usually furnished in connection with such systems to provide a complete installation including all demolition, disposal, and patching of adjacent surfaces. Materials, equipment, and articles incorporated in the work shall be new and of the best grade of their respective kinds.

E. This section supplements the General Conditions.

F. Consult the individual sections of the specifications for cleaning of Work installed under those sections.

1.02 CLEANING DURING CONSTRUCTION

A. Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.

1. Do not burn or bury rubbish and waste materials on the site.

2. Do not dispose of volatile wastes such as mineral spirits, oil, or paint thinner in storm or sanitary drains.

3. Do not dispose of wastes into streams or waterways.

B. Wet down dry materials and rubbish to lay dust and prevent blowing dust.

C. Do not allow materials and rubbish to drop free or be thrown from upper floors, but remove by use of a material hoist or rubbish chutes.

D. Maintain the Site free from accumulations of waste, debris, and rubbish.

E. Provide on-site containers for collection of waste materials and rubbish.

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F. At the end of each day, remove and legally dispose waste materials and rubbish from site.

G. Disposal of materials shall be in compliance with all applicable laws, ordinances, codes, and by-laws.

1.03 FINAL CLEANING

A. Prior to submitting a request to the Architect to certify Substantial Completion of the Work, the Contractor shall inspect all interior and exterior spaces and verify that all waste materials, rubbish, tools, equipment, machinery, and surplus materials have been removed, and that all sight-exposed surfaces are clean. Leave the Project clean and ready for occupancy.

B. Unless otherwise specified under other sections of the Specifications, the Contractor shall perform final cleaning operations as herein specified prior to final inspection.

C. Cleaning shall include all surfaces, interior and exterior, which the Contractor has had access to, whether new or existing.

D. Employ experienced workmen or professional cleaners for final cleaning.

E. Use only cleaning materials recommended by the manufacturer of the surface to be cleaned.

F. Use cleaning materials which will not create a hazard to health or property and which will not damage surfaces.

G. All broken or defective glass caused by the Contractor's Work shall be replaced at the expense of the Contractor.

H. Remove grease, mastic, adhesive, dust, dirt, stains, labels, fingerprints, and other foreign materials from sight-exposed interior and exterior surfaces. This includes cleaning of the Work of all finishing trades where needed, whether or not cleaning by such trades is included in their respective specifications.

I. Clean and polish all new and existing glass and plastic glazing (if any) throughout the building(s), on both sides. Clean plastic glazing in accordance with the manufacturer's directions. This cleaning shall be completed by qualified window cleaners at the expense of the Contractor just prior to acceptance of the Work.

J. Repair, patch, and touch up marred surfaces to the specified finish, to match adjacent surfaces.

K. Polish glossy surfaces to a clear shine.

L. Leave all architectural metals, hardware, and fixtures in undamaged, polished conditions.

M. Leave pipe and duct spaces, plenums, furred spaces and the like clean of debris and decayable materials.

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N. In cleaning items with manufacturer's finish or items previously finished by a Subcontractor, care shall be taken not to damage such manufacturer's or Subcontractor's finish. In cleaning glass and finish surfaces, care shall be taken not to use detergents or other cleaning agents which may stain adjoining finish surfaces. Any damage to finishes caused by cleaning operations shall be repaired at the Contractor's expense.

O. Broom clean exposed concrete surfaces and paved surfaces. Rake clean other surfaces of grounds.

P. Ventilating systems - Replace filters and clean ducts, blowers, and coils if units were operated during construction.

Q. Owner's responsibility for cleaning commences at Substantial Completion.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

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DIVISION 01 GENERAL REQUIREMENTS

SECTION 01 70 00 PROJECT CLOSEOUT

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

A. Include the General Conditions, Modifications to the General Conditions, and applicable parts of Division 01 as part of this Section.

B. Examine all other Sections of the Specifications for requirements which 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 Contract.

D. It is the intent of the Specifications and the Drawings to require that the equipment to be furnished be complete in every respect, and that this Contractor shall provide all equipment needed and usually furnished in connection with such systems to provide a complete installation. Equipment, materials, and articles incorporated in the work shall be new and of the best grade of their respective kinds.

1.02 COMPLETION OF WORK

A. The site shall be cleaned of all debris resulting from the work and areas damaged during the course of the work restored to the satisfaction of the architect and the Owner.

B. The Contractor shall notify the Architect and Owner that the work is completed and Project Manual requirements have been met. The Architect shall review the completed work with the Contractor within seven (7) calendar days of notification. Any deficiencies observed at the time will be conveyed directly to the Contractor with a written confirmation, after which the Contractor shall correct the stated deficiencies to the satisfaction of the Architect within fourteen (14) calendar days prior to demobilization from the site.

C. After satisfactory completion of the above, the work shall be considered complete with notification by the Architect to the Owner.

D. The Contractor shall submit all lien waivers and warranties at this time of final payment.

E. All guarantees, as required in any Section of the Project Manual shall be submitted for approval prior to final payment.

F. Contractor shall maintain and record all changes to the plans throughout the entire project and shall submit as-built drawings of the entire project, in electronic AutoCAD and PDF format, prior to final payment. The Town and the Architect will provide existing AutoCAD base files for the sole purpose of the Contractor to generate the as-built drawings from.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

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DIVISION 01 GENERAL REQUIREMENTS

SECTION 01 72 00 SURVEYS AND RECORD DRAWINGS

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

A. Include the General Conditions, Modifications to the General Conditions, and applicable parts of Division 01 as part of this Section.

B. Examine all other Sections of the Specifications for requirements which 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 Contract.

D. It is the intent of the Specifications and the Drawings to require that all the material, labor, and equipment be furnished complete in every respect, and that this Contractor shall provide all material, labor, and equipment needed and usually furnished in connection with such systems to provide a complete installation including all demolition, disposal, and patching of adjacent surfaces. Materials, equipment, and articles incorporated in the work shall be new and of the best grade of their respective kinds.

1.01 RECORD DRAWINGS

A. Record Drawings shall consist of all the Contract Drawings.

B. From the sets of drawings furnished by the Owner, the Contractor shall reserve one set for record purposes. From this set, the Contractor shall detach and furnish, at no charge to the Subcontractors the drawings of their portion of the Work for the same purpose.

C. The Contractor and the above Subcontractors shall keep their marked up As Built set on the site at all times and note on it in colored ink or pencil, neatly and accurately, at the end of each working day, the exact location of their work as actually installed. This shall include the location and dimensions of underground and concealed Work, and any architectural, mechanical, or electrical variations from the Contract Drawings. All changes, including those issued by Addendum, Change Order, or instructions by the Architect shall be recorded. Marked up As Built drawings shall be prepared for the entire project and include all Work, including but not limited to:

1. The location of all underground utilities and appurtenances referenced to permanent surface improvements, both horizontally and vertically at ten (10) foot intervals and at all changes of direction.

2. The location of all internal utilities and appurtunces, concealed by finish materials, including but not limited to valves, coils, dampers, vents, cleanouts, strainers, pipes, junction boxes, turning vanes, variable and constant volume boxes, ducts, traps, and maintenance devices.

   a. The location of these, items shall be shown by offsets to structure and drawing grid lines.

   b. The tolerance for the actual location of these items on the marked up As Built Drawings shall be plus or minus two (2) inches.

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c. Each item shall be referenced by showing a tag number, areas served, and function on the marked up As Built drawing

D. The Architect may periodically inspect the marked up As Built drawings at the site. The proper and current maintenance of the information required on these drawings shall be a condition precedent to approval of the monthly applications for payment.

E. At Substantial Completion the Contractor shall submit the complete set of marked up As Built drawings in electronic AutoCAD and PDF format to the Architect. The Town and the Architect will provide existing AutoCAD base files for the sole purpose of the Contractor to generate the as-built drawings from. The Contractor shall check all marked up As-Builts prepared by subcontractors and certify in writing on the title sheet of the drawings that they are complete and correct, prior to submission to the Architect.

F. The Architect shall review the marked up As Built drawings and verify by letter to the Owner that the Work is complete. The Architect shall incorporate all changes onto original drawings.

G. The Contractor may make a written request for copies of the completed Record Drawings. The Contractor shall reimburse the Owner directly for the cost of printing of any requested Record Drawings.

H. Contractor shall maintain and record all changes to the plans throughout the entire project and shall submit as-built drawings of the entire project prior to final payment.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

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DIVISION 02 EXISTING CONDITIONS

SECTION 02 41 00 SELECTIVE DEMOLITION

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

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 which 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 Contract.

D. It is the intent of the Specifications and the Drawings to require that all the material, labor, and equipment be furnished complete in every respect, and that this Contractor shall provide all material, labor, and equipment needed and usually furnished in connection with such systems to provide a complete installation including all demolition, disposal, and patching of adjacent surfaces. Materials, equipment, and articles incorporated in the work shall be new and of the best grade of their respective kinds.

1.02 WORK TO BE PERFORMED

A. Provide all the Selective Demolition work required to complete the work of the contract including all the Selective Demolition work shown on the plans, listed in the specification, and needed to install a complete assembly in every way, with all reinforcing, pinning, and finishes. Coordinate the Selective Demolition work with all the other trades for the project. Provide all demolition and disposal work to complete the work. Patch to match all adjacent surfaces that are disturbed, left exposed, or unfinished. All work of the contract is related. It is the General Contractor's responsibility to review all the work of each section, each sub-contractor, and each file sub-bidder for the entire project so that all the work can be properly and completely performed.

B. Selective Demolition includes, but is not limited to:

1. General:
   a. Abatement and legal disposal of hazardous materials disturbed by the demolition activities. Refer to Sections 02 82 13 - for asbestos abatement and disposal requirements for identified asbestos-containing materials including presumed pcb materials.
   b. Remove and dispose of all exterior and interior sealants at the perimeter of all window, door and storefronts to be replaced.

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c. Contractor shall coordinate all of the work and verify all existing conditions.
d. The General Contractor shall be responsible for cutting and patching to accommodate their work, unless otherwise noted in this Section or elsewhere in the Contract.
e. The General Contractor shall be responsible for selective demolition and hoisting, including removal and disposal for their respective work, unless otherwise noted.
f. The General Contractor shall be responsible for all hazardous materials removal and legal disposal.

2. Alternate #2: Selective Demolition at Cafeteria Storefronts and Windows:
   a. Remove and dispose of existing windows, storefront, and glazing in its entirety, including all sealants, sills, and fillers.
   b. Carefully remove and dispose of existing brick and through-wall flashing at head of existing windows to be replaced.
3. Selective Demolition at Library Curtainwall
   a. Remove and dispose of existing curtainwall and glazing in its entirety, including all sealants, sills, and fillers.
   b. Carefully remove existing stone bench at Curtainwall B as shown on the drawings, and prepare for modification.
4. Selective Demolition at Library for Interior Partitions
   a. Carefully remove existing ceiling tiles and grid in area of new soffit to allow work above ceiling and prepare for modification of grid layout.
   b. Carefully remove existing ceiling tiles adjacent to existing soffits at head of new partitions to allow work above ceiling.
5. Selective Demolition at Library Interior Entrance
   a. Remove and dispose of existing doors and frame at interior library entrance.

1.03 SECTION INCLUDES

A. Selective demolition of building elements for alteration purposes.

1.04 REFERENCE STANDARDS

A. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2013.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Demolition Plan: Submit demolition plan as specified by OSHA and local authorities.

1. Indicate extent of demolition, removal sequence, bracing and shoring, and location and construction of barricades and fences.

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2. Identify demolition firm and submit qualifications.
3. Include a summary of safety procedures.

C. Project Record Documents: Accurately record actual locations of capped and active utilities.

1.06 QUALITY ASSURANCE

A. Demolition Firm Qualifications: Company specializing in the type of work required.

PART 2 PRODUCTS -- NOT USED

PART 3 EXECUTION

3.01 GENERAL PROCEDURES AND PROJECT CONDITIONS

A. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.
1. Obtain required permits.
2. Comply with applicable requirements of NFPA 241.
3. Use of explosives is not permitted.
4. Take precautions to prevent catastrophic or uncontrolled collapse of structures to be removed; do not allow worker or public access within range of potential collapse of unstable structures.
5. Provide, erect, and maintain temporary barriers and security devices.
6. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
7. Do not close or obstruct roadways or sidewalks without permit.
8. Conduct operations to minimize obstruction of public and private entrances and exits; do not obstruct required exits at any time; protect persons using entrances and exits from removal operations.
9. Obtain written permission from owners of adjacent properties when demolition equipment will traverse, infringe upon or limit access to their property.

B. Do not begin removal until receipt of notification to proceed from Owner.

C. Do not begin removal until built elements to be salvaged or relocated have been removed.

D. Protect existing structures and other elements that are not to be removed.
1. Provide bracing and shoring.
2. Prevent movement or settlement of adjacent structures.
3. Stop work immediately if adjacent structures appear to be in danger.

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E. Minimize production of dust due to demolition operations; do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.

F. If hazardous materials are discovered during removal operations, stop work and notify Architect and Owner; hazardous materials include regulated asbestos containing materials, lead, PCB's, and mercury.

G. Perform demolition in a manner that maximizes salvage and recycling of materials.

1. Dismantle existing construction and separate materials.
2. Set aside reusable, recyclable, and salvageable materials; store and deliver to collection point or point of reuse.

3.02 EXISTING UTILITIES

A. Protect existing utilities to remain from damage.

B. Do not close, shut off, or disrupt existing utility branches or take-offs that are in use without at least 3 days prior written notification to Owner.

C. Locate and mark utilities to remain; mark using highly visible tags or flags, with identification of utility type; protect from damage due to subsequent construction, using substantial barricades if necessary.

D. Remove exposed piping, valves, meters, equipment, supports, and foundations of disconnected and abandoned utilities.

E. Prepare building demolition areas by disconnecting and capping utilities outside the demolition zone; identify and mark utilities to be subsequently reconnected, in same manner as other utilities to remain.

3.03 SELECTIVE DEMOLITION FOR ALTERATIONS

A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.

1. Verify that construction and utility arrangements are as indicated.
2. Report discrepancies to Architect before disturbing existing installation.
3. Beginning of demolition work constitutes acceptance of existing conditions that would be apparent upon examination prior to starting demolition.

B. Maintain weatherproof exterior building enclosure except for interruptions required for replacement or modifications; take care to prevent water and humidity damage.

C. Provide temporary closures that are weathertight throughout all demolition and construction activities.

D. Remove existing work as indicated and as required to accomplish new work.

1. Remove items indicated on drawings.

E. Protect existing work to remain.

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1. Prevent movement of structure; provide shoring and bracing if necessary.
2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
3. Repair adjacent construction and finishes damaged during removal work.
4. Patch as specified for patching new work.

3.04 DEBRIS AND WASTE REMOVAL

A. Remove debris, junk, and trash from site.

B. Leave site in clean condition, ready for subsequent work.

C. Clean up spillage and wind-blown debris from public and private lands.

END OF SECTION

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DIVISION 02 EXISTING CONDITIONS

SECTION 02 82 13 ASBESTOS ABATEMENT

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. General Provisions of Contract, including General Supplementary Conditions shall apply to this Section.

B. Limited Hazardous Building Materials Inspection report prepared by Fuss & O'Neill EnviroScience, LLC November 20, 2014

C. Limited Hazardous Building Materials Inspection report prepared by Fuss & O'Neill EnviroScience, LLC January 3, 2018

D. Architectural Demolition Drawings

E. Section 028433 - Polychlorinated Biphenyl Performance-Based Disposal.

F. At a later time, a Non-Traditional Asbestos Abatement Work Practice (NTWP) Application may be prepared by a third-party, industrial hygiene firm and submitted to the Commonwealth of Massachusetts Department of Environmental Protection (MassDEP) for approval for work described herein.

1.02 SCOPE OF WORK

A. Work outlined in this Section includes all work necessary for the removal, packaging, transporting, and disposing of asbestos-containing materials (ACM) and asbestos-containing waste materials (ACWM) impacted during the Curtainwall, Storefront, and Window Replacement Project (the "Work") at Barnstable High School located at 774 West Main Street in Hyannis, Massachusetts (the "Site").

B. Work shall be performed by a MADLS-licensed Asbestos Abatement Contractor (the "Contractor") with certified Asbestos Workers and Supervisor(s). Training shall be in accordance with MADLS Regulation 453 CMR 6.00. In addition, workers shall have PCB-awareness training.

C. This scope of work includes all necessary selective demolition to access ACM scheduled for abatement.

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1.03 PROJECT DESCRIPTION

A. The Base Bid includes removal, packaging, transporting, and disposing ACM and ACWM, as identified herein, conducted by workers meeting the requirements of OSHA Title 29 CFR, Part 1926.1101 for Class I and II work. This shall include all necessary demolition to access ACM for abatement.

B. Materials, as discovered outside of those listed (either above or below), will be measured and paid or credited by unit prices to be negotiated prior to commencement of the Work. The quantities are estimates only and should be field-verified by the Contractor.

C. The following table summarizes the locations of the Base Bid work with estimated ACM quantities. Note quantities provided below are order-of-magnitude estimates only. Refer to the Demolition Drawings for specific locations.

BASE BID - ASBESTOS

MATERIAL TYPE	LOCATION	QUANTITY	NOTES
Window Sill Adhesive	Cafeteria	9 EA	1
Interior Window Caulking	Media Center	200 LF	1, 2, 3

EA = Each; LF = Linear Feet;

Notes:

1 Denotes whole-component window system removal as required for window replacement; this includes concealed caulking, adhesives, dampproofing, etc. down to bare substrate at rough openings.

2 Denotes material type contains, or is presumed to contain, regulated concentrations of polychlorinated biphenyls.

3 Denotes window frame/sash components impacted by caulking shall be removed and disposed of as ACWM and assumed PCB Bulk Product Waste.

D. A portion of the Work may be performed in multiple mobilizations, at different periods of time, in conjunction with other trades (i.e., other trades work, demolition work, etc.).

E. Safety Data Sheets (SDS) for chemicals to be used during the project must be submitted to the Consultant prior to chemicals being delivered to the Site.

F. Chemical strippers and/or encapsulants applied to any surface that will receive a new finish that requires an adhesive must be compatible with the application of the new finish. Coordination shall be made with the flooring installer for product/installation warranty (if applicable).

G. The Contractor shall be responsible for providing temporary water, power, and heat (as needed) at the Site to perform the Work. Temporary lighting within the work areas must be connected to ground-fault circuit interrupter (GFCI) power panels installed by a Commonwealth of Massachusetts-licensed electrician (permitted as required) and located outside of the work areas.

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1.04 DEFINITIONS

A. The following definitions relative to asbestos abatement apply:

1. Abatement: Procedures to control fiber release from ACM; includes removal, encapsulation, and enclosure.
2. ACM: Asbestos-containing material(s).
3. Air Monitoring: The process of measuring the total airborne fiber concentration of an area or a person.
4. Amended Water: Water to which a surfactant (wetting agent) has been added.
5. Architect: CBI Consulting, LLC.
6. Asbestos: The name given to a number of naturally-occurring, fibrous silicates. This includes the serpentine and the amphiboles forms, and includes chrysotile, amosite, crocidolite, tremolite, anthophyllite, and actinolite, or any of these forms, which have been chemically-altered.
7. Asbestos Abatement: Any activity to control fiber release from ACM; includes removal, encapsulation, enclosure, and repair.
8. Asbestos Abatement Project: All activities, including site preparation and clean-up, associated with asbestos abatement, from the time of initial arrival of the contractor on-site through obtaining an acceptable final clearance air sampling in the abatement areas(s) and/or removal of all abated ACM from the project site, whichever is later.
9. Asbestos-Containing Waste Material (ACWM): Any friable ACM removed during a demolition/renovation project and anything contaminated in the course of a demolition/renovation project including asbestos waste from control devices, bags or containers that previously contained asbestos, contaminated clothing, materials used to enclose the work area during the demolition/renovation operation, and demolition/renovation debris.
10. Asbestos Felt: A product made by saturating felted asbestos with asphalt, or other suitable bindery, such as a synthetic elastomer.
11. Asbestos Fibers: Those particles with a length greater than five (5) microns and a length to diameter ratio of 3:1 or greater.
12. Asbestos Project Designer: The MADLS-certified Asbestos Project Designer for this project is Mr. Dustin A. Diedricksen (Certification No. AD000037).
13. Asbestos Supervisor: Any employee of a MADLS-licensed Asbestos Abatement Contractor who possesses a valid MADLS certification and EPA accreditation as an Asbestos Supervisor.
14. Asbestos Work Area: A regulated area, as defined by OSHA Title 29 CFR, Part 1926.1101, where asbestos abatement operations are performed, which is isolated by physical barriers to prevent the spread of asbestos dust, fibers, or debris. The regulated area shall comply with requirements of regulated areas for demarcation, access, respirators, prohibited activities, competent persons and exposure assessments and monitoring.

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15. Asbestos Worker: Any employee of a MADLS-licensed Asbestos Abatement Contractor who possesses a valid MADLS certification and EPA accreditation as an Asbestos Worker.
16. Caulking: Resilient mastic compound often having a silicone bituminous or rubber base; used to seal cracks, fill joints, and prevent leakage.
17. Clean Room: An uncontaminated area or room, which is a part of the worker decontamination enclosure system with provisions for storage of worker street clothes and protective equipment.
18. Competent Person: As defined by OSHA Title 29 CFR, Part 1926.1101, a Site representative who is capable of identifying existing asbestos hazards in the workplace and selecting the appropriate control strategy for asbestos exposure. The Competent Person has authority to take prompt corrective measures and to eliminate such hazards during asbestos removal. The Competent Person shall be properly trained in accordance with EPA's Model Accreditation Plan (MAP).
19. Consultant: Fuss and O'Neill EnviroScience, LLC
20. Containment: An enclosure which surrounds the location where ACM and/or other toxic or hazardous substance removal is conducted, and establishes a controlled work area.
21. Contractor: Any person, firm, corporation, or other entity who has a valid Asbestos Abatement Contractor license issued by MADLS for the purpose of entering into, or engaging in, asbestos abatement work.
22. Curtained Doorway: A device to allow ingress and egress from one area to another while permitting minimal air movement between the areas. Two curtained doorways spaced a minimum of three feet apart can form an airlock.
23. Dampproofing: Application of water-impervious materials to a surface (such as a wall) to prevent penetration of moisture, typically associated with below-grade surfaces and veneers.
24. Decontamination Enclosure System (Decon): A series of connected areas, with curtained doorways between adjacent areas, for the decontamination of workers and equipment. A decontamination enclosure system always contains at least one airlock and is adjacent and connected to the regulated area, where possible.
25. Encapsulant: A liquid material which can be applied to ACM, that controls the possible release of asbestos fibers either by creating a membrane over the surface (bridging encapsulant), or penetrating the material and binding its components together (penetrating encapsulant).
26. EPA: The United States Environmental Protection Agency.
27. Equipment Room: Any contaminated area or a room that is part of the worker decon with provisions for storage of contaminated clothing and equipment.
28. Fixed Object: Unit of equipment or furniture in the work areas that cannot be removed from the work area.

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29. Friable ACM: Any material that contains greater than one percent (> 1%) asbestos as determined using the method specified in Title 40 CFR, Part 763, Appendix A, Subpart F, Section 1, via PLM, or is presumed to contain asbestos, that can be crumbled, pulverized, or reduced to powder by hand pressure (when dry).
30. Glazing Compound: Any compound used to hold glass in-place, also referred to as glazing putty.
31. HEPA Filter: High-Efficiency Particulate Air (HEPA) filter in compliance with ANSI Z9.2 1979.
32. HEPA-Filtered Work Area Ventilation System: A portable local exhaust system equipped with HEPA filtration used to create negative pressure in a regulated area (negative with respect to adjacent unregulated areas) and capable of maintaining a constant, low velocity air flow into regulated areas from adjacent unregulated areas.
33. HEPA-Vacuum Equipment: Vacuum equipment where all the air drawn into the machine is expelled through a HEPA filter with none of the air leaking past it and with a HEPA-filter as the last filtration stage.
34. MADLS: The Commonwealth of Massachusetts Department of Labor Standards.
35. MassDEP: The Commonwealth of Massachusetts Department of Environmental Protection.
36. Movable Object: Unit of equipment of furniture in the work area that can be removed from the work area.
37. NESHAP: National Emissions Standard for Hazardous Air Pollutants regulations enforced by the EPA.
38. Non-Friable ACM: Any material that contains > 1% asbestos as determined using the method specified in EPA Title 40 CFR, Part 763, Appendix A, Subpart F, Section 1, via PLM, or is presumed to contain asbestos, that cannot be crumbled, pulverized, or reduced to powder by hand pressure (when dry).
39. NPE: Negative Pressure Enclosure.
40. OSHA: The Occupational Safety and Health Administration.
41. Owner: Barnstable Public Schools
42. Permissible Exposure Limit (PEL): The maximum total airborne fiber concentration to which an employee is allowed to be exposed. The new limit established by OSHA Title 29 CFR, Part 1926.1101 is 0.1 fibers/cc as an eight (8)-hour time-weighted average (TWA), and 1.0 fibers/cc averaged over a sampling period of thirty (30) minutes as an Excursion Limit. The Contractor shall be responsible for maintaining work areas in a manner that this standard is not exceeded.

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43. Project Monitor: A professional capable of conducting air monitoring and analysis of schemes. This individual should be an industrial hygienist, an environmental scientist, or a Consultant with experience in asbestos air monitoring, personal protection equipment, and abatement procedures. This individual should have demonstrated proficiency in conducting air sample collection in accordance with OSHA Title 29 CFR, Parts 1910.1001 and 1926.1101.
44. RCRA: The Resource Conservation and Recovery Act (EPA Title 40 CFR, Parts 260 - 265).
45. Regulated Area: An area established by the employer to demarcate where Class I, II, and III asbestos work is conducted and any adjoining area where debris and waste from such asbestos work accumulate, and a work area, within which, total airborne fiber concentrations exceed, or there is a reasonable possibility that they may exceed, the PEL.
46. Shower Room: A room between the Clean Room and the Equipment Room in the decon with hot and cold running water suitably arranged for employee showering during decontamination. The Shower Room is located in an airlock between the contaminated area and the clean area.
47. Site: Barnstable High School located at 744 West Main Street in Hyannis, MA.
48. Surfactant: A chemical wetting agent added to water to improve penetration into ACM.
49. Totally-Enclosed Manner: A manner that will ensure no exposure of human beings or the environment to a concentration of asbestos.
50. Transport Vehicle: A motor vehicle or rail car used for the transportation of cargo by any mode. Each cargo-carrying body (e.g., trailer, railroad freight car) is a separate transport vehicle.
51. TWA: Time-Weighted Average.
52. Waterproofing: Material, usually a membrane or applied compound (tar/mastic), used to make a surface impervious to water, includes concealed conditions (applications around doors, windows, and in wall cavities). Sometimes combined with felts.

1.05 CONSULTANT

A. The Owner/Architect shall retain a third-party, industrial hygiene firm (the “Consultant”) for the purposes of project management and monitoring during Asbestos Abatement activities. At the discretion of the Owner/Architect, the Consultant will represent the aforementioned during the abatement project. The Contractor will regard the Consultant’s direction as authoritative and binding, as provided herein, in matters particularly, but not limited to the following:

1. Work area approval.
2. Monitoring results review.
3. Completion of the various work segments.
4. Final abatement completion.

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5. Data submission.
6. Daily field punch list items.

B. The Commonwealth of Massachusetts Department of Labor Standards (MADLS) Asbestos Consultant - Project Designer for this Asbestos Abatement Project is Mr. Dustin A. Diedricksen (Certification No. AD000037).

1.06 USE OF THE CONTRACT DOCUMENTS

A. It shall be incumbent upon the Contractor to visit the Site and determine what exists, its condition, and what will be required to accomplish the Work intended by the Contract Documents. No increase in the Contract Sum will be permitted as a result of the Contractor's failure to visit the Site and understand the existing conditions.

B. All work shall comply with the Contract Documents and with applicable codes, laws, regulations, and ordinances wherever applicable. The most stringent of all the foregoing shall govern the Work.

C. It is not intended that this Section show every detail of the Work, but the Contractor shall be required to furnish, within the Contract Sum, all material and labor necessary for the completion of the Work in accordance with the intent of this Section.

D. In case of ambiguity among the Contract Documents, the more stringent requirement, as determined by the Consultant, shall prevail.

E. The Work includes making modifications as necessary, subject to approval by Owner in consultation with the Consultant, to correct any conflicts.

F. All items not specifically mentioned in the Contract Documents, but implied by trade practices to complete the Work, shall be included.

1.07 SITE EXAMINATION

A. It is understood that the Contractor has examined the Site and made their own estimates of the facilities and difficulties attending the execution of the Work and has based their price thereon.

B. Except for unforeseeable concealed conditions as determined by the Consultant, the Contractor shall make no claim for additional cost due to the existing conditions at the Site.

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1.08 CONTRACTOR QUALIFICATIONS

A. The Contractor shall submit a record of prior experience in asbestos abatement projects, listing no less than three completed projects in the past year of similar size and scope. The Contractor shall list the experience and training of the Asbestos Supervisor and the Asbestos Abatement Workers The information that should be included is as follows:

1. Project Name and Address
2. Owner's Name and Address
3. Architect's Name
4. Consultant's Name
5. Contract Amount
6. Date of Completion
7. Extras and Changes

B. The Contractor selected must currently hold a valid MADLS Asbestos Abatement Contractor license.

C. Submit a written statement regarding whether the Contractor has ever been cited for non-compliance with federal, state, or local asbestos regulations pertaining to worker protection, removal, transport, or disposal.

1.09 ADDITIONAL GENERAL REQUIREMENTS

A. The Contractor shall employ a competent, MADLS-certified Asbestos Abatement Supervisor with at least three years of experience on projects of similar scope and magnitude, who shall be responsible for all work involving asbestos abatement as described in the Contract Documents and defined in applicable regulations and have full-time, daily supervision of the same. The Supervisor shall be the competent person as defined by Occupational Safety and Health Administration (OSHA) regulations.

B. If required by federal, state, local, or any other authorities having jurisdiction over such work, the Contractor shall allow the Work of this contract to be inspected. The Contractor shall immediately notify the Owner, Architect, and Consultant and shall maintain written evidence of such inspection for review by the aforementioned parties.

C. The Contractor shall incur the cost of all fines resulting from regulatory non-compliance as issued by federal, state, and local agencies. The Contractor shall incur the cost of all work requirements mandated by federal, state, and local agencies as a result of regulatory non-compliance or negligence.

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D. The Contractor shall immediately notify the Owner, Architect, and Consultant of the delivery of all permits, licenses, certificates of inspection, of approval, or of occupancy, etc., and any other such instruments required under codes by authorities having jurisdiction, regardless of who issued, and shall cause them to be displayed to the aforementioned parties for verification and recording.

1.10 SUBMITTALS

A. The Contractor shall submit the following to the Consultant, in one complete package, prior to the pre-construction meeting and at least ten (10) business days before the start of the Work:

1. Submit a schedule to the Owner/Architect and the Consultant that defines a timetable for executing and completing the project, including work area preparations, removal, cleanup, decontamination, and final clearance air monitoring (if applicable).
2. Submit copies of all notifications, permits, applications, licenses and like documents required by federal, state, or local regulations obtained or submitted in proper fashion. The Contractor's supervisor and laboratory information (Fuss & O'Neill EnviroScience, LLC - AA000198) submitted on Asbestos Notification Form (ANF-001) must be accurate or a revision will be required.
3. Submit the name and address of the hauling contractor and the landfill to be used. Also, submit current, valid operating permits and certificates of insurance for the transporter and landfill.
4. Submit photographic or video documentation showing the building conditions prior to the start of work. The Contractor shall be held responsible for all damage to the building and its contents not shown on the pre-construction documentation. The Contractor shall note if this does not apply since the documentation was collected by others (i.e., General Contractor).
5. Submit a detailed, site-specific work plan including, but not limited to, decon construction, work area isolation, and removal methods.
6. Submit the training, medical, and respirator fit test records as well as a current, valid MADLS certification of each employee who may be on the Site.
7. If the Contractor's MADLS-certified Asbestos Abatement Supervisor is not conducting OSHA-required employee exposure monitoring, submit the name, address, and qualifications of the air sampling professional that the Contractor proposes to use on this project for this task. The Contractor shall note if this does not apply.
8. Submit the name, address, and qualifications of proposed laboratories intended to be utilized for Contractor personal air sampling analysis as required by this Section.
9. Submit detailed product information on all materials and equipment proposed for asbestos abatement work on this project. This includes all SDS for products and chemicals that may be used on the project.

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10. Submit pertinent information regarding the qualifications of the Project Supervisor (competent person) for this project, as well as a list of past projects completed.
11. Submit a chain-of-command for the project. The chain-of-command should include the name, title, and contact number for each person listed.
12. Submit a site-specific Emergency Action Plan for the project. The Emergency Action Plan may include emergency procedures to be followed by Contractor personnel to evacuate the building, hospital name and phone number, most direct transportation route from the Site, emergency telephone numbers, etc. If this information is contained within an Emergency Action Plan prepared by the Site's General Contractor, a copy shall be submitted for review.
13. Submit a written, site-specific Respiratory Protection Program for employees undertaking the Work, including make, model, and National Institute of Occupational Safety and Health (NIOSH) approval numbers of respirators to be used at the Site. The Contractor shall note if the Respiratory Protection Program is not required at the Site and why.
14. Submit the proposed electrical safeguards to be implemented by a Commonwealth of Massachusetts-licensed electrician, including but not limited to: location of transformers, GFCI outlets, lighting, and power panels necessary to safely perform the Work, including a description of electrical hazards and a safety plan for common practices in the work area. This may also include a safety plan for temporary lighting, extension cords, and other powered equipment used in the work area (locations, daily inspections, etc.).
15. Submit the proposed worker orientation plan that, at a minimum, includes a description of asbestos hazards and abatement methodologies, a review of worker protection requirements, and the outline of safety procedures.
16. Refer to Section 028433 - Polychlorinated Biphenyl Performance-Based Disposal for additional submittal requirements.

No work on the Site will be allowed to begin until the Owner/Architect and the Consultant approve the Pre-Construction Submittals. Any delay caused by the Contractor's refusal or inability to submit this documentation in a timely manner does not constitute a cause for change order or a time extension.

B. The Contractor shall submit the following to the Consultant during the Work:

1. Copies of training, MADLS certifications, respirator fit test records, and medical records for new employees to start work 24 hours in advance of the new employee arriving at the Site.

C. The Contractor shall submit the following to the Owner at the completion of the Work. The Owner reserves the right to retain payment(s) until all items are received in completion:

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1. Original final completed copies of the WSR, signed by all transporters and the designated disposal site owner/operator.
2. Original final completed copies of weight tickets, recycling tickets, and manifests for all specified materials.
3. Contractor's logs (daily activity logs, daily sign in sheets, containment sign-in sheets), and all worker training, MADLS certifications, medical records, and respirator fit test records.
4. Copies of all OSHA personal monitoring results.

1.11 REGULATIONS AND STANDARDS

A. The Contractor shall be solely responsible for conducting this project and supervising all work in a manner that will be in conformance with all federal, state, and local regulations and guidelines pertaining to asbestos abatement. Specifically, the Contractor shall comply with the requirements of the following:

1. EPA National Emissions Standards for Hazardous Air Pollutants (NESHAP) Regulations (Title 40 CFR, Part 61, Subpart M).
2. EPA Asbestos Hazards Emergency Response Act (AHERA) Regulations (Title 40 CFR, Part 763, Subpart E).
3. OSHA Asbestos Regulations (Title 29 CFR, Parts 1910.1001 and 1926.1101).
4. Department of Transportation (DOT) Hazardous Waste Transportation Regulations (Title 49 CFR, Parts 170 - 180).
5. MassDEP Asbestos Regulations (310 CMR 7.00 and 7.15).
6. MADLS "The Removal, Containment or Encapsulation of Asbestos" Standards for Asbestos Abatement (453 CMR 6.00).
7. Life Safety Code, National Fire Protection Association (NFPA).
8. Local health and safety codes, ordinances or regulations pertaining to asbestos remediation and all national codes and standards including American Society for Testing and Materials (ASTM), American National Standards Institute (ANSI), and Underwriter's Laboratories (UL).

1.12 EXEMPTIONS

A. Any deviations from the Contract Documents require the written approval and authorization from the Owner and Consultant. Any deviations that may impact the bid cost shall be delineated with the bid for the Owner to review.

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B. Any modifications from the standard work practices identified in MADLS Regulations 453 CMR 6.00 or MassDEP Regulations 310 CMR 7.00 and 7.15 must be requested in writing and approved in writing by both regulatory agencies. The Consultant shall develop a Non-Traditional Asbestos Abatement Work Practice (NTWP) on behalf of the Owner. If the Contractor intends to request a NTWP for this project, the nature of the NTWP shall be disclosed in the Bid Documents, and the cost savings associated with said NTWP shall be provided for Owner's consideration. A NTWP shall not be filed without prior Owner and Consultant approval.

1.13 FINAL RE-OCCUPANCY AIR CLEARANCE

A. Following the completion of the encapsulation phase of the Work, the Consultant shall collect final re-occupancy clearance air samples inside the negative pressure enclosure (NPE) work area per MADLS regulatory requirements for re-occupancy.

B. The Owner shall be responsible for payment of the sampling and analysis of the initial final clearance air samples only. If the first set of samples fails to satisfy the re-occupancy criteria, the Contractor shall be responsible for payment of all costs associated with the collection and analysis of additional final clearance air samples.

C. The Contractor shall not conduct demolition or other removal activities during final clearance air sampling for re-occupancy.

D. Exterior asbestos abatement work: Re-occupancy clearance air sampling is not required following removal if abatement activities.

1.14 NOTIFICATIONS, POSTINGS, SUBMITTALS, AND PERMITS

A. The Contractor shall make the following notifications and provide the submittals to the following agencies prior to the start of work. Submissions may be made electronically on eDEP File. This notification is required ten (10) calendar days prior to the start of the abatement project. The supervisor and laboratory information (Fuss & O'Neill EnviroScience, LLC - AA000198) submitted on the form must be accurate or a revision will be required.

1. Commonwealth of Massachusetts Department of Environmental Protection
Asbestos Program
Enforcement Division
P.O. Box 4062
Boston, MA 02211

2. Commonwealth of Massachusetts Department of Labor Standards
19 Staniford Street, 2nd Floor
Boston, MA 02114

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B. The minimum information included in the notification to these agencies includes:

1. Building Owner/Operator Name and address.
2. Building location.
3. Building size, age, and use.
4. Amount of asbestos to be removed.
5. Asbestos Abatement Supervisor Name and Certification Number.
6. Laboratory Analytical Name and License Number.
7. Work schedule, including proposed start and completion date.
8. Asbestos removal procedures to be used.
9. Name and location of disposal site for generated asbestos waste, residue, and debris.

1.15 WORK SITE SAFETY PLAN

A. The Contractor shall establish a set of emergency procedures and shall post them in a conspicuous place at the Site. The safety plan should include provisions for the following:

1. Injured worker evacuation.
2. Emergency and fire exit routes from all work areas.
3. Emergency first aid treatment.
4. Local telephone numbers for emergency services including ambulance, fire, and police.
5. A method to notify building occupants in the event of a fire or other emergency requiring building evacuation.

B. The Contractor shall be responsible for training all workers in these procedures.

1.16 INDEPENDENT AIR SAMPLING AND ASBESTOS ABATEMENT MONITORING

A. This Subsection describes independent air sampling work being performed on behalf of, and paid for by, the Owner. This Subsection describes air monitoring conducted by the Consultant to verify that the building, beyond the work area, and the outside environment remains uncontaminated. Personal air monitoring required by OSHA is work to be performed by the Contractor and is within the Contract Sum. A negative exposure assessment will not be reviewed and/or approved by the Consultant; it shall be the Contractor’s responsibility to determine its validity.

B. The purpose of the Consultant’s air monitoring is to verify proper engineering controls in the work areas including, but not limited to:

1. Building contamination outside the work area by airborne fibers.
2. Filtration failure or differential pressure system rupture.
3. Air contamination outside the building envelope by airborne fibers.

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C. If any of the above occurs, the Contractor shall immediately cease Asbestos Abatement activities until the fault is made correct. Do not recommence work until authorized by the Consultant.

D. The Consultant may monitor total airborne fiber concentrations outside the work area. The purpose of this air monitoring will be to detect total airborne fiber concentrations outside the NPE, which may challenge the effectiveness of the work area isolation procedures to protect the ambient areas inside and at the exterior of the Site.

E. To determine if the elevated total airborne fiber concentrations encountered during abatement operations have been reduced to an acceptable level, the Consultant will sample and analyze ambient air in accordance with final clearance air sampling requirements.

F. The Consultant may perform on-site monitoring throughout the project, as follows:

1. All work procedures may be monitored by the Consultant to assure that areas outside the designated work areas will not be contaminated.
2. Prior to work on any given day, the Contractor's designated "competent person" shall discuss the day's work schedule with the Consultant to evaluate job tasks with respect to safety procedures and requirements specified to prevent contamination of the Site or the employees. This includes a visual inspection of the work area and the decon.

1.17 CONTRACTOR'S AIR SAMPLING RESPONSIBILITY

A. The Contractor shall independently retain an air-sampling professional or the MADLS-certified Asbestos Abatement Supervisor shall monitor total airborne fiber concentrations in the worker breathing zones to establish conditions and work procedures for maintaining compliance with OSHA Title 29 CFR, Parts 1910.1001 and 1926.1101.

B. The Contractor's air sampling professional shall document all air sampling results and provide a report to the Consultant within 48 hours after sample collection.

C. All air sampling shall be conducted in accordance with methods described in OSHA Title 29 CFR, Parts 1910.1001 and 1926.1101.

1.18 PROPER WORKER PROTECTION

A. This Subsection describes the equipment and procedures required for protecting workers against asbestos contamination and other workplace hazards except for respiratory protection.

B. All workers are to be accredited as Abatement Workers as required by the EPA AHERA Title 40 CFR, Parts 763 Appendix C to Subpart E, February 3, 1994.

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C. The Contractor is required to be certified and accredited as required by MADLS.

D. In accordance with OSHA Title 29 CFR, Part 1926, all workers shall receive a training course covering the dangers inherent in handling asbestos, the dangers of breathing asbestos dust, proper work procedures, and proper worker protective measures. This course must include, but is not limited to the following:

1. Methods of recognizing asbestos
2. Health effects associated with asbestos
3. Relationship between smoking and asbestos in producing lung cancer
4. Nature of operations that could result in exposure to asbestos
5. Importance of and instruction in the use of necessary protective controls, practices and procedures to minimize exposure including:
    a. Engineering controls
    b. Work Practices
    c. Respirators
    d. Housekeeping procedures
    e. Hygiene facilities
    f. Protective clothing
    g. Decontamination procedures
    h. Emergency procedures
    i. Waste disposal procedures
6. Purpose, proper use, fitting, instructions, and limitations of respirators as required by OSHA Title 29 CFR, Part 1910.134
7. Appropriate work practices for the work
8. Requirements of medical surveillance program
9. Review of OSHA Title 29 CFR, Part 1926
10. Pressure Differential Systems
11. Work practices including hands on or on job training
12. Personal Decontamination procedures
13. Air monitoring, personal and area

E. The Contractor shall provide medical examinations for all workers who may encounter a total airborne fiber concentration of 0.1 fibers/cc or greater for an 8-hour TWA. In the absence of specific airborne fiber data, provide medical examinations for all workers who will enter the work area for any reason. Examination shall, at a minimum, meet OSHA requirements as set forth in Title 29 CFR, Part 1926. In addition, provide an evaluation of the individual's ability to work in environments capable of producing heat stress in the worker.

F. The Contractor shall maintain control of and be responsible for access to all work areas to ensure the following requirements:

1. Non-essential personnel are prohibited from entering the work area.

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2. All authorized personnel entering the work area shall read the "Worker Protection Procedures" that are posted at the entry points to the enclosure system, and shall be equipped with properly fitted respirators and protective clothing.
3. All personnel who are exiting from the decon shall be properly decontaminated.
4. Asbestos waste that is removed from the work area must be properly bagged and labeled in accordance with these Specifications. Asbestos waste removed from a NPE must be immediately transported off-site or immediately placed in locked, posted temporary storage on-site, and removed within 24 hours of the project conclusion.
5. Any materials, equipment, or supplies that are removed from the decon shall be thoroughly cleaned and decontaminated by wet-cleaning methods and/or HEPA vacuuming of all surfaces.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Deliver all materials in the original packages, containers, or bundles bearing the brand name, manufacturer name, and product technical description.

B. The Contractor shall have a sufficient inventory of, or dated purchase orders for, materials necessary for the Work (e.g., protective clothing, respirators, respirator filter cartridges, polyethylene (poly) sheeting of proper size and thickness, tape, spray adhesive, air filters, etc.).

C. Damaged or deteriorating materials are not permitted for use and shall be removed from the premises. Material that becomes contaminated with asbestos shall be decontaminated or disposed as ACWM.

D. Poly sheeting (packaged in a roll to minimize the frequency of joints) shall be delivered to the Site with factory label indicating four (4) or six (6)-mil thickness.

E. Poly disposable bags shall be 6-mil with OSHA-required pre-printed labels (OSHA Title 29 CFR, Part 1926.1101(k)(8)(iii)).

F. Tape or adhesive spray shall be capable of sealing joints in adjacent poly sheeting, and shall be able to attach poly sheeting to finished or unfinished surfaces of dissimilar materials. Tape and adhesive spray shall also be capable of adhering under both dry and wet conditions (including use of amended water).

G. Surfactant (wetting agent) shall consist of fifty percent (50%) polyoxyethylene ether and 50% polyoxyethylene ester, or equivalent, and shall be mixed with water to provide a concentration of 1 ounce surfactant to 5 gallons of water, or as directed by manufacturer.

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H. Removal encapsulant shall be non-flammable, factory-prepared penetrating chemical encapsulant deemed acceptable by the Consultant. Usage shall be in accordance with manufacturer's printed technical data.

I. The Contractor shall have spray equipment capable of mixing wetting agent with water. Spray equipment shall be capable of generating sufficient pressure and volume; the hose length must reach all areas within the work area.

J. Impermeable containers shall be used to receive and retain any asbestos-containing or contaminated materials until disposal at an acceptable disposal site. The containers shall be labeled in accordance with OSHA Title 29 CFR, Part 1926.1101(k)(8)(iii) [June 1, 2015 requirements]. Containers must be airtight and watertight.

K. Labels and signs, as required by OSHA Title 29 CFR, Part 1926.1101, will be used. When applicable, signage requirements of Section 028433 - Polychlorinated Biphenyl Performance-Based Disposal also apply.

L. Encapsulant shall be bridging or penetrating type which has been deemed acceptable by the Consultant. Usage shall be in accordance with manufacturer's printed technical data.

2.02 TOOLS AND EQUIPMENT

A. The Contractor shall provide all clean tools and equipment necessary for asbestos abatement activities.

B. The Contractor's air monitoring professional or Abatement Supervisor shall have air-monitoring equipment of type and quantity to monitor operations and conduct personnel exposure surveillance per OSHA requirements. The equipment shall function properly and air samples shall be calibrated with a recently calibrated (within 6 calendar months) rotometer.

C. The Contractor shall have available sufficient inventory or dated purchase orders for materials necessary for the Work, including protective clothing, respirators, respirator filter cartridges, poly sheeting of proper size and thickness, tape, spray adhesive, and air filters.

D. The Contractor shall provide (as needed) temporary electrical power panels, electrical power cables, and/or electrical power sources (e.g., generators, etc.). Any electrical-connection work affecting the building electrical power system shall be performed by a Commonwealth of Massachusetts-licensed electrician, permitted as required.

E. The Contractor shall be responsible for coordinating electrical and water services, and shall pay for these services for the duration of the project (if applicable).

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F. The Contractor shall assist the Consultant by providing necessary tools and equipment (e.g., coveralls, ladders, extension cords, lighting, etc.) for the Consultant to perform project monitoring activities (e.g., final visual inspection(s), in-progress and final clearance air sampling, etc.). The Consultant reserves the right to reject such items that are deemed unsafe and/or do not function properly, and may request items be replaced with adequate replacements. The work areas must be safe to enter/occupy by the Consultant at all times.

G. The Contractor shall have available shower stalls and plumbing, including sufficient hose length and drain system, or an acceptable alternate.

H. If required, HEPA-filtered work area ventilation systems shall contain HEPA filter(s) and be capable of sustaining sufficient air exhaust to create a minimum negative air pressure of -0.02 inches of water column within NPE with respect to the outside area. Digital monometers shall be supplied for Class 1 work. Equipment shall be checked for proper operation by smoke tubes or differential pressure gauge before the start of each shift and at least twice during the shift. Adequate exhaust air shall be provided for a minimum of 4 air changes per hour within the NPE. No air movement system or air-filtering equipment shall discharge unfiltered air outside the work area. The Contractor will have reserve units so that system will operate continuously.

I. HEPA-Vacuum Equipment, of suitable size and capacities for the project, shall have HEPA filter(s) capable of trapping and retaining at least 99.97% of all mono-dispersed particles of 0.3 micrometers in diameter or larger.

PART 3 - EXECUTION

3.01 PRE-CONSTRUCTION MEETING

A. A pre-construction meeting may be scheduled prior to the start of Work. The Contractor must attend this meeting (as required by the Owner); the assigned Asbestos Abatement Supervisor must also attend this meeting.

B. The Contractor shall present a detailed project schedule and project submittals at the pre-construction meeting. Variations, amendments, and corrections to the presented schedule will be discussed, and the Owner and the Consultant will inform the Contractor of any scheduling adjustments for this project.

C. Following the pre-construction meeting, the Contractor shall submit a revised schedule (if needed) no later than one week after the meeting.

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3.02 WORK AREA PREPARATION - NEGATIVE PRESSURE ENCLOSURE (NPE)

A. Where necessary, deactivate electrical power, including receptacles and light fixtures. Under no circumstances during the decontamination procedures will lighting fixtures be permitted to be operating when amended water spray may contact the fixture. Provide GFCI devices, temporary power, and temporary lighting installed in compliance with the applicable electrical codes. All installations are to be made by a Commonwealth of Massachusetts-licensed electrician (permitted as required) and located outside the work areas.

B. Temporary power shall be continuous power. Portable generators are not authorized for use during interior asbestos abatement without an approved NTWP.

C. HEPA-filtered work area ventilation systems shall be utilized during the installation of enclosures and supports where ACM may be disturbed.

D. Deactivate and/or isolate heating, ventilating, and air conditioning (HVAC) systems or zones to prevent contamination and fiber dispersal to other areas of the building or structure. During the Work, vents within the work area shall be covered with two (2) layers of 6-mil poly sheeting completely sealed with duct tape. If deactivation is not possible, isolation shall include a hard barrier, such as plywood or rigid-foam insulation board, securely affixed to active duct openings prior to covering with 2 layers of 6-mil poly sheeting completely sealed with duct tape.

E. The Contractor shall be responsible for removing furniture, equipment, and any other materials to be salvaged from the work areas. The Contractor shall be responsible for removing all solid waste within the work areas. The Contractor shall pre-clean moveable objects within the proposed work areas using HEPA-vacuum equipment and/or wet-cleaning methods as appropriate and remove such objects from work areas.

F. Completely seal all openings including, but not limited to, windows, corridors, doorways, skylights, ducts, grills, diffusers, and any other work area penetrations with 6-mil poly sheeting sealed with duct tape. This includes doorways and corridors that will not be used for passage during work.

G. Pre-clean fixed objects within the work areas with HEPA-vacuum equipment and/or wet-cleaning methods as appropriate, and enclose with 6-mil poly sheeting completely sealed with duct tape.

H. Clean the proposed work areas using HEPA-vacuum equipment or wet-cleaning methods as appropriate. Do not use methods that raise dust, such as dry sweeping or vacuuming with equipment not equipped with HEPA filters.

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I. After HEPA-vacuum cleaning, where wall materials are not being abated, cover fixed walls with 2 layers of 4-mil poly sheeting. Where fixed walls do not form a barrier, 2 layers of 6-mil poly sheeting shall be applied to a rigid framework of wood, metal, or polyvinyl chloride (PVC). Where flooring materials are not being abated, cover the floor with 2 layers of 6-mil poly sheeting. Where ceiling materials are not being abated, cover ceilings with 2 layers of 4-mil poly sheeting in accordance with current MassDEP Regulation 310 CMR 7.15(7)(c)(6). All overlaps shall be completely sealed with tape and spray adhesive.

J. Pursuant to MassDEP Regulation 310 CMR 7.15(7)(c)(4), large openings such as open doorways, elevator doors, and passageways shall be first sealed with solid construction materials, such as plywood over studding, which shall constitute the outermost boundary of the Asbestos Abatement work area. All cracks, seams, and openings in such solid construction materials shall be caulked or otherwise sealed, so as to prevent the movement of asbestos fibers out of the work area.

K. Maintain emergency and fire exits from the work areas, or establish alternate exits satisfactory to fire officials.

L. Clean and remove ceiling-mounted objects, such as lights and other items not sealed-off, which interfere with asbestos abatement. Use hand-held, amended water sprayers or HEPA-vacuum equipment during fixture removal to reduce settled fiber dispersal.

M. Create pressure differential between work areas and adjacent unregulated areas by the use of acceptable HEPA-filtered work area ventilation systems sufficient to provide 4 air changes per hour, and create a negative air pressure of -0.02 inches of water column within the NPE with respect to the adjacent area as measured on a manometer.

N. If a Consultant is retained for pre-abatement services, the Contractor and the Consultant shall visually inspect barrier several times daily to assure an effective seal and the Contractor shall repair defects immediately.

3.03 WORK AREA PREPARATION - EXTERIOR WINDOW SYSTEM ABATEMENT

A. This Subsection only applies to exterior window caulking/glazing compounds pursuant to MassDEP Regulation 310 CMR 7.15(11). All other ACM abatement work area preparations must follow Subsection 3.2, unless a NTWP is submitted to, and approved by, MassDEP.

B. Work is to be conducted from the building exterior. Completely seal all openings including, but not limited to, windows, doors, ventilation openings, drains, grilles, diffuser grates, and any other penetration into the work areas with 2 layers of 6-mil poly sheeting completely sealed with tape and spray adhesive.

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C. Window openings shall be isolated from the building interior on the interior side using 2 layers of 6-mil poly sheeting sealed with tape and spray adhesive.

D. Provide 2 layers of 6-mil poly sheeting on exterior ground surface extending to a minimum of ten (10) feet from the building perimeter where ACM and/or ACWM are to be removed. Poly sheeting shall be attached to the building foundation with tape and spray adhesive.

E. Movable lifts or staging platforms to be used during abatement shall be protected with 2 layers of 6-mil poly sheeting.

F. Pre-clean fixed objects within the work areas using HEPA-vacuum equipment and wet-cleaning methods, as appropriate, and enclose with 6-mil poly sheeting sealed with tape.

G. Clean the proposed work areas using HEPA-vacuum equipment and wet-cleaning methods, as appropriate. Do not use methods that raise dust, such as dry sweeping or vacuuming with equipment not equipped with HEPA filters.

H. Post asbestos warning signs, in accordance with OSHA Title 29 CFR, Part 1926.1101, at all approaches to the work area. Signs shall be conspicuously posted to permit a person to read them and take precautionary measures to avoid exposure to asbestos. When applicable, signage requirements of Section 028433 - Polychlorinated Biphenyl Performance-Based Disposal also apply.

I. Maintain emergency and fire exits from the work area or establish alternative exits satisfactory to fire officials.

3.04 DECONTAMINATION ENCLOSURE SYSTEM (DECON)

A. The Contractor shall establish, contiguous to the work area, a three-chamber decon consisting of (in-series) equipment room, shower room, and clean room. The only access between contaminated and uncontaminated areas shall be through this decon. If it is not feasible to erect a contiguous decon, the Contractor shall establish a remote decon in as close proximity to the work area as is feasible. For abatement not requiring a NPE, the Contractor shall establish a remote decon at the perimeter of the regulated work area. Use of a remote decon shall be specified on the Contractor's Asbestos Notification Form (ANF-001).

B. Access between rooms in the decon shall be through double-flap, curtained openings. The clean room, shower room, and equipment room within the decon shall be completely sealed ensuring that the sole source of airflow through this area originates from uncontaminated areas outside the work area.

C. If feasible, the Contractor shall establish, contiguous with the work area, an equipment decon consisting of 2 totally-enclosed chambers divided by a double-flapped, curtained opening. No personnel are permitted to enter or exit through this unit.

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D. Construct the decon with wood or metal framing, cover both sides with 2 layers of 6-mil poly sheeting, completely sealed with spray adhesive, and taped at the joints.

3.05 ASBESTOS REMOVAL PROCEDURE - GENERAL

A. Prior to the removal of ACM, the Contractor shall ensure that work area preparations have been conducted in accordance with applicable Subsections of this Section.

B. The Contractor shall have a MADLS-licensed Asbestos Supervisor on the Site at all times to ensure establishment of a proper NPE and proper work practices throughout project.

C. If a Consultant is retained for pre-abatement services, abatement work shall not commence until authorized by the Consultant.

D. The Contractor shall properly coordinate abatement work with other trades, new construction, and Site use. The Contractor shall be responsible for addressing any concerns to the Owner and/or Consultant.

E. With a fine mist, spray ACM/ACWM with amended water using airless spray equipment or apply an approved removal wetting agent to reduce the release of fibers during removal operation.

F. Remove wet ACM/ACWM in manageable sections to keep fiber concentrations to a minimum. Material drop shall not exceed 8 feet. For heights up to 15 feet, provide inclined chutes or scaffolding to intercept drop.

G. Remove ACM/ACWM by standard methods, as appropriate. Fill disposal containers as removal proceeds; seal filled containers and clean containers before removal to equipment decon. Wet clean each container thoroughly, double bag, and apply caution labels, if required.

H. After completion of stripping work, all surfaces from which ACM/ACWM have been removed shall be wet brushed, using a nylon brush, wet-wiped, and sponged or cleaned by an equivalent method to remove all visible material (wire brushes are prohibited). During this work, the surfaces being cleaned shall be kept wet.

I. Remove and containerize all visible accumulations of ACM and ACWM. During cleanup, utilize brooms, non-metal dustpans, and rubber squeegees to minimize damage to floor covering. Non-porous materials (i.e., metal) to be removed from the work area during abatement activities for recycling/disposal as solid waste shall be cleaned and visually inspected by an Asbestos Project Monitor prior to removal from work areas.

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J. Sealed disposal containers, and all equipment used in the work area, shall be included in the cleanup and shall be removed from work areas via the equipment decon at an appropriate time in the cleaning sequence. All asbestos waste in 6-mil poly disposal bags shall be double-bagged in the equipment decon before removal from the Site.

K. At any time during asbestos removal, should the Consultant suspect contamination of areas outside the work area(s), they shall cause all abatement work to stop until the Contractor takes the necessary steps to decontaminate these areas and eliminate the causes of such contamination. Unprotected individuals shall be prohibited from entering suspected contaminated areas until air sampling and visual inspections verify decontamination.

L. After completion of the initial final cleaning procedure, including removal of the inner layers of poly sheeting but prior to encapsulation, a pre-sealant inspection shall be conducted by the Consultant. The pre-sealant inspection shall verify that ACM and residual dust has been removed from the work area.

3.06 ASBESTOS REMOVAL PROCEDURES - CAULKING AND WINDOW SILL ADHESIVE

A. Spray ACM with amended water using airless spray equipment or apply an approved wetting agent to reduce the release of fibers during removal operations.

B. Window system (frame/sash) components with asbestos-containing caulking shall be removed and wrapped for disposal as ACWM. Note: window caulking is also presumed to contain regulated concentrations of PCBs. Refer to Section 028433 - Polychlorinated Biphenyl Performance-Based Disposal for additional disposal requirements.

C. Asbestos-containing caulking/adhesives shall be wet-misted and removed from substrates. Asbestos caulking/adhesives shall be placed in double 6-mil poly disposal bags. Note: window caulking is also presumed to contain regulated concentrations of PCBs. Refer to Section 028433 - Polychlorinated Biphenyl Removal and Disposal for additional disposal requirements.

D. Caulking/adhesives may be covered with non-asbestos, silicone-type caulking/adhesives that must be removed to completely access and abate ACM from substrates. Caulking/adhesives in contact with ACM shall be placed in double 6-mil poly disposal bags for disposal as ACWM.

E. Upon removal, caulking/adhesives and/or substrates to be disposed of shall be wrapped in 2 layers of 6-mil poly sheeting or placed in double 6-mil poly disposal bags and properly labeled for disposal as ACWM.

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3.07 ASBESTOS REMOVAL PROCEDURES - EXTERIOR WINDOW SYSTEMS

A. Work shall be conducted from the building exterior pursuant to MassDEP Regulation 310 CMR 7.15(11) - Requirements for Window Painting and/or Repair Work that Result in the Disturbance of Asbestos-Containing Glazing and/or Caulking Compounds.

B. It will be at the discretion of the Consultant to determine if removal procedures will render ACM friable, thus requiring additional dust-control measures to prevent airborne asbestos fiber concentrations and/or environmental contamination.

C. Spray ACM with amended water using airless spray equipment or apply an approved wetting agent to reduce fiber release during removal operations.

D. Window system (frame/sash) components with asbestos-containing caulking shall be removed and wrapped in 2 layers of 6-mil poly sheeting for disposal as ACWM. Note: window caulking is also presumed to contain regulated concentrations of PCBs. Refer to Section 028433 - Polychlorinated Biphenyl Performance-Based Disposal for additional disposal requirements.

E. Asbestos-containing (residual) window caulking shall be wet-misted and removed from substrates. Asbestos caulking shall be placed in double 6-mil poly disposal bags. Note: window caulking is also presumed to contain regulated concentrations of PCBs. Refer to Section 028433 - Polychlorinated Biphenyl Performance-Based Disposal for additional disposal requirements.

F. Upon removal, caulking and window system (frame/sash) components to be disposed of shall be wrapped in 2 layers of 6-mil poly sheeting or placed in double 6-mil poly disposal bags and properly labeled for disposal as ACWM.

G. Surrounding surfaces, such as exterior brick/block, remaining window surfaces, etc. shall be thoroughly cleaned with HEPA-vacuum equipment and wet-wiped to remove all visible dust and debris.

H. Once the Consultant completes their final visual inspection, the Contractor shall remove the protective poly sheeting by rolling in all 4 corners towards the center.

I. Check all ground surfaces in work areas after removal is complete and the protective ground poly drop cloths have been removed. Remove and dispose any suspect ACM/ACWM observed on the ground.

3.08 CONSULTANT'S AIR SAMPLING RESPONSIBILITIES

A. If required or retained for this service, air sampling will be conducted by the Consultant's Asbestos Project Monitor to determine the effectiveness of the work area controls in preventing asbestos contamination. Independently, the Contractor shall monitor air quality within the work area to comply with OSHA regulations for worker safety.

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B. The Consultant's Asbestos Project Monitor will collect and analyze air samples during the following period:

1. Removal Period: If required or retained for this service, the Consultant's Asbestos Project Monitor will provide continual evaluation of the building air quality during removal, using their best professional judgment in respect to the MADLS guidance level of 0.010 fibers/cc and the background airborne fiber concentration, if established during the pre-abatement period.

   a. If the Consultant's Asbestos Project Monitor determines that the building air quality has become contaminated from the abatement project, they shall immediately inform the Contractor to cease all removal operations, and implement a work stoppage cleanup procedure. The Contractor shall conduct a thorough cleanup of the building areas designated by the Consultant. No further removal work may occur until the Asbestos Project Monitor has determined through air sample collection and analysis that the airborne fiber concentrations are at or below the MADLS re-occupancy standard.

2. Post-Abatement Period: If required, the Consultant's Asbestos Project Monitor will conduct air sampling following the final cleanup phase of the project, once the "no visible, suspect dust or debris" criterion, as established by the Consultant's Asbestos Project Monitor, has been met and the work area has been encapsulated by the Contractor. Final clearance air samples shall be collected in accordance with the MADLS re-occupancy clearance standard.

   a. As required, the Consultant's Asbestos Project Monitor will collect final re-occupancy clearance air samples inside the work area at the completion of abatement work. These final clearance air samples shall be analyzed in accordance with requirements of EPA Title 40 CFR, Part 763, Subpart E and MADLS Regulation 453 CMR 6.00.
   b. Final clearance air sample collection and analysis will be in accordance with MADLS Regulation 453 CMR 6.14(5)(b)(2)(c) and include at least 1 sample for each 500 linear/1,000 square feet of asbestos or portion thereof, or 1 sample per room, whichever is greater. A minimum of 2 samples per clearance will be collected and analyzed. Sample collection and analysis shall be in accordance with NIOSH 7400 Method and include utilizing aggressive air-sampling techniques to obtain a minimum air volume of 1,200 liters.
   c. The Owner shall be responsible for payment for the initial final clearance air sampling performance, only. If the first set of samples fails to satisfy the re-occupancy criteria, the Contractor shall be responsible for payment of all costs associated with the additional final clearance air sampling and analysis.

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d. The Contractor shall properly schedule abatement work and other site activities at appropriate times and locations to prevent cross-contamination and/or dust in areas where the Consultant's Asbestos Project Monitor will conduct air sampling.

3.09 CONSULTANT'S INSPECTION RESPONSIBILITIES

A. The Consultant's Asbestos Project Monitor may conduct inspections throughout the progress of the abatement project. Inspections will be conducted to document the abatement work progress, as well as the Contractor's procedures and practices.

B. The Consultant's Asbestos Project Monitor may perform the following inspections during abatement activities:

1. Pre-Commencement Inspection: If required or retained for this service, pre-commencement inspections shall be performed at the time requested by the Contractor. The Consultant shall be informed 24 hours prior to the time the inspection is needed. If deficiencies are noted during the pre-commencement inspection, the Contractor shall perform the necessary adjustments to obtain compliance.
2. Work Area Inspections: If required or retained for this service, work area inspections shall be conducted on a daily basis, at the discretion of the Consultant. During the work inspections, the Consultant's Asbestos Project Monitor shall observe the Contractor's removal procedures, verify barrier integrity, monitor HEPA-filtered work area ventilation systems, assess project progress, and, if deficiencies are noted, inform the Contractor of specific remedial activities.

C. The Consultant's Asbestos Project Monitor shall perform the following inspections after removal activities are completed:

1. Pre-Sealant Inspection: If required or retained for this service, the Consultant's Asbestos Project Monitor will conduct a pre-sealant inspection, at a time requested by the Contractor. The Consultant shall be informed 24 hours prior the time that the inspection is needed. The pre-sealant inspection shall be conducted after completion of the initial cleaning procedures, but prior to encapsulation. The pre-sealant inspection shall verify that all ACM and residual debris have been removed from the work area. If the Consultant's Asbestos Project Monitor identifies residual dust or debris during the pre-sealant inspection, the Contractor shall re-clean to meet the "no visible, suspect dust or debris" standard.

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2. Final Visual Inspection: When abatement is complete, the Consultant's Asbestos Project Monitor will conduct a final visual inspection inside each regulated work area. The Consultant shall be informed 24 hours prior to the time that the inspection is needed. Following the removal of the inner layer of poly sheeting, but prior to final clearance air sampling, the Consultant's Asbestos Project Monitor will conduct a final visual inspection inside the work area. If residual dust or debris is identified during the final inspection, the Contractor shall re-clean to meet the "no visible, suspect dust or debris" standard.

3.10 ASBESTOS DISPOSAL

A. ACM and/or ACWM disposal (including supplies, rags, disposable clothing, respirator filter cartridges, etc.) shall be completed in accordance with MassDEP and EPA regulations. Waste receptacles (bags, drums, etc.) shall be labeled in accordance with the most current OSHA regulations (Title 29 CFR, Parts 1910.1001 and 1926.1101) and contain the following:

DANGER
CONTAINS ASBESTOS FIBERS
MAY CAUSE CANCER
CAUSES DAMAGE TO LUNGS
DO NOT BREATHE DUST
AVOID CREATING DUST

Note some materials are presumed to contain regulated concentrations of PCBs. Refer to Section 028433 - Polychlorinated Biphenyl Performance-Based Disposal for additional disposal requirements.

B. Disposal site approvals shall be obtained and accepted prior to the start of asbestos removal activities.

C. A copy of the signed disposal authorization shall be provided to the Owner, Consultant, and any required federal, state, or local agencies.

D. Copies of all Waste Shipment Records (WSR) shall be provided to the Owner no later than 35 calendar days from when the waste was removed from the Site for inclusion in the project file. The Contractor shall document the specific amount of waste on each WSR, portion/location of the Site building it was generated from, and the type of waste. Upon receipt of the ACM waste, the landfill operator shall sign the WSR so the quantity of asbestos debris leaving the Site and arriving at the landfill is documented for the Owner.

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E. All wash water and shower water shall be collected and filtered through a five-micron filter before discharge to a sanitary sewer with prior appropriate permitting or publicly-owned treatment works (POTW) approval. Alternately, wash and shower water can be used to moisten ACWM.

F. All ACWM shall be transported in covered sealed vans, boxes, or dumpsters which are physically isolated from the driver by an airtight barrier. All vehicles must be properly-licensed to meet Commonwealth of Massachusetts and United State Department of Transportation (DOT) requirements.

G. Any vehicles used to store or transport ACWM will either be removed from the Site at night, or securely locked and posted to prevent disturbance.

H. Any incident and/or accident that may result in spilling or exposure of ACWM outside the containment, on and off the property, and all related issues shall be the sole responsibility of the Contractor.

END OF SECTION

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DIVISION 02 **EXISTING CONDITIONS**

SECTION 02 84 33 **POLYCHLORINATED BIPHENYL PERFORMANCE-BASED DISPOSAL**

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. General Provisions of Contract, including General Supplementary Conditions shall apply to this Section.

B. Limited Hazardous Building Materials Inspection report prepared by Fuss & O'Neill EnviroScience, LLC November 20, 2014

C. Limited Hazardous Building Materials Inspection report prepared by Fuss & O'Neill EnviroScience, LLC January 3, 2018

D. Section 028213 – Asbestos Abatement

1.02 SCOPE OF WORK

A. Work outlined in this Section includes all work necessary for the removal and disposal of the presumed greater than or equal to (≥) 50 parts per million (ppm) PCB-containing material (i.e., PCB Bulk Product Waste) impacted during the Curtainwall, Storefront, and Window Replacement Project (the "Work") at Barnstable High School located at 774 West Main Street in Hyannis, Massachusetts (the "Site").

B. The Work of this Section includes the following:

1. Site preparation and controls to facilitate performance-based disposal of PCB Bulk Product Waste. Containment procedures for materials referenced for the PCB Work Zone must be utilized for PCB Bulk Product Waste removal.
2. Health and Safety in accordance with Occupational Safety and Health Administration (OSHA) requirements.
3. Removal, packaging, transportation, and disposal of presumed PCB-containing materials as PCB Bulk Product Waste at a facility permitted to accept PCB Bulk Product Waste (EPA Title 40 CFR, Part 761.62).
4. Removal, packaging, transportation, and disposal of containment barriers, personal protective equipment (PPE), cleaning materials and supplies, and waste generated during removal of PCB Bulk Product Waste as PCB Remediation Waste at a facility permitted to accept PCB Remediation Waste.
5. Cleaning of the Work Zones following complete removal of PCB Bulk Product Waste and PCB Remediation Waste (EPA Title 40 CFR, Part 761.61).

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6. Recordkeeping and distribution as required in accordance with EPA Title 40 CFR, Part 761.

C. Work shall be performed by a MADLS-licensed Asbestos Abatement Contractor (the "Contractor") with certified Asbestos Workers and Supervisor(s). Training shall be in accordance with MADLS Regulation 453 CMR, Part 6.00. In addition, workers shall have PCB-awareness training.

1.03 PROJECT DESCRIPTION

A. The Base Bid includes the removal, packaging, transporting, and disposing the presumed PCB Bulk Product Waste and PCB Remediation Waste, as identified herein, conducted by workers in accordance with OSHA and EPA regulations. The Base Bid will include the cost for removing, packaging, transporting, and disposing PCB Bulk Product Waste and PCB Remediation Waste.

B. Materials, as discovered outside of those listed (either above or below), will be measured and paid or credited by unit prices. The quantities are estimates only and should be verified by the Contractor.

C. The following table summarizes the locations of the base bid work with estimated material quantities. Note quantities provided below are order-of-magnitude estimates only. Refer to Demolition Drawings for specific locations.

BASE BID - PCB BULK PRODUCT WASTE

MATERIAL TYPE	LOCATION	ESTIMATED QUANTITY	NOTES
Exterior Window Caulking	Cafeteria Exterior (Refer to Architectural Demolition Drawings)	175 LF	1
Window Glazing Compound	Cafeteria Exterior (Refer to Architectural Demolition Drawings)	9 EA (2' x 7')	1
Interior Window Caulking	Cafeteria (Refer to Architectural Demolition Drawings)	175 LF	1

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MATERIAL TYPE	LOCATION	ESTIMATED QUANTITY	NOTES
Control-Joint Caulking	Cafeteria Exterior (Refer to Architectural Demolition Drawings)	8 LF	1
Exterior Window Caulking	Cafeteria Exterior (Refer to Architectural Demolition Drawings)	1 Window System (7' x 75')	1
Window Glazing Compound	Cafeteria Exterior (Refer to Architectural Demolition Drawings)		
Interior Window Caulking	Cafeteria (Refer to Architectural Demolition Drawings)		
Interior Window Caulking	Media Center (Refer to Architectural Demolition Drawings)	200 LF	1, 2
Exterior Window Caulking	Media Center (Refer to Architectural Demolition Drawings)	200 LF	1

EA = Each; LF = Linear Feet

Notes:

1. Denotes whole-component window system removal and disposal as required for replacement, including, but not limited to, concealed caulking, mastics/adhesive, and dampproofing materials.
2. Denotes material type contains asbestos.

D. A portion of the Work may be performed in multiple mobilizations, at different periods of time, in conjunction with other trades (i.e., other trades work, demolition work, etc.).

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E. Safety Data Sheets (SDS) for chemicals to be used during the project must be submitted to the Consultant prior to Site delivery.

F. The Contractor shall be responsible for providing temporary water, power, and heat as needed at the Site. Temporary lighting within the Work Zones must be connected to Ground-Fault Circuit Interrupter (GFCI) power panels, installed by a Commonwealth of Massachusetts-licensed electrician, permitted as required, and located outside of the Work Zone.

1.04 DEFINITIONS

A. The following definitions relative to PCB removal and disposal shall apply:

1. Architect: CBI Consulting, LLC
2. Air Monitoring: The process of measuring PCB concentrations of an area or exposure of a person.
3. CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act (Title 42 CFR, Parts 9601-9657).
4. Chemical Waste Landfill: A landfill at which protection against risk of injury to health or the environment from PCB migration to land, water, or the atmosphere is provided from PCBs and PCB items deposited therein by locating, engineering, and operating the landfill as specified in EPA Title 40 CFR, Part 761.75.
5. Cleanup Site: The full contamination extent and all suitable areas in very close proximity to the contamination necessary for implementation of a PCB Remediation Waste cleanup, regardless of whether the Site was intended for management of waste.
6. Competent Person: As defined by OSHA, a representative of the Contractor who is capable of identifying existing PCBs hazards in the workplace and selecting the appropriate control strategy for PCB exposure. Person who has authority to take prompt corrective measures to eliminate such hazards during PCB removal.
7. Consultant: Fuss & O'Neill EnviroScience, LLC.
8. Containment: An enclosure which establishes a contaminated area by surrounding the location where PCB and/or other toxic or hazardous substance removal is performed and establishing a Controlled Work Zone.
9. Decontamination Enclosure System (Decon): A series of connected areas, with curtained doorways between any two adjacent areas, for the decontamination of workers and equipment. A decontamination enclosure system always contains at least one airlock and is adjacent and connected to the regulated area, where possible.
10. Designated Facility: An off-site disposer or commercial storer of PCB-containing waste designated on the manifest as the facility that will receive a manifested shipment of PCB-containing waste.

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11. Disposal: An intentional or accidental act of discarding, throwing away, completing, or terminating the useful life of PCBs and PCB-containing items. Disposal includes spills, leaks, and other uncontrolled discharges of PCBs, as well as actions related to containing, transporting, destroying, degrading, decontaminating, or confining PCBs and PCB items.
12. DOT: The United States Department of Transportation.
13. EPA Identification Number: The 12-digit number assigned to a facility by EPA upon notification of PCB waste activity under EPA Title 40 CFR, Part 761.205.
14. Excluded PCB Product: A PCB-containing material which is determined by laboratory analysis to contain concentrations of PCBs less than 50 ppm, and meets the requirements of EPA Title 40 CFR, Part 761.3.
15. Fixed Object: Mechanical equipment, electrical equipment, fire detection systems, alarms, or all other fixed equipment, fixtures, or items which cannot be removed from the Work Zone.
16. Generator of PCB Waste: Any person who acts, processes, or produces PCBs that are regulated for disposal under EPA Title 40 CFR, Part 761, Subpart D, whose act first causes PCBs or PCB-containing items to become subject to the disposal requirements of EPA Title 40 CFR, Part 761, Subpart D, or who has physical control over the PCBs when a decision is made that the use of the PCBs has been terminated, and is therefore subject to the disposal requirements of EPA Title 40 CFR, Part 761, Subpart D. Unless another provision of EPA Title 40 CFR, Part 761 specifically requires a site-specific meaning, "Generator of PCB Waste" includes all of the PCB waste generation sites owned or operated by the person who generates PCB waste.
17. GFCI: Ground-Fault Circuit Interrupter.
18. HEPA: High-Efficiency Particulate Air.
19. HEPA Filter: Filter in compliance with ANSI Z9.2 1979.
20. HEPA Vacuum Equipment: Vacuum equipment where all the air drawn into the machine is expelled through a HEPA filter with none of the air leaking past it and with a HEPA-filter as the last filtration stage.
21. High-Occupancy Area: Any area where PCB Remediation Waste has been disposed on-site and where occupancy for any individual not wearing dermal and respiratory protection for a calendar year is: 840 hours or more (an average of 16.8 hours or more per week) for non-porous surfaces and 335 hours or more (an average of 6.7 hours or more per week). Examples might include a residence, school, day care center, sleeping quarters, a single or multiple occupancy, 40-hours per week work station, a school classroom, a cafeteria in an industrial facility, a control room, or a work station at an assembly line.
22. Incinerator: An engineered device using controlled flame combustion to thermally degrade PCBs and PCB Items. Examples of devices used for incineration include rotary kilns, liquid-injection incinerators, cement kilns, and high-temperature boilers.

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23. Laboratory: A facility that analyzes samples for PCBs and is unaffiliated with any entity whose activities involve PCBs.
24. Large PCB Mark (PCB M_L): Mark that includes letters and striping on a white or yellow background, and shall be sufficiently durable to equal or exceed the life (including storage for disposal) of the PCB Article, PCB Equipment, or PCB Container. The size of the mark shall be at least six inches (6") on each side. If the PCB Article or PCB Equipment is too small to accommodate this size, the mark may be reduced in size proportionately down to a minimum of two inches (2") on each side.
25. Liquid PCBs: A homogenous, flowable material containing PCBs, and no more than 0.5 percent by weight of non-dissolved material.
26. Low-Occupancy Area: Any area where PCB Remediation Waste has been disposed on-site, and where occupancy for any individual not wearing dermal and respiratory protection for a calendar year is: less than 840 hours (an average of 16.8 hours per week) for non-porous surfaces and less than 335 hours (an average of 6.7 hours per week). Examples might include an electrical substation or a location in an industrial facility where a worker spends small amounts of time per week (such as an un-occupied area outside a building, an electrical equipment vault, or in the non-office space in a warehouse where occupancy is transitory).
27. Manifest: The shipping document EPA form 8700-22, and any continuation sheet attached to EPA form 8700-22, originated and signed by the Generator of PCB Waste.
28. Mark: The descriptive name, instructions, cautions, or other information applied to PCBs, PCB Items, or other objects.
29. Marked: The marking of PCB Items, PCB storage areas, and transport vehicles by means of applying a legible mark by painting, fixation of an adhesive label, or by any other method that meets the requirements of the EPA Title 40 CFR, Part 761.
30. Movable Object: Unit of equipment of furniture in the Work Zone that can be removed from the Work Zone.
31. Municipal Solid Waste: Garbage, refuse, sludges, wastes, and other discarded materials resulting from residential and non-industrial operations and activities, such as household activities, office functions, and commercial housekeeping wastes.
32. Negative Air Pressure Equipment: A portable, local exhaust system equipped with HEPA filtration used to create negative pressure in a regulated area (negative with respect to adjacent unregulated areas), and capable of maintaining a constant, low-velocity air flow into regulated areas from adjacent unregulated areas.

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33. Non-Liquid PCBs: Materials containing PCBs that, by visual inspection, do not flow at room temperature (25°C or 77°F), or from which no liquid passes when a 100 gram or 100 milliliter representative sample is placed in a mesh number 60 ±5 percent paint filter and allowed to drain at room temperature for five minutes.
34. Non-Porous Surface: A smooth, unpainted solid surface that limits penetration of PCB-containing liquid beyond the immediate surface. Examples include smooth uncorroded metal, natural gas pipe with a thin porous coating originally applied to inhibit corrosion, smooth glass, smooth glazed ceramics, impermeable polished building stone such as marble or granite, and high-density plastics, such as polycarbonates and melamines, which do not absorb organic solvents.
35. On-Site: Within the boundaries of a contiguous property unit.
36. Owner: Barnstable Public Schools
37. PCB(s): A chemical substance that is limited to the biphenyl molecule that has been chlorinated to varying degrees or any combination of substances that contain such substance. Refer to EPA Title 40 CFR, Part 761.1(b) for applicable concentrations of PCBs. PCB and PCBs as contained in PCB Items are defined in EPA Title 40 CFR, Part 761.3.
38. PCB Article: A manufactured article, other than a PCB Article Container, that contains PCBs and whose surface(s) has been in direct contact with PCBs. Includes capacitors, transformers, electric motors, pumps, pipes, and other manufactured item which (1) is formed to a specific shape or design during manufacture, (2) has end use function(s) dependent in whole or in part upon its shape or design during end use, and (3) has either no change of chemical composition during its end use, or only those changes of composition that have no commercial purpose separate from that of the PCB Article.
39. PCB Article Container: A package, can, bottle, bag, barrel, drum, tank, or other device used to contain PCB Articles or PCB Equipment, and whose surface(s) has not been in direct contact with PCBs.
40. PCB Bulk Product Waste: A waste derived from manufactured products containing PCBs in a non-liquid state, at any concentration where the concentration at the time of designation for disposal is greater than or equal to (≥) 50 ppm PCBs. Does not include PCBs or PCB Items regulated for disposal under EPA Title 40 CFR Parts 761.60(a)-(c), 7611.61, 761.63, or 761.64. PCB Bulk Product Waste is further defined in EPA Title 40 CFR, Part 761.3.
41. PCB Capacitor: A capacitor that contains PCBs at concentration ≥ 500 ppm. Concentration assumptions applicable to capacitors appear under EPA Title 40 CFR, Part 761.2.
42. PCB Equipment: A manufactured item, other than a PCB Article Container, which contains a PCB Article or other PCB Equipment, and includes microwave ovens, electronic equipment, and fluorescent light ballasts and fixtures.
43. PCB Item: A PCB Article, PCB Article Container, PCB Container, PCB Equipment, or anything that deliberately or unintentionally contains, or has as a part of it, any PCBs.

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44. PCB Remediation Waste: Waste containing PCBs in concentrations ≥ 1 ppm as a result of a spill, release, or other unauthorized disposal. This includes wastes generated during PCB removal including containment barriers (polyethylene sheeting, tape, etc.), PPE, waste/decontamination water, used decontamination disposables (e.g., towels, cloths), and other disposables used and generated during PCB removal work. **PCB Remediation Waste must be disposed as a hazardous waste.**
45. PCB Waste(s): PCBs and PCB Items that are subject to the disposal requirements of EPA Title 40 CFR, Part 761, Subpart D.
46. Performance-Based Disposal: Disposal of PCB Bulk Product presumed to contain ≥ 50 ppm PCBs.
47. Porous Surface: A surface that allows PCBs to penetrate or pass into itself including, but not limited to, paint or coating on metal, corroded metal, fibrous glass or glass wool, unglazed ceramics, ceramics with a porous glaze, porous building stone such as sandstone, travertine, limestone, or coral rock, low-density plastics such as Styrofoam™ and low-density polyethylene (poly), coated (varnished or painted) or uncoated wood, concrete or cement, plaster; plasterboard, wallboard, rubber, fiberboard, chipboard, asphalt, or tar paper. For purposes of cleaning and disposing of PCB Remediation Waste, porous surfaces have different requirements than non-porous surfaces.
48. RCRA: The Resource Conservation and Recovery Act (EPA Title 40 CFR, Parts 260 - 265).
49. Regulated Work Zone: An area established by the employer to demarcate where PCB removal is conducted and any adjoining area where debris, and waste from such PCB removal work, accumulates.
50. Site: Barnstable High School located at 744 West Main Street in Hyannis, MA.
51. Storage for Disposal: Temporary storage area for PCBs that have been designated for disposal.
52. SW-846: The document having the title "SW-846, Test Methods for Evaluating Solid Waste."
53. Totally-Enclosed Manner: A manner that will ensure no exposure to human beings, or the environment, to a concentration of PCBs.
54. Transfer Facility: A transportation-related facility including loading docks, parking areas, and other similar areas where shipments of PCB waste are held during normal transportation. Transport vehicles are not transfer facilities under this definition, unless they are used for the storage of PCB waste, rather than for actual transport activities. Storage areas for PCB waste at transfer facilities are subject to the storage facility standards of EPA Title 40 CFR, Part 761.65, but such storage areas are exempt from the approval requirements of EPA Title 40 CFR, Part 761.65(d) and the recordkeeping requirements of EPA Title 40 CFR, Part 761.180, unless the same PCB waste is stored there for a period of more than 10 consecutive days between destinations.

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55. Transporter of PCB Waste: For the purposes of Title 40 CFR, Part 761, Subpart K, any person engaged in the transportation of regulated PCB waste by air, rail, highway, or water for purposes other than consolidation by a generator.
56. Transport Vehicle: A motor vehicle or rail car used for the transportation of cargo by any mode. Each cargo-carrying body (e.g., trailer, railroad freight car) is a separate transport vehicle.
57. TSCA: The Toxic Substances Control Act (15 U.S.C. 2601 et seq.).

1.05 CONSULTANT

A. The Owner shall retain a third-party, environmental hygiene firm (the "Consultant") for the purposes of project management and monitoring during Polychlorinated Biphenyl (PCB) Bulk Product Waste performance-based disposal. The Consultant will represent the Owner in all phases of the PCB performance-based disposal project at the discretion of the Owner. The Asbestos Abatement Contractor and/or Demolition Contractor (collectively the "Contractor") shall regard the Consultant's direction as authoritative and binding (as provided herein) in matters particularly, but not limited to, the following:

1. Work Zone approval
2. Monitoring results review
3. Various segments of work completion
4. Final visual inspection
5. Data submission review

1.06 USE OF THE CONTRACT DOCUMENTS

A. It shall be incumbent upon the Contractor to visit the Site and determine what exists, its condition, and what will be required to accomplish the Work intended by the Contract Documents. No increase in the Contract Sum will be permitted as a result of the Contractor's failure to visit the Site and understand the existing conditions.

B. All work shall comply with the Contract Documents and with applicable codes, laws, regulations, and ordinances wherever applicable. The most stringent of all the foregoing shall govern the Work.

C. It is not intended that the Specifications show every detail of the Work, but the Contractor shall be required to furnish, within the Contract Sum, all materials and labor necessary for the completion of the Work in accordance with the intent of the Specifications.

D. In case of ambiguity among the Contract Documents, the more stringent requirement, as determined by the Consultant, shall apply.

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E. The Work of this Contract includes making modifications as necessary, subject to approval by the Owner in consultation with the Consultant, to correct any conflicts between Contract Documents.

F. All items, not specifically mentioned in the Specifications, but implied by trade practices to complete the Work, shall be included.

1.07 SITE EXAMINATION

A. It is understood that the Contractor has examined the Site and made their own estimates of the Site facilities and difficulties attending to the execution of the Work, and has based their bid price thereon.

B. Except for unforeseeable concealed conditions as determined by the Consultant, the Contractor shall make no claim for additional cost due to the existing Site conditions.

1.08 CONTRACTOR QUALIFICATIONS

A. All bidders shall submit a record of prior experience in PCB performance-based disposal (or similar) projects, listing no less than three completed projects in the past year, with all projects of similar size and scope. The Contractor shall list the experience and training of the project supervisor and all on-site personnel. The information to be included is as follows:

1. Project Name and Address
2. Owner’s Name and Address
3. Architect/Consultant
4. Contract Amount
5. Completion Date
6. Extras and Changes

B. Submit a written statement regarding whether the Contractor and/or any employees have ever been cited for non-compliance with federal or state regulations pertaining to worker protection, removal, transport, or disposal related to PCBs or other hazardous materials.

1.09 CONSTRUCTION PROGRESS SCHEDULE

A. To assure adequate planning and execution of the Work and to assist the Consultant in reviewing the justification for the Contractor's applications for payment, the Contractor shall prepare and maintain a detailed Progress Schedule.

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B. The Contractor shall supervise and direct all work of theirs and other trades using their best skill and attention. The Contractor shall be solely responsible for all construction means, methods, techniques, sequences, and procedures, and for coordinating all portions of the Work under the Contract.

C. Due to the nature of this construction work, the scheduling or phasing of work under this Contract may be adjusted by the Owner. As long as the scope of work is not altered, adjustments to the project phasing shall have no effect on the contract price.

D. The Contractor and any Subcontractors shall attend a pre-construction meeting with the Owner and their Consultant. The assigned Supervisor must attend this meeting.

1.10 TESTING LABORATORY SERVICES

A. The Contractor shall submit to the Consultant the name, address, and qualifications of proposed laboratories intended to be utilized for sample analysis, as required by this Section.

B. Bulk sample collection by the Contractor shall be prohibited without prior written consent of the Owner or their Consultant.

C. If representative composite samples of the anticipated waste stream must be collected and analyzed using the Toxicity Characteristic Leaching Procedure (TCLP) for disposal purposes, the Contractor shall seek written approval from the Owner and the Consultant. The Owner or the Consultant may elect to have the testing provided by a third-party, environmental-hygiene firm of their choosing at the Contractor’s expense.

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1.11 ADDITIONAL GENERAL REQUIREMENTS

A. The Contractor shall employ a competent Supervisor with at least three years of experience on projects of similar scope and magnitude, who shall be responsible for all work involving performance-based disposal of presumed PCB-containing materials, as described in this Section and defined in applicable regulations, and have full-time, daily supervision of the same. The Supervisor shall be the competent person as defined by OSHA regulations.

B. The Contractor shall furnish all labor, materials, facilities, equipment, installation services, employee training, permits, licenses, certifications, agreements, and incidentals necessary to perform the specified work. Work shall be performed in accordance with the Contract Documents, the latest regulations from OSHA, the United State Environmental Protection Agency (EPA), and all other applicable federal, state, and local agencies. Whenever the requirements of the above references conflict or overlap, the more stringent provision shall apply.

C. All project personnel engaged in the work covered under this Section shall be trained in accordance with OSHA Title 29 CFR, Parts 1910.1000 and 1910.1200.

D. This Section specifies the procedures for disposal of existing materials presumed to contain PCBs at concentrations of ≥ 50 ppm. Note that these materials may also contain asbestos.

E. This Section also specifies the procedures for removal and disposal of PCB Bulk Product Waste generated during PCB performance-based disposal. **This includes disposal of containment barriers, PPE, cleaning materials, and supplies as PCB Remediation Waste.**

F. Subsequent cleaning of all adjacent surfaces upon completion of Work is also included in this Section.

G. Disturbance or removal of PCB-containing material may cause a health hazard to workers and building occupants. The Contractor shall disclose to workers, supervisory personnel, subcontractors, and consultants at the Site the seriousness of the hazard and proper work procedures that must be strictly followed.

H. During performance of the Work, workers, supervisory personnel, Subcontractors, or consultants who may encounter, disturb, or otherwise function in the immediate vicinity of the PCB-containing material, shall take continuous measures, as necessary, to protect workers from the hazard of exposure. Such measures shall include the procedures and methods described in this Section, OSHA regulations, EPA regulations, and local requirements, as applicable.

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I. If requested or required by local, state, federal, and any other authorities having jurisdiction over such work, the Contractor shall allow the Work of this Contract to be inspected. The Contractor shall immediately notify the Owner and the Consultant, and shall maintain written evidence of such inspection for review by the Owner and the Consultant.

J. The Contractor shall incur the cost of all fines resulting from regulatory non-compliance during the Work, as issued by federal, state, and local agencies. The Contractor shall incur the cost of all work requirements mandated by federal, state, and local agencies as a result of regulatory non-compliance, or negligence.

K. The Contractor shall immediately notify the Owner and Consultant when all permits, licenses, certificates of inspection, of approval, or of occupancy, etc. are delivered. The Contractor shall also immediately notify the Owner and Consultant of any other such instruments required under codes by authorities having jurisdiction, regardless of issuer, and shall cause them to be displayed to the Owner and Consultant for verification and recording.

1.12 SUBMITTALS

A. The Contractor shall submit the following to the Consultant, in one complete package, prior to the pre-construction meeting, and no later than 10 business days prior to the anticipated start of the Work:

1. Site-Specific Health and Safety Plan (HASP): The Contractor shall prepare a site-specific HASP plan for protection of workers and control of the work site in accordance with OSHA regulatory requirements located at Title 29 CFR, Part 1910.120. The HASP shall govern all work conducted at the Site during removal of PCB-Containing Materials and related debris, waste handling, sampling, waste management, and waste transportation. At a minimum, the HASP shall address the requirements set forth in OSHA Title 29 CFR, Part 1910.120, as further outlined below:

a. Health and Safety Organization
b. Site Description and Hazard Assessment
c. Training
d. Medical Surveillance
e. Work Zones
f. Personal Protective Equipment
g. Personal Hygiene and Decontamination
h. Standard Operating Procedures and Engineering Controls
i. Emergency Equipment and First Aid Provisions
j. Equipment Decontamination
k. Air Monitoring

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l. Telephone List
m. Emergency Response and Evacuation Procedures and Routes
n. Site Control
o. Permit-Required Confined Space Procedures (if applicable)
p. Spill Prevention Control and Countermeasure (SPCC) Plan
q. Heat and Cold Stress
r. Recordkeeping
s. Community Protection Plan

2. Employee Training, Medical, and Respirator Fit Test Documentation: The Contractor shall submit the following documentation:

   a. Submit documentation of OSHA 40-Hour HAZWOPER training for workers and additional 8-Hour HAZWOPER Supervisor Training for the designated on-site Supervisor for the abatement work. All workers shall have required training for other materials, if required, such as asbestos, and a minimum of awareness training for PCBs, consistent with OSHA requirements for hazard communication.

   b. Medical clearance and respirator fit test records of each employee who may be on the Site.

3. PCB and/or other Toxic or Hazardous Substances Disposal Plan: A written plan that details the Contractor's plan for transportation and disposal of PCB Bulk Product Waste, PCB Remediation Waste, or other Toxic or Hazardous Substance wastes generated during the project. The Disposal Plan shall identify:

   a. The Contractor's insurance certificate and each landfill's (PCB Bulk Product Waste and PCB Remediation Waste) operating permits and insurance certificates.
   b. Waste packaging, labeling, placarding, and manifesting procedures.
   c. The name, address, and 24-hour contact number for the proposed treatment or disposal facility, or facilities to which waste generated during the project will be transported.
   d. The name, address, contact person(s), and state-specific permit numbers for proposed waste transporters, and EPA and DOT identification number for firms that will transport PCB Bulk Product Waste and PCB Remediation Waste.
   e. The license plate numbers of vehicles to be used in transporting of the waste from the Site to each disposal facility.
   f. The route(s) by which the waste will be transported to the designated disposal facility and states or territories through which the waste will pass.

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4. Safely Data Sheets (SDS): SDS and manufacturer's information shall be provided for all chemicals and materials to be used during the project including, but not limited to, specialty cleaners and chemical stripping products.

5. Air Sampling Professional Qualifications: The qualifications of the air sampling professional that the Contractor proposed to use for this project to perform OSHA-required employee exposure monitoring.

No work on the Site will be allowed to begin until the Owner/Architect and the Consultant, as listed herein, approve the Pre-Construction Submittals. Any delay caused by the Contractor's refusal or inability to submit this documentation in a timely manner does not constitute a cause for change order or a time extension.

B. The following documents shall be submitted to the Consultant within 30 working days following removal of waste from the Site:

1. Waste Profile Sheets
2. Pre-Disposal Analysis Test Results (if required by disposal facility)
3. Waste Manifests signed by the disposal facility
4. Tipping Receipts provided by the disposal facility
5. Certification of Final Treatment/Disposal signed by the responsible disposal facility official.

C. The following shall be submitted to the Consultant at the completion of the Work:

1. Disposal Site Receipts: Copy of waste shipment record(s) and disposal site receipt(s) that indicate that PCB Bulk Product Waste, PCB Remediation Waste or other Toxic or Hazardous Substances materials have been properly disposed.
2. Product Data: Catalog sheets, specifications, and application instructions for any removal products, if used.

1.13 REGULATIONS AND STANDARDS

A. The Contractor shall be solely responsible for conducting the Work and supervising all work in a manner that will be in conformance with all federal, state, and local regulations and guidelines pertaining to PCB Bulk Products performance-based disposal. Specifically, the Contractor shall comply with the requirements of the following:

1. EPA TSCA (Title 40 CFR, Part 761);
2. OSHA HAZWOPER Regulations (Title 29 CFR, Part 1910.120);
3. OSHA Respiratory Protection Standard (Title 29 CFR, Part 1910.134)
4. OSHA Hazard Communication (Title 29 CFR, Part 1910.1200)
5. DOT Hazardous Waste Transportation Regulations (Title 49 CFR, Parts 170 - 180).

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6. 2003 International Building Code and all amendments;
7. Life Safety Code (National Fire Protection Association [NFPA]);
8. Local health and safety codes, ordinances or regulations pertaining to PCB remediation and all national codes and standards including ASTM, ANSI, and Underwriter's Laboratories.

1.14 POSTING AND RECORD MAINTENANCE REQUIREMENTS

A. The following items shall be conspicuously displayed proximate, but outside of, removal Work Zones:

1. Exit Routes: Emergency exit procedures and routes.
2. Emergency Phone Numbers: A list indicating the telephone numbers and locations of the local hospital(s), the local emergency squad, the local fire department, the local police department, the Poison Control Center, Chemical Emergency Advise (CHEMTREC), the Department of Health's local office, the Contractor (on-site and after hours numbers), and the Consultant (on-site and after hours contact numbers).
3. Warning Signs: Warning signs shall be in English and the language of any workers on-site who do not speak English, and be of sufficient size to be clearly legible and display the following or similar language in accordance with OSHA Title 29 CFR, Part 1910.1200:

WARNING
HAZARDOUS WASTE WORK ZONE
PCBs-POISON
NO SMOKING, EATING OR DRINKING
AUTHORIZED PERSONNEL ONLY
PROTECTIVE CLOTHING IS REQUIRED IN THIS AREA

4. In addition, all entrances to Work Zones shall be posted with a PCB M_L.
5. Posting requirements of Section 028213 - Asbestos Abatement are required as well when the material being removed also contains asbestos.

B. The Contractor shall maintain the following items on-site and have copies available for review by all employees and authorized visitors:

1. Contractor's Site-Specific HASP.
2. Training, Medical Clearance, and Respirator Fit Test Record Documentation for all employees and the project Supervisor.
3. Codes, Standards, and Publications.
4. SDS for all chemicals used during the project.
5. Contractor's written hazard communication, respiratory protection, and confined space entry programs.

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C. Fees, Permits, and Licenses: The Contractor shall pay all licensing fees, royalties, and other costs necessary for the use of any copyrighted or patented product, design, invention, or processing in the performance of the work specified in this Section.

1. The Contractor shall be solely responsible for costs, damages, or losses resulting from any infringement of these patent rights or copyrights. The Contractor shall hold the Owner and the Consultant harmless from any costs, damages, and losses resulting from any infringement of these patent rights or copyrights.
2. The Contractor shall be responsible for securing all necessary permits for work under this Section, including hauling, removal, and disposal, fire, and materials usage, or any other permits required to perform the specified work.

1.15 MINIMUM REQUIREMENTS FOR WORKER HEALTH AND SAFETY

A. The Contractor is responsible and liable for the health and safety of all on-site personnel and the off-site community affected by the Work. All on-site workers or other persons entering the Work Zones, decontamination areas, or waste handling and staging areas shall be knowledgeable of and comply with the requirements of the site-specific HASP at all times. The Contractor's HASP shall comply with all applicable federal, state, and local regulations protecting human health and the environment from the hazards posed by the Work.

B. Consistent disregard for the provisions of the HASP shall be deemed as sufficient cause for immediate stoppage of work and termination of the Contract or any Subcontracts without compromise or prejudice to the rights of the Owner or Consultant.

C. Any discrepancies between the Contractor's HASP and these Specifications or federal, state, and local regulations shall be resolved in favor of the more stringent requirements that provide the highest degree of protection to the project personnel, the surrounding community, and the environment.

D. In addition to exposure concerns relating to the presence of PCBs, other health and safety considerations will apply to the Work. The Contractor shall be responsible for recognizing such hazards and shall be responsible for the health and safety of the Contractor's employees at all times. It is the Contractor's responsibility to comply with all applicable health and safety regulations.

E. The HASP shall be reviewed by all personnel prior to entry into the PCB removal, decontamination, or waste staging areas. This includes representatives of the Contractor, Owner, Consultant, Subcontractor(s), Waste Transporter, or Federal, State, or Local Regulatory Agencies. Such review shall be acknowledged and documented by the Contractor's Site Supervisor by obtaining the name, signature, and affiliation of all personnel reviewing the HASP.

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F. The HASP shall be maintained so as to be readily accessible and reviewable by all site personnel throughout the duration of the PCB performance-based disposal project, and until all waste materials are removed from the Site and disposed at the appropriate disposal facility.

G. The Contractor's Site Supervisor shall be responsible for ensuring that project personnel and site visitors are informed of and comply with the provisions of the HASP.

1.16 WORK ZONES AND ZONES

A. The Contractor shall demarcate and clearly identify Work Zones at the Site. Access by equipment, site personnel, and the general public to the Work Zones shall be limited as follows:

1. Work Zone: The work zone(s) shall consist of all areas where removal of Bulk Products and other Toxic or Hazardous Substances, and waste handling and staging activities are on-going and the immediately surrounding locale or other areas where contamination could occur. For PCB Bulk Product removal purposes or other Toxic or Hazardous Substances for disposal, work shall be performed in each work zone within a regulated work zone (as defined in subsequent Subsections) to demarcate work zones from non-work zones. The regulated Work Zone shall be visibly delineated with appropriate warning signs at all approaches to the area (including a PCB M_L), and be restricted from access by all personnel except those directly necessary for the completion of the respective PCB Bulk Product removal and disposal tasks. The Work Zones shall be relocated and delineated, as necessary, as work progresses from one portion of the Site to another, to limit access to each area and to minimize risk of exposure to Site workers and the general public. Access shall be controlled at the periphery of the Work Zones to regulate the flow of personnel and equipment into and out of each zone and to help verify that proper procedures for entering and exiting are followed. All persons within the Work Zones shall wear the appropriate level of PPE established in the Contractor's HASP.

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2. Decontamination Zone: The Decontamination Zone is the transition zone between the Work Zone and the clean Support Zone of the Site, and is intended to reduce the potential for contaminants from being dispersed from the Work Zone to clean areas of the Site. The Decontamination Zone shall consist of a buffer area surrounding each Work Zone through which the transfer of equipment, materials, personnel, and containerized waste products will occur, and in which decontamination of equipment, personnel, and clothing will occur. The Decontamination Zones shall be constructed as a three-chambered decon for workers and a two-chambered equipment room for waste load out, as detailed in subsequent Subsections. All emergency response and first aid equipment shall be readily maintained in this zone. All PPE and clothing shall be removed or decontaminated in the Decontamination Zone prior to exiting to the Support Zone. If PPE, clothing, and equipment cannot be decontaminated, it shall be segregated as PCB Remediation Waste and disposed as such.
3. Support Zone: The Support Zone shall consist of the area outside the Decontamination Zones and the remainder of the Site. Administrative and any support activities that by nature need not be conducted in the Work or Decontamination Zone related to the project shall occur in the Support Zone. Access to the Work and Decontamination Zones shall be controlled by the Contractor's Site Supervisor, and limited to those persons necessary to complete the Work, and who have reviewed and signed the Contractor's HASP.

1.17 PERSONNEL PROTECTIVE EQUIPMENT

A. The Contractor shall provide all employees with the appropriate safety equipment and protective clothing to ensure an appropriate level of protection for each task, taking into consideration the chemical, physical, ergonomic, and biological hazards posed by the Site and the Work.

B. The Contractor shall establish criteria for PPE selection and use in the HASP.

C. The PPE to be utilized for the project shall be selected based upon the potential hazards associated with the Site and the Work. Appropriate PPE shall be worn at all times within the Work Zone.

D. The Contractor shall provide the appropriate level of respiratory protection to all field personnel engaged in activities where respiratory hazards exist, or where there is a potential for such hazards to exit.

E. The Contractor shall provide, as necessary, protective coveralls, disposable gloves, and other protective clothing for all personnel that will be actively involved in waste handling activities, or otherwise present in the Work Zones. Coveralls shall be Tyvek™ or equivalent material. Should the potential for exposure to liquids exist, splash-resistant disposable suits shall be provided and utilized.

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F. Protective coveralls and other protective clothing shall be donned and doffed within the Decontamination Zone and shall be disposed as PCB Remediation Waste at the end of each day. Ripped coveralls shall be immediately replaced after appropriate decontamination has been completed to the satisfaction of the Contractor's Site Supervisor. Protective clothing shall not be worn outside of the Decontamination Zone.

G. Hard hats, protective eyewear, rubber boots, and/or other non-skid footwear shall be provided by the Contractor as required for workers and authorized visitors.

H. All contaminated protective clothing, respirator cartridges, and disposable protective items shall be placed into proper containers to be provided by the Contractor for transport and proper disposal as PCB Remediation Waste in accordance EPA regulations.

1.18 EMERGENCY EQUIPMENT AND FIRST AID REQUIREMENTS

A. At a minimum, the Contractor shall provide and maintain at the Site the following Emergency and First Aid Equipment:

1. Fire Extinguishers: A minimum of one fire extinguisher shall be supplied and maintained at the Site by the Contractor throughout the duration of the Work. Each extinguisher shall be a 20-pound Class ABC dry fire extinguisher minimum with Underwriters Laboratory approval per OSHA Title 29 CFR, Part 1910.157.
2. First Aid Kit: A minimum of one first aid kit meeting the requirements of OSHA Title 29 CFR, Part 1910.151 shall be supplied and maintained at the Site by the Contractor throughout the duration of the Work.
3. Communications: Telephone communications (either cellular or land line) shall be provided by the Contractor for use by site personnel at all times during the Work.

B. The Contractor's Site Supervisor shall be notified immediately in the event of personal injury, potential exposure to contaminants, or other emergency. The Contractor's Site Supervisor shall then immediately notify the Owner and Consultant.

1.19 STANDARD SAFETY AND HEALTH PROCEDURES AND ENGINEERING CONTROLS

A. The following provisions shall be employed to promote overall safety, personnel hygiene, and personnel decontamination:

1. Each Contractor or Subcontractor shall ensure that all safety equipment and protective clothing to be utilized by its personnel is maintained in a clean and readily-accessible manner at the Site.
2. All prescription eyeglasses in use on this project shall be safety glasses conforming to ANSI Standard Z87.1. No contact lenses shall be allowed on the Site.

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3. Prior to exiting the delineated Decontamination Zone(s), all personnel shall remove protective clothing, and place disposable items in appropriate disposal containers to be dedicated to that purpose. Following removal of PPE, personnel shall thoroughly wash and rinse their face, hands, arms, and other exposed areas with soap and tap water wash and subsequent tap water rinse. A fresh supply of tap water shall be provided at the Site on each work day by the Contractor for this purpose.
4. All PPE used on-site shall either be decontaminated (in accordance with EPA Title 40 CFR, Part 761.79), or containerized at the end of each work day (to be disposed as PCB Remediation Waste). Discarded PPE shall be placed in sealed, DOT-approved 55-gallon drums for off-site disposal.
5. Respirators shall be dedicated to each employee and not interchanged between workers without cleaning and sanitizing.
6. Eating, drinking, chewing gum or tobacco, smoking, and any other practice that increases the likelihood of hand-to-mouth contact shall be prohibited within the delineated Work Zones. Prior to performing these activities, each employee shall thoroughly cleanse their face, hands, arms, and other exposed areas.
7. All personnel shall thoroughly cleanse their face, hands, arms, and other exposed areas prior to using toilet facilities.
8. No alcohol, illicit drugs, or firearms will be allowed on the Site at any time.
9. Contact with potentially contaminated surfaces should be avoided, if possible. Field personnel should minimize walking through standing water/puddles, mud, or other wet or discolored surfaces, kneeling on the ground, and placing equipment, materials or food on the ground, or other potentially contaminated surface.
10. The use of the "Buddy System" shall be employed at all times while conducting work at the Site. Each employee shall frequently monitor other workers for signs of heat stress, chemical exposure, or fatigue by periodically examining others' PPE for signs of wear or damage, routinely communicate with others, and notify the Contractor's Site Supervisor in the case of an emergency.

B. Workers must wear protective suits, protective gloves, eye protection, and a minimum of half-face, air-purifying respirator with dual HEPA-filter cartridges (P100). Respiratory protection shall be in accordance with OSHA Title 29 CFR, Part 1910.134 and ANSI Z88.2.

C. Workers must be trained per OSHA requirements, have medical clearance, and must have recently received a pulmonary function test (PFT) and a respirator fit test by a trained professional.

1. A personal air sampling program shall be in place, as required by OSHA.
2. The use of respirators must also follow a complete written respiratory protection program as specified by OSHA.

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PART 2 - PRODUCTS

2.01 MATERIALS

A. Deliver all materials in the original packages, containers, or bundles bearing the name of the manufacturer, the brand name, and the product technical description.

B. Damaged or deteriorating materials shall not be used and shall be removed from the premises by the end of the day. Material that becomes contaminated with PCBs shall be decontaminated or disposed as PCB Remediation Waste.

C. Poly sheeting, in a roll size to minimize the frequency of joints, shall be delivered to the Site with factory label indicating four (4) or 6-mil thickness.

D. Poly disposable bags shall be 6-mil thickness with pertinent pre-printed labels. Tie wraps for bags shall be plastic, five-inches long (minimum), pointed and looped to secure filled poly bags.

E. Tape or adhesive spray shall be capable of sealing joints in adjacent poly sheeting and for attachment of poly sheeting to finished or unfinished surfaces of dissimilar materials, and capable of adhering under both dry and wet conditions, including use of cleaning products.

F. Cleaning Products: The Contractor shall utilize cleaning products such as Simple Green®, Natural Orange™, or other cleaners approved by the Consultant for use in decontaminating porous and non-porous surfaces to remain. All such products shall be utilized in accordance with manufacturer's specifications as intended. The Contractor shall ensure appropriate use and disposal associated with use in accordance with the SDS sheets for each product utilized.

G. The Contractor shall have available spray equipment capable of mixing wetting agent with water and capable of generating sufficient pressure and volume, and having sufficient hose length to reach all PCB Work Zones.

H. The Contractor shall have available enough DOT-approved 17-C or 17-H drums for waste disposal.

2.02 TOOLS AND EQUIPMENT

A. The Contractor shall provide all tools and equipment necessary for PCB removal and disposal.

B. The Contractor's air monitoring professional shall have air-monitoring equipment of type and quantity to monitor operations and conduct personnel exposure surveillance per OSHA requirements.

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C. The Contractor shall have available sufficient inventory or dated purchase orders for materials necessary for the Work including protective clothing, respirators, respirator filter cartridges, poly sheeting of proper size and thickness, tape, and air filters.

D. The Contractor shall provide (as needed) temporary electrical power panels, electrical power cables, and electrical power sources (such as generators). Any electrical connection work affecting the building electrical power system shall be performed by a Commonwealth of Massachusetts-licensed electrician, and permitted as required.

E. The Contractor shall have available shower stalls and support plumbing including sufficient hose length and drain system, or an acceptable alternate.

F. Vacuum units, of suitable size and capacities for the project, shall have HEPA filter(s) capable of trapping and retaining at least 99.97 percent of all mono-dispersed particles of 0.3 micrometers in diameter or larger.

PART 3 - EXECUTION

3.01 PRE-CONSTRUCTION MEETING

A. At least one week prior to the start of work a Pre-Construction Meeting shall be scheduled with the Owner and their Consultant, and must be attended by the Contractor, and any Subcontractors. The assigned Contractor Site Supervisor must also attend this meeting.

B. The Contractor shall present a detailed project schedule and project submittal package at the Pre-Construction Meeting. Variations, amendments, and corrections to the presented schedule will be discussed, and the Owner and Consultant will inform the Contractor of any scheduling adjustments for this project.

C. Following the Pre-Construction Meeting, the Contractor shall submit a revised schedule (if needed) no later than one week after the meeting.

3.02 WORK ZONE PROTECTION

A. Where necessary, deactivate electrical power. Provide GFCI devices, temporary power, and temporary lighting installed in compliance with all applicable electrical codes. All installations are to be made by a Commonwealth of Massachusetts-licensed electrician, permitted as required, and located outside the Work Zone.

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B. Post warning signs in accordance with OSHA Title 29 CFR, Part 1910.1200 at all approaches to the Work Zone(s). Signs shall be conspicuously posted to permit a person to read signs and take precautionary measures to avoid exposure to PCBs or other Toxic or Hazardous Substances. These signs should include the large PCB M_L markers at each entrance to the Work Zone.

C. If applicable, refer to Section 028213 - Asbestos Abatement for additional requirements when materials contain asbestos.

D. Separate waste containers for PCB Bulk Product Waste and PCB Remediation Waste shall be located on-site and shall be placed adjacent to work zone or in an area designated by the Owner. Waste containers shall be lined, covered, and secured. The PCB waste containers shall be properly marked as described in EPA Title 40 CFR, Part 761.40. Marking shall include a PCB M_L marker formatted in accordance with EPA Title 40 CFR, Part 761.45.

3.03 DECONTAMINATION ENCLOSURE SYSTEM

A. The Contractor shall establish, contiguous to the work area, a three-chamber decon consisting of equipment room, shower room, and clean room, in series. The only access between contaminated and uncontaminated areas shall be through this decon. If it is not feasible to erect a contiguous decon, the Contractor shall establish a remote decon in as close proximity to the work area as is feasible. For abatement not requiring a NPE, the Contractor shall establish a remote decon at the perimeter of the regulated work area.

B. Access between rooms in the decon shall be through double-flap, curtained openings. The clean room, shower room, and equipment room within the decontamination enclosure, shall be completely sealed ensuring that the sole source of airflow through this area originates from uncontaminated areas outside the work area.

C. If feasible, the Contractor shall establish, contiguous with the work area, an equipment decon consisting of 2 totally-enclosed chambers divided by a double-flapped, curtained opening. No personnel are permitted to enter or exit through this unit.

D. Occupied areas and/or building space not within the work areas shall be separated from work areas by means of airtight barriers.

E. Construct the decon with wood or metal framing, cover both sides with 2 layers of 6-mil poly sheeting, completely sealed with spray adhesive, and taped at the joints.

E. If a Consultant is retained for pre-abatement services, the Contractor and the Consultant shall visually inspect barrier several times daily to assure effective seal and the Contractor shall repair defects immediately.

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3.04 PCB BULK PRODUCT WASTE REMOVAL PROCEDURES

A. The Contractor shall have a designated OSHA competent person on the Site at all times to ensure proper work practices are implanted throughout the project.

B. The Contractor shall regulate the Work Zone as required for compliance with OSHA Title 29 CFR, Part 1910.1200 to prohibit non-trained workers from entering areas where PCBs are to be removed.

C. PCB Bulk Products shall be removed in a manner that does not breakdown the materials into fine dust or powder to the extent feasible. Equipment and tools to be utilized shall include hand tools and mechanical equipment, such as demolition hammers, mechanical grinders, etc., to remove PCB Bulk Products from adjacent substrates. Mechanical removal equipment shall be fitted with HEPA-filtered vacuum attachments.

D. Minimal quantities of water shall be utilized to adequately moisten the generated dust prior to collection for disposal. Under no circumstances shall the PCB Bulk Product Waste show evidence of free-liquid water, pooling, or ponding within the waste stream. Any liquid used to wet the dust and debris to control fugitive emissions shall be properly containerized and decontaminated in accordance with EPA Title 40 CFR, Part 761.79(b)(1) or disposed in accordance with EPA Title 40 CFR, Part 761.60(a).

E. Dry or brittle PCB Bulk Products shall be removed with additional engineering controls such as use of HEPA-filtered vacuums and/or wet-wiping methods to remove accumulated dust or debris during removal.

F. Sequence of removal shall follow the following general requirements:

1. Site preparation and controls shall be completed. Work shall not proceed until authorized by the Consultant.
2. PCB Bulk Product Waste shall be removed in entirety for disposal as PCB Bulk Product Waste. Note: window caulking at the Media Center also contains asbestos. Refer to Section 028213 - Asbestos Abatement for additional disposal requirements.
3. Following removal, cleaning of Work Zone shall be performed prior to a final visual inspection by the Consultant. Note that clearance criteria for asbestos may apply. Refer to Section 028213 - Asbestos Abatement for additional clearance requirements.
4. Following an acceptable final visual inspection, the containment barriers, PPE, cleaning materials, products and supplies, and waste generated during removal of PCB Bulk Product Waste shall be containerized for disposal as PCB Remediation Waste (i.e., hazardous waste).

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G. Remove and containerize all visible accumulations of PCB Bulk Product Waste and PCB Remediation Waste. Wastes shall be containerized in labeled and signed 6-mil poly disposable bags. Tie wraps for bags shall be plastic, 5-inches long (minimum), pointed and looped to secure filled plastic bags. Disposal bags shall then be placed either in steel 55-gallon DOT-approved drums, or a fully-enclosed roll-off container (with a lock).

H. At any time during PCB Bulk Product removal work should the Consultant suspect contamination of areas outside the Work Zone, the Consultant shall be authorized to issue a stop work order until the Contractor takes required steps to decontaminate these areas, and to eliminate the causes of such contamination. Unprotected individuals shall be prohibited from entering suspected contaminated areas until visual inspections indicate acceptable decontamination.

I. The Consultant shall conduct a final visual inspection of the Work Zone. If residual suspect debris is identified during the final inspection, the Contractor shall comply with the Consultant's request to render the area clean of all suspect dust and debris.

3.05 CLEANING AND DECONTAMINATION

A. The Contractor shall be responsible for complete cleaning and decontamination of the Work Zone upon completion of work. The Work Zone will be required to meet proposed final visual inspection requirements.

B. The Contractor shall utilize HEPA-filtered vacuum equipment and wet-cleaning products to remove all visible dust and debris from all surfaces within the Work Zone. If specialty cleaning products are utilized, the Contractor shall utilize the product(s) in accordance with manufacturer's specifications, including any additional safety and disposal requirements for such use.

C. Any liquid used to wet the dust and debris to control fugitive emissions shall be collected and decontaminated in accordance with EPA Title 40 CFR, Part 761.79(b)(1), or disposed in accordance with EPA Title 40 CFR, Part 761.60(a). Wash water shall not be discharged on-site.

D. All rags and other materials used to clean the Work Zone shall be properly disposed as PCB Remediation Waste (i.e., hazardous waste). All PCB Remediation Waste shall be stored for disposal in accordance with EPA Title 40 CFR, Part 761.61(a)(5)(v)(A). All waste containers shall be appropriately marked and labeled in accordance with EPA Title 40 CFR, Parts 761.40 and 761.45.

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E. Equipment to be utilized in connection with the removal of PCB Bulk Product Waste including waste collection, or that will or may come in direct contact with the Site contaminants, shall be decontaminated prior to leaving the Site to prevent migration of the contaminated residues. Decontamination shall be in accordance with EPA Title 40 CFR, Part 761.79 and Subpart S procedures.

F. All non-disposable equipment and tools employed in the Work will be decontaminated at the conclusion of each work day utilizing the following sequence:

1. Gross debris removal
2. Tap water and detergent or equivalent wash
3. Tap water rinse
4. Hexane or equivalent solvent
5. Air dry
6. Tap water rinse

G. The wash water and decontamination liquids shall be captured and containerized in DOT-approved 55-gallon drums for off-site disposal in accordance with EPA Title 40 CFR, Part 761.60(a).

3.06 CONSULTANT'S RESPONSIBILITIES

A. If required or requested, the Contractor shall monitor air quality (visually) within the Work Zone to ascertain the protection of employees and to comply with OSHA regulations. The Consultant may verify this monitoring.

B. If required or requested, the Consultant's project monitor shall provide continual evaluation of the condition of the building during removal, using their best professional judgments, in respect to EPA and MassDEP regulations.

3.07 CONSULTANT'S INSPECTION RESPONSIBILITIES

A. The Consultant may conduct inspections throughout the progress of the removal project. Inspections may be conducted to document the progress of the removal work, as well as the procedures and practices employed by the Contractor.

B. The Consultant may perform the following inspections during PCB performance-based disposal activities:

1. Pre-Commencement Inspection: Pre-commencement inspections shall be performed at the time requested by the Contractor. The Consultant shall be informed 24 hours prior to the time the inspection is needed. If deficiencies are identified during the pre-commencement inspection, the Contractor shall perform the necessary adjustments to obtain compliance.

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2. Work Zone Inspection: Work Zone inspections may be conducted on a daily basis at the discretion of the Consultant. During the work inspections, the Consultant shall observe the Contractor's removal procedures, verify isolation barrier integrity, assess project progress, and inform the Contractor of specific remedial activities if deficiencies are noted.

C. The Consultant shall perform the following inspection following performance-based disposal activities:

1. Final Visual Inspection: Upon the request of the Contractor, the Consultant shall conduct a final visual inspection of the Work Zone. The final visual inspection shall be conducted after completion of the final cleaning procedures. The final visual inspection shall verify that all PCB Bulk Product Waste residual debris has been removed from the Work Zone. If during the inspection the Consultant identifies residual dust or debris, the Contractor shall comply with the request of the Consultant to render the area "free of suspect dust or debris".

3.08 MARKING OF WASTE CONTAINERS

A. All waste containers must be marked with the name of the waste contained, the date when waste was first placed in the vessel, and the last date at which addition of waste occurred. All waste containers must be marked with a PCB M_L.

B. All waste containers containing PCB Bulk Product Waste and PCB Remediation Waste in the form of waste and contaminated debris, containment system components, used PPE, personal decontamination and equipment wash water, and any other decontamination fluids or other wastes generated during the Work shall be labeled as follows:

DOT Class 9 UN3432 (solid)
Or UN2315 (liquid) PCB Waste
RQ
Waste for Disposal
Federal law prohibits improper disposal.
If found, contact the nearest police or public safety authority or
The U.S. Environmental Protection Agency.
Generator's Information: _____
Manifest Tracking No.: _____
Accumulation Start Date: _____
EPA ID No.: _____
EPA Waste No.: _____
Total Weight: _____
Container No.: _____
HANDLE WITH CARE

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C. In addition, these containers must be marked with a PCB M_L.

D. If applicable, the containers must also be marked in accordance with Section 028213 - Asbestos Abatement.

E. Such marking must be durable, in English, and printed on, or affixed to, the surface of the package, and be displayed on a background of sharply contrasting color not unobscured by labels or attachments, and located away from any other marking (such as advertising) that could substantially reduce its effectiveness.

3.09 ON-SITE WASTE MANAGEMENT AND DISPOSAL OF SOLID HAZARDOUS WASTES

A. All solid waste material, containment system components, used PPE, and other solid wastes generated during the Work, shall be placed directly in appropriate waste receptacles immediately upon removal from its in-situ position. Suitable waste receptacles may consist of roll-off containers or DOT-approved 55-gallon drums.

B. The Contractor shall be responsible for all packaging, labeling, transport, disposal, and recordkeeping associated with PCB Bulk Product Waste and PCB Remediation Waste in accordance with all federal, state, and local regulations.

C. The Contractor shall ensure that the person transporting the waste holds a valid permit issued in accordance with appropriate federal, state, and local regulations.

D. The Contractor shall provide appropriate shipping records or uniform waste manifests to the transporter at the time of transfer as required by the federal, state, and local regulations with a copy provided to the Owner and Consultant.

E. The Owner should coordinate with the Contractor to sign-off waste materials as the "Generator". The Consultant shall be given 48-hour notice prior to waste leaving the site (i.e., scheduled pick-up by waste hauler).

F. The Contractor shall maintain proper follow-up procedures to assure that waste materials have been received by the designated waste facility in a timely manner, and in accordance with all federal, state, and local regulations.

G. The Contractor shall assure that disposal of PCB Bulk Product Waste and PCB Remediation Waste is at a facility permitted to accept such waste(s) and shall provide a tracking/manifest form signed by the landfill's authorized representative.

H. If roll-off containers are to be utilized for containerization of the PCB performance-based disposal wastes the following shall apply:

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1. All roll-off containers, or other similar vessels utilized, shall be watertight and lined with 6-mil poly sheeting or equivalent impermeable lining, and equipped with a secured and impermeable cover.
2. The impermeable cover shall remain securely in-place at all times when waste is not being actively placed in the vessels. The Contractor shall be responsible for ensuring that the cover remains securely intact until the container is removed from the Site. The container must be equipped with a lock.

I. If 55-gallon drums are to be utilized for waste containerization, the drums shall consists of suitable DOT-approved 55-gallon drums that are watertight and free of corrosion, perforations, punctures, or other damage. All drums shall be securely covered and sealed at the conclusion of each work day.

J. The waste containers shall remain staged at the Site with a secure, impermeable cover in-place until the materials are transported from the Site to be delivered to the designated waste disposal facility.

K. Waste roll-off and barrel staging area shall be designated prior to initiation of the performance-based disposal work, and be approved by the Consultant. If this area is located outside of the building, it is recommended that the area (or areas) be surrounded by a chain-link fence with a minimum height of six feet. The fence shall be labeled with a large PCB M_L marker.

L. Properly containerized waste must be transported by a licensed hauler and be shipped as PCB Bulk Product Waste for disposal at a permitted soil waste facility in accordance with EPA Title 40 CFR, Part 761.62(b).

M. PCB Remediation Waste must be transported by a licensed hauler and be shipped as PCB Remediation Waste for disposal in accordance with EPA Title 40 CFR, Part 761.61(b)(2) at one of the following a facilities:

1. A hazardous waste landfill permitted by EPA under Section 3004 of EPA RCRA;
2. A State-authorized landfill under Section 3006 of EPA RCRA; or
3. A chemical waste landfill approved under EPA Title 40 CFR, Part 761.75.

N. Any PCB liquid water waste shall be properly containerized and either decontaminated in accordance with EPA Title 40 CFR, Part 761.79, or disposed in accordance with EPA Title 40 CFR, Part 761.60(a).

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O. Any chemicals, solvents, or other products used during decontamination shall be properly containerized as liquid PCB Remediation Waste. Waste must be properly decontaminated in accordance with 40 CFR Part, 761.79 or disposed of in accordance with 40 CFR Part, 761.60(a) or (e). Liquid PCB Remediation Waste shall be transported by a licensed hauler and shipped for treatment or disposal. Provide required copies of the uniform waste manifests for hazardous wastes to the Owner waste generation State and waste destination State as required.

P. Provide required copies of the uniform waste manifests for PCB Remediation Waste to the Owner, waste generation State, and waste destination State, as required.

Q. All contaminated waste shall be carefully loaded on trucks or other appropriate vehicles for transport. Before and during transport, care shall be exercised to insure that no unauthorized persons have access to the waste materials.

R. Waste transporters are prohibited from "back hauling" any freight after PCB waste disposal until decontamination of the vehicle and/or trailer is assured.

END OF SECTION

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DIVISION 04 MASONRY

SECTION 04 20 00 UNIT MASONRY

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

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 which 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 Contract.

D. It is the intent of the Specifications and the Drawings to require that all the material, labor, and equipment be furnished complete in every respect, and that this Contractor shall provide all material, labor, and equipment needed and usually furnished in connection with such systems to provide a complete installation including all demolition, disposal, and patching of adjacent surfaces. Materials, equipment, and articles incorporated in the work shall be new and of the best grade of their respective kinds.

1.02 WORK TO BE PERFORMED

A. Provide all the Unit Masonry work required to complete the work of the contract including all the Unit Masonry work shown on the plans, listed in the specification, and needed to install a complete assembly in every way, with all reinforcing, pinning, and finishes. Coordinate the Unit Masonry work with all the other trades for the project. Provide all demolition and disposal work to complete the Unit Masonry work. Patch to match all adjacent surfaces that are disturbed, left exposed, or unfinished. All work of the contract is related. It is the General Contractor's responsibility to review all the work of each section, each sub-contractor, and each file sub-bidder for the entire project so that all the work can be properly and completely performed.

B. Unit Masonry work includes, but is not limited to:

1. Cafeteria
   a. No base bid scope.
2. Library Curtainwall
   a. No base bid scope.
3. Library Interior
   a. No base bid scope.

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4. Alternate #1
   a. No scope in this section.
5. Alternate #2, Cafeteria
   a. Install Face Brick to match existing at the head of the windows on the South Elevation.
   b. Install new through-wall flashing at the head of all windows to be replaced as part of the Add Alternate work.
   c. Mortar and Grout.
   d. Reinforcement and Anchorage.
   e. Flashings.
   f. Accessories.
6. Alternate #3
   a. No scope in this section.

1.03 RELATED REQUIREMENTS

A. Section 07 92 00 - Joint Sealants: Sealing control and expansion joints.

B. Section 07 90 05 - Joint Sealers: Backing rod and sealant at control and expansion joints.

1.04 REFERENCE STANDARDS

A. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures; 2016.

B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.

C. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2016.

D. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2015.

E. ASTM C67 - Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile; 2017.

F. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar; 2011.

G. ASTM C150/C150M - Standard Specification for Portland Cement; 2017.

H. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes; 2006 (Reapproved 2011).

I. ASTM C216 - Standard Specification for Facing Brick (Solid Masonry Units Made From Clay or Shale); 2017a.

J. ASTM C270 - Standard Specification for Mortar for Unit Masonry; 2014a.

K. ASTM C404 - Standard Specification for Aggregates for Masonry Grout; 2011.

L. ASTM C476 - Standard Specification for Grout for Masonry; 2016.

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M. ASTM C979/C979M - Standard Specification for Pigments for Integrally Colored Concrete; 2016.

N. BIA Technical Notes No. 7 - Water Penetration Resistance – Design and Detailing; 2005.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data for masonry units, fabricated wire reinforcement, mortar, and masonry accessories.

C. Samples: Submit four samples of facing brick and split-faced block units to illustrate color, texture, and extremes of color range.

D. Manufacturer's Certificate: Certify that masonry units meet or exceed specified requirements.

E. Test Reports: Concrete masonry manufacturer's test reports for units with integral water repellent admixture.

F. Samples: All samples shall be presented for approval by the Owner and CBI.

1. Brick:
   a. Brick shall match existing in quality, texture, color and size.
2. Mortar:
   a. Mortar shall match existing in quality, texture, color, joint size and finish.
3. Install 4 SF (2’x2’) sample of pointing for approval. This amount shall be in addition to the contract quantities at a location approved by the Architect.

1.06 QUALITY ASSURANCE

A. Referenced Standards. Conform to the following:

1. Brick Institute of America
2. National Concrete Masonry Association
3. Portland Cement Association

B. Obtain materials from approved individual sources in sufficient quantities to complete each portion of the work.

C. Brick masonry units shall be of uniform quality, texture and color or a uniform blend within the ranges accepted for these characteristics to match existing.

D. Mortar ingredients shall be of uniform quality, texture and color within each pier to match existing.

1.07 MOCK-UP

A. Construct a masonry mock-up panel sized 8 feet long by 1 feet high; include mortar, accessories, and flashings in mock-up.

B. Locate where directed.

C. Approved mock-up may remain as part of the Work.

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1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver, handle, and store masonry units by means that will prevent mechanical damage and contamination by other materials.

B. Store and handle brick masonry units and materials to prevent their deterioration or damage due to moisture, temperature changes, contaminants, corrosion or other causes.

C. Limit moisture absorption of brick masonry units and cement lime, etc., during delivery and until time of installation to the maximum percentage specified for brick for the brick for the average annual relative humidity as reported by the U.S. Weather Bureau Station nearest project site.

D. Store cementitious materials off the ground, under weather tight covers or indoors, and kept clean and dry.

E. Store aggregates where grading and other required characteristics can be maintained.

F. Store masonry accessories including metal items to prevent deterioration by corrosion and accumulation of dirt.

1.09 PROJECT/SITE CONDITIONS

A. Protection of Work:

1. During erection, cover top of masonry element with waterproof sheeting at end of each day's Work.
   a. Cover partially completed structures when Work is not in progress.
   b. Extend cover min. 24 in. down both sides of walls on structures and hold cover securely in place.
   c. Do not apply loads for min. 3 days after building masonry walls or structures.

B. Staining:

1. Prevent grout, mortar or soil from staining the face of masonry to be left exposed.
   a. Remove immediately grout or mortar in contact with such masonry.
   b. Protect base of walls from rain-splashed mud and mortar splatter by means of covering spread on ground and over wall surface.
   c. Protect sills, ledges, and projections from droppings of mortar.

C. Cold Weather:

1. No masonry work will be performed in temperatures lower than 40 degrees F and no material will be allowed to freeze within 48 hours of installation.

PART 2 PRODUCTS

2.01 BRICK UNITS

A. Face Brick: ASTM C216, Type FBS Smooth, Grade SW.

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1. Color and texture: Match existing to be replaced above the windows.
2. Nominal size: Match existing to be replaced above the windows, approximately 3-3/8" X 7-7/8" X 2-1/4" +/-, V.I.F..
3. Compressive strength: not less than 6,000 psi (individual) nor 8,000 psi (average of five) , measured in accordance with ASTM C67.
4. Water Absorption shall not exceed 10% (individual) or 8% (average of five) when subjected to 5 hour boiling test, in accordance with testing procedures defined in ASTM C67

2.02 MORTAR AND GROUT MATERIALS

A. Mortar: Shall conform to ASTM C270, Type N, consisting of one (1) part Portland Cement (ASTM C150, Type 1, and meeting efflorescence requirements below), ½ to 1-1/4 parts hydrated lime (ASTM C207, Type S), and sand (ASTM C144) in quantity of not less than 2-1/2 nor more than 3 times the sum of the quantities of cement and lime, by volume.

B. New mortar at new brickwork and at all repointing locations shall match the existing mortar in color, texture, aggregate and finish.

C. Portland Cement: ASTM C150/C150M, Type I; color as required to produce approved color sample.

D. Hydrated Lime: ASTM C207, Type S.

E. Mortar Aggregate: ASTM C144.

F. Grout Aggregate: ASTM C404.

G. Pigments for Colored Mortar: Pure, concentrated mineral pigments specifically intended for mixing into mortar and complying with ASTM C979/C979M.

1. Color(s): As selected by Architect from manufacturer's full range.

H. Water: Clean and potable.

2.03 REINFORCEMENT AND ANCHORAGE

A. Reinforcing Steel: ASTM A615/A615M, Grade 40 (40,000 psi), deformed billet bars; galvanized.

B. Wall Ties: Corrugated formed sheet metal, 7/8 inch wide by 0.05 inch thick, hot dip galvanized to ASTM A 153/A 153M, Class B, sized to provide not more than 1 inch and not less than 1/2 inch of mortar coverage from masonry face.

2.04 FLASHINGS

A. Stainless Steel Flashing: ASTM A666, Type 304, soft temper; 26 gage, 0.0187 inch thick; finish 2B to 2D.

B. New Self Adhering through-wall flashing membrane within the wall masonry shall be PermaBarrier by W R Grace, Blue-Skin by Henry Company, or approved equal.

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C. Flashing Sealant/Adhesives: Silicone, type required or recommended by flashing manufacturer; type capable of adhering to type of flashing used. Refer to Section 07 90 05 - JOINT SEALERS

2.05 ACCESSORIES

A. Cavity Mortar Control: Semi-rigid polyethylene or polyester mesh panels, sized to thickness of wall cavity, and designed to prevent mortar droppings from clogging weeps and cavity vents and allow proper cavity drainage.

1. Mortar Diverter: Semi-rigid mesh designed for installation at flashing locations.

B. Termination Bars: Stainless steel; compatible with membrane and adhesives.

C. Type: Polyester mesh.

1. Manufacturers:
   a. CavClear/Archovations, Inc: www.cavclear.com.
   b. Mortar Net Solutions: www.mortarnet.com.
   c. Substitutions: See Section 01 60 00 - Product Requirements.
2. Color to match mortar.
3. Fill opening to restrict insect access.

D. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials.

2.06 MORTAR AND GROUT MIXES

A. Mortar for Unit Masonry: ASTM C270, using the Proportion Specification.

1. Exterior, loadbearing masonry: Type N.

B. Grout: ASTM C476; consistency required to fill completely volumes indicated for grouting; fine grout for spaces with smallest horizontal dimension of 2 inches or less; coarse grout for spaces with smallest horizontal dimension greater than 2 inches.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive masonry.

B. Verify that related items provided under other sections are properly sized and located.

C. Verify that built-in items are in proper location, and ready for roughing into masonry work.

3.02 PREPARATION

A. Direct and coordinate placement of metal anchors supplied for installation under other sections.

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B. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.

3.03 COLD AND HOT WEATHER REQUIREMENTS

A. Comply with requirements of TMS 402/602 or applicable building code, whichever is more stringent.

3.04 COURSING

A. Establish lines, levels, and coursing indicated. Protect from displacement.

B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.

C. Brick Units: Match existing.

1. Bond: Running.
2. Mortar Joints: Concave to match existing adjacent mortar.

3.05 PLACING AND BONDING

A. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.

3.06 WEEPS/CAVITY VENTS

A. Install weeps in veneer and cavity walls at 24 inches on center horizontally above through-wall flashing, above shelf angles and lintels, and at bottom of walls.

3.07 CAVITY MORTAR CONTROL

A. Do not permit mortar to drop or accumulate into cavity air space or to plug weep/cavity vents.

B. Install cavity mortar diverter at base of cavity and at other flashing locations as recommended by manufacturer to prevent mortar droppings from blocking weep/cavity vents.

3.08 MASONRY FLASHINGS

A. Whether or not specifically indicated, install masonry flashing to divert water to exterior at all locations where downward flow of water will be interrupted.

1. Extend flashings full width at such interruptions and at least 6 inches, minimum, into adjacent masonry or turn up at least 8 inches, minimum, to form watertight pan at non-masonry construction.
2. Remove or cover protrusions or sharp edges that could puncture flashings.
3. Seal lapped ends and penetrations of flashing before covering with mortar.

B. Extend metal flashings through exterior face of masonry and turn down to form drip. Install joint sealer below drip edge to prevent moisture migration under flashing.

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C. If above roofing flashing - Install a two piece metal flashing with a removable counter-flashing.

D. Overlap the pan section a minimum of 3" and solder.

E. Overlay the metal flashing with a continuous self-adhering membrane flashing tucked into a new reglet cut into a mortar joint. Seal all membrane flashing joints and make a watertight seal. Roll joints with a hand roller.

F. Pocket all ends of the flashing materials and make continuous at each location on the wall.

G. Provide open head joint weep slots filled with woven fabric weephole filler inserts to form full head joints at 24" on center.

H. Open the wall in small segments to avoid masonry movement above.

3.09 CONTROL AND EXPANSION JOINTS

A. Do not continue horizontal joint reinforcement through control or expansion joints.

B. Install preformed control joint device in continuous lengths. Seal butt and corner joints in accordance with manufacturer's instructions.

C. Size control joints as indicated on drawings; minimum 3/4 inch wide and deep.

D. Size control joint in accordance with Section 07 90 05 for sealant performance.

3.10 CLEANING

A. Remove excess mortar and mortar droppings.

B. Replace defective mortar. Match existing adjacent work.

C. Clean soiled surfaces with cleaning solution.

D. After mortar is thoroughly set and cured, clean masonry.

E. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.

F. Test cleaning methods on sample wall panel; leave ½ panel unclean for comparison purposes.

G. Obtain approval of CBI for sample cleaning before proceeding with cleaning of masonry.

H. Protect adjacent stone and non-masonry surfaces from contact with cleaner by covering them with liquid strippable masking agent, polyethylene film, or waterproof masking tape in addition to required plywood protection at ornamental ironwork.

I. Clean masonry to comply with masonry manufacturer's directions and applicable NCMA TEK Bulletins.

3.11 MASONRY CONSTRUCTION, GENERAL

A. Masonry work shall be done by skilled workmen, fully instructed as to the requirements of this specification, and adequately supervised during the work.

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B. Cold Weather Masonry:

1. Do no masonry work when outdoor temperatures are less than 40 degrees F. unless provisions are made to adequately protect the masonry materials and finished work from frost by heating materials, enclosing the work, and heating the enclosed spaces.
2. Antifreeze admixtures will not be allowed in the mortar. No frozen work shall be built upon. No masonry unit having a film of frost on its surface shall be laid in the work. Any completed work found to be affected by frost shall be taken down and rebuilt.

C. Lay masonry plumb; true to line; with level courses; straight, clean, uniform joints; dry surfaces; and straight, plumb corners. Maintain vertical alignment of joints as required to match existing bond patterns. Align horizontal joints with tops of openings, as indicated. Lay units in solid partitions in manner to provide same evenness of surface on each side.

D. Adjust each masonry unit in final position while mortar is still soft and plastic. Remove any unit disturbed after mortar has stiffened and re-lay with fresh mortar.

E. Provide all chases, slots, and recesses as required to accommodate the work of other trades. Close only after such work has been installed tested, and approved. As the work progresses, set all anchors, bolts sleeves, frames, lintels, and all other items of the various trades required to be built-into the masonry. No cutting and patching of completed masonry work will be permitted except as approved by CBI.

F. Do not use installed masonry work to support or in any way receive scaffolding or other temporary supports.

G. Provide complete protection against breakage, staining and weather damage to masonry. Masonry, when not roofed over, shall be positively protected with non-staining waterproof coverings, properly weighted, at night, during showers, and whenever masons are not working on the structure.

H. Maintain masonry clean as the work progresses. Exercise extreme care at exposed work to prevent smearing or staining with mortar. Wash mortar stains immediately from exposed surfaces. At completion of work cut out and repoint all holes and defective joints, leaving the entire work free of blemishes.

END OF SECTION

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DIVISION 04 MASONRY

SECTION 04 27 31 REINFORCED UNIT MASONRY

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

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 which 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 Contract.

D. It is the intent of the Specifications and the Drawings to require that all the material, labor, and equipment be furnished complete in every respect, and that this Contractor shall provide all material, labor, and equipment needed and usually furnished in connection with such systems to provide a complete installation including all demolition, disposal, and patching of adjacent surfaces. Materials, equipment, and articles incorporated in the work shall be new and of the best grade of their respective kinds.

1.02 WORK TO BE PERFORMED

A. Provide all the Reinforced Unit Masonry work required to complete the work of the contract including all the Reinforced Unit Masonry work shown on the plans, listed in the specification, and needed to install a complete assembly in every way, with all reinforcing, pinning, and finishes. Coordinate the Reinforced Unit Masonry work with all the other trades for the project. Provide all demolition and disposal work to complete the work. Patch to match all adjacent surfaces that are disturbed, left exposed, or unfinished. All work of the contract is related. It is the General Contractor's responsibility to review all the work of each section, each sub-contractor, and each file sub-bidder for the entire project so that all the work can be properly and completely performed. Provide labor, materials and equipment necessary to complete the work of this section.

B. Reinforced Unit Masonry includes, but is not limited to:

1. Cafeteria
   a. No base bid scope.
2. Library Curtainwall
   a. Provide and install CMU kneewall at base of Curtainwall A.
   b. Concrete Block.

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c. Mortar and Grout.
d. Reinforcement and Anchorage.
e. Flashings.

3. Library Interior
   a. No base bid scope.
4. Alternate #1
   a. No scope in this section.
5. Alternate #2
   a. No scope in this section.
6. Alternate #3
   a. No scope in this section.

1.03 REFERENCE STANDARDS

A. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures; 2016.

B. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2016.

C. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2017.

D. ASTM C90 - Standard Specification for Loadbearing Concrete Masonry Units; 2016a.

E. ASTM C91/C91M - Standard Specification for Masonry Cement; 2012.

F. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete; 2017a.

G. ASTM C140/C140M - Standard Test Methods of Sampling and Testing Concrete Masonry Units and Related Units; 2017a.

H. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar; 2011.

I. ASTM C150/C150M - Standard Specification for Portland Cement; 2017.

J. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes; 2006 (Reapproved 2011).

K. ASTM C270 - Standard Specification for Mortar for Unit Masonry; 2014a.

L. ASTM C404 - Standard Specification for Aggregates for Masonry Grout; 2011.

M. ASTM C476 - Standard Specification for Grout for Masonry; 2016.

N. ASTM C780 - Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry; 2017.

O. ASTM C1072 - Standard Test Method for Measurement of Masonry Flexural Bond Strength; 2013, with Editorial Revision (2014).

P. ASTM C1314 - Standard Test Method for Compressive Strength of Masonry Prisms; 2016.

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Q. ASTM E518/E518M - Standard Test Methods for Flexural Bond Strength of Masonry; 2015.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene one week before starting work of this section.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data for masonry units, fabricated wire reinforcement, and mortar and grout.

C. Shop Drawings: Indicate bar sizes, spacings, reinforcement quantities, bending and cutting schedules, reinforcement supporting and spacing devices, and accessories.

D. Design Data: Indicate required mortar strength, unit assembly strength in each plane, and supporting test data.

E. Manufacturer's Certificate: Certify that masonry units meet or exceed specified requirements.

1.06 QUALITY ASSURANCE

A. Comply with provisions of TMS 402/602, except where exceeded by requirements of the contract documents.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

C. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver, handle, and store masonry units by means that will prevent mechanical damage and contamination by other materials.

1.08 FIELD CONDITIONS

A. Cold and Hot Weather Requirements: Comply with requirements of TMS 402/602 or applicable building code, whichever is more stringent.

PART 2 PRODUCTS

2.01 CONCRETE MASONRY UNITS

A. Concrete Block: Comply with referenced standards and as follows:

1. Size: Standard units with nominal face dimensions of 16 by 8 inches and nominal depth of 8 inches.
2. Special Shapes: Provide non-standard blocks configured for corners.
3. Load-Bearing Units: ASTM C90, normal weight.

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a. Hollow block, as indicated.

2.02 MORTAR AND GROUT MATERIALS

A. Masonry Cement: ASTM C91/C91M Type S.

B. Portland Cement: ASTM C150/C150M, Type I; color as required to produce approved color sample.

C. Hydrated Lime: ASTM C207, Type S.

D. Mortar Aggregate: ASTM C144.

E. Grout Aggregate: ASTM C404.

F. Water: Clean and potable.

2.03 REINFORCEMENT AND ANCHORAGE

A. Manufacturers:

1. Blok-Lok Limited: www.blok-lok.com.
2. Hohmann & Barnard, Inc: www.h-b.com/sle.
3. WIRE-BOND: www.wirebond.com.
4. Approved Equal.

B. Reinforcing Steel: ASTM A615/A615M, Grade 40 (40,000 psi) yield strength.

1. Deformed billet-steel bars.
2. Unfinished.

C. Single Wythe Joint Reinforcement: Truss type; ASTM A1064/A1064M steel wire, hot dip galvanized after fabrication to ASTM A153/A153M, Class B; 0.1483 inch side rods with 0.1483 inch cross rods; width as required to provide not more than 1 inch and not less than 1/2 inch of mortar coverage on each exposure.

2.04 MORTAR MIXES

A. Mortar for Unit Masonry: ASTM C270, using the Proportion Specification.

1. Exterior, loadbearing masonry; Type S.

2.05 MORTAR MIXING

A. Thoroughly mix mortar ingredients using mechanical batch mixer, in accordance with ASTM C270 and in quantities needed for immediate use.

B. Maintain sand uniformly damp immediately before the mixing process.

C. Do not use anti-freeze compounds to lower the freezing point of mortar.

D. If water is lost by evaporation, re-temper only within two hours of mixing.

2.06 GROUT MIXES

A. Bond Beams and Lintels: 3,000 psi strength at 28 days; 8-10 inches slump; provide premixed type in accordance with ASTM C 94/C 94M.

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1. Fine grout for spaces with smallest horizontal dimension of 2 inches or less.
2. Coarse grout for spaces with smallest horizontal dimension greater than 2 inches.

B. Engineered Masonry: 3,000 psi strength at 28 days; 8-10 inches slump; provide premixed type in accordance with ASTM C 94/C 94M.

1. Fine grout for spaces with smallest horizontal dimension of 2 inches or less.
2. Coarse grout for spaces with smallest horizontal dimension greater than 2 inches.

2.07 GROUT MIXING

A. Mix grout in accordance with ASTM C94/C94M.

B. Thoroughly mix grout ingredients in quantities needed for immediate use in accordance with ASTM C476 for fine and coarse grout.

C. Add admixtures in accordance with manufacturer's instructions; mix uniformly.

D. Do not use anti-freeze compounds to lower the freezing point of grout.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive masonry.

B. Verify that related items provided under other sections are properly sized and located.

C. Verify that built-in items are in proper location, and ready for roughing into masonry work.

3.02 PREPARATION

A. Direct and coordinate placement of metal anchors supplied for installation under other sections.

B. Clean reinforcement of loose rust.

C. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.

3.03 COURSING

A. Establish lines, levels, and coursing indicated. Protect from displacement.

B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.

C. Concrete Masonry Units:

1. Bond: Running.
2. Coursing: One unit and one mortar joint to equal 8 inches.
3. Mortar Joints: Flush.

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3.04 PLACING AND BONDING

A. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.

B. Lay hollow masonry units with face shell bedding on head and bed joints.

C. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.

D. Remove excess mortar as work progresses.

E. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.

F. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.

3.05 REINFORCEMENT AND ANCHORAGE

A. Reinforcement Bars: Secure at locations indicated and to avoid displacement during grouting. Minimum spacing between bars or to masonry surfaces shall be one bar diameter.

B. Reinforced Hollow Unit Masonry: Keep vertical cores to be grouted clear of mortar, including bed area of first course.

1. Bond Beams: At bond beams or other locations for horizontally reinforced masonry, provide special masonry units or saw to accommodate reinforcement.

3.06 GROUTING

A. Use either high-lift or low-lift grouting techniques, at Contractor's option, subject to other limitations of contract documents.

B. Low-Lift Grouting:

1. Limit height of pours to 12 inches.
2. Limit height of masonry to 16 inches above each pour.
3. Pour grout only after vertical reinforcing is in place; place horizontal reinforcing as grout is poured. Prevent displacement of bars as grout is poured.
4. Place grout for each pour continuously and consolidate immediately; do not interrupt pours for more than 1-1/2 hours.

C. High-Lift Grouting:

1. Verify that horizontal and vertical reinforcement is in proper position and adequately secured before beginning pours.
2. Place grout for spanning elements in single, continuous pour.

3.07 TOLERANCES

A. Maximum Variation from Alignment of Columns: 1/4 inch.

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B. Maximum Variation From Unit to Adjacent Unit: 1/16 inch.

C. Maximum Variation from Plane of Wall: 1/4 inch in 10 ft and 1/2 inch in 20 ft or more.

D. Maximum Variation from Plumb: 1/4 inch per story non-cumulative; 1/2 inch in two stories or more.

E. Maximum Variation from Level Coursing: 1/8 inch in 3 ft and 1/4 inch in 10 ft; 1/2 inch in 30 ft.

F. Maximum Variation of Joint Thickness: 1/8 inch in 3 ft.

G. Maximum Variation from Cross Sectional Thickness of Walls: 1/4 inch.

3.08 CUTTING AND FITTING

A. Cut and fit for conduit. Coordinate with other sections of work to provide correct size, shape, and location.

B. Obtain approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.

3.09 FIELD QUALITY CONTROL

A. Concrete Masonry Unit Tests: Test each variety of concrete unit masonry in accordance with ASTM C140/C140M for conformance to requirements of this specification.

B. Mortar Tests: Test each type of mortar in accordance with recommended procedures in ASTM C780, testing with same frequency as masonry samples.

C. Prism Tests: Test masonry and mortar panels for compressive strength in accordance with ASTM C1314 and for flexural bond strength in accordance with ASTM C1072 or ASTM E518/E518M; perform tests and evaluate results.

3.10 CLEANING

A. Remove excess mortar and mortar smears as work progresses.

B. Replace defective mortar. Match adjacent work.

C. Clean soiled surfaces with cleaning solution.

D. Use non-metallic tools in cleaning operations.

3.11 PROTECTION

A. Without damaging completed work, provide protective boards at exposed external corners that are subject to damage by construction activities.

END OF SECTION

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DIVISION 04 MASONRY

SECTION 04 42 00 EXTERIOR STONE CLADDING

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

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 which 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 Contract.

D. It is the intent of the Specifications and the Drawings to require that all the material, labor, and equipment be furnished complete in every respect, and that this Contractor shall provide all material, labor, and equipment needed and usually furnished in connection with such systems to provide a complete installation including all demolition, disposal, and patching of adjacent surfaces. Materials, equipment, and articles incorporated in the work shall be new and of the best grade of their respective kinds.

1.02 WORK TO BE PERFORMED

A. Provide all the Stone Masonry Veneer work required to complete the work of the contract including all the Stone Masonry Veneer work shown on the plans, listed in the specification, and needed to install a complete assembly in every way, with all reinforcing, pinning, and finishes. Coordinate the Stone Masonry Veneer work with all the other trades for the project. Provide all demolition and disposal work to complete the work. Patch to match all adjacent surfaces that are disturbed, left exposed, or unfinished. All work of the contract is related. It is the General Contractor's responsibility to review all the work of each section, each sub-contractor, and each file sub-bidder for the entire project so that all the work can be properly and completely performed. Provide labor, materials and equipment necessary to complete the work of this section.

B. Stone Masonry Veneer includes, but is not limited to:

1. Cafeteria
   a. No base bid scope.
2. Library Curtainwall
   a. Provide and install exterior granite stone veneer at base of Curtainwall A.
   b. Cut granite veneer at exterior walls.
   c. Metal anchors and supports.

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d. Sealing exterior joints.

3. Library Interior
   a. No base bid scope.
4. Alternate #1
   a. No scope in this section.
5. Alternate #2
   a. No scope in this section.
6. Alternate #3
   a. No scope in this section.

1.03 RELATED REQUIREMENTS

A. Section 07 92 00 - Joint Sealants: Sealing perimeter and expansion joints in interior stone work.

1.04 REFERENCE STANDARDS

A. ASTM A240/A240M - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications; 2016.

B. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2015.

C. ASTM C270 - Standard Specification for Mortar for Unit Masonry; 2014a.

D. ASTM C615/C615M - Standard Specification for Granite Dimension Stone; 2011.

E. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2014a.

F. ASTM C1248 - Standard Test Method for Staining of Porous Substrate by Joint Sealants; 2008 (Reapproved 2012).

G. ASTM C1330 - Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid-Applied Sealants; 2002 (Reapproved 2013).

H. NBGQA (SPEC) - Specifications for Architectural Granite; Version 14-1, 2014.

1.05 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene one week before starting work of this section.

1.06 SUBMITTALS

A. Product Data: Provide data on stone, mortar products, and sealant products.

B. Shop Drawings: Indicate layout, pertinent dimensions, anchorages, head, jamb, and sill opening details, and jointing methods.

C. Samples: Submit two stone samples 6 by 6 inch in size, illustrating color range and texture, markings, surface finish.

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1.07 QUALITY ASSURANCE

A. Design anchors and supports under direct supervision of a Professional Structural Engineer, registered in the State in which the Project is located.

1. Design anchors to resist positive and negative wind pressures and other loads as required by applicable code.
2. Design anchor attachment to stone with a factor of safety of 5:1.
3. Design each individual anchor with a factor of safety in the vertical dead-load-bearing direction of 4:1 and in the horizontal lateral-load-bearing direction of 2:1.

B. Perform work in accordance with NBGQA (SPEC).

C. Stone Fabricator: Company specializing in fabricating cut stone with minimum ten years of documented experience.

D. Installer Qualifications: Company specializing in performing the work of this section with minimum 3 years of experience.

1.08 FIELD CONDITIONS

A. During temporary storage on site, at the end of working day, and during rainy weather, cover stone work exposed to weather with non-staining waterproof coverings, securely anchored.

PART 2 PRODUCTS

2.01 STONE

A. Granite: Barre Gray; complying with ASTM C615/C615M.

1. Surface Texture: Honed.
2. Color: Barre Gray.
3. Acceptable Producers:
   a. Swenson Granite Co. LLC; www.swensongranite.com.
   b. Approved Equal.

2.02 MORTAR

A. Mortar: ASTM C270, Type N, Proportion specification, using Portland cement of white color.

2.03 ANCHORS AND ACCESSORIES

A. Anchors and Other Components in Contact with Stone: Stainless steel, ASTM A666, Type 304.

1. Sizes and configurations: As required for vertical and horizontal support of stone and applicable loads.
2. Wire ties are not permitted.

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B. Support Components not in Contact with Stone: Stainless steel, ASTM A240/A240M, Type 304.

C. Setting Buttons and Shims: Lead type.

D. Weep/Cavity Vents: Preformed plastic tubes.

E. Joint Sealant: ASTM C920 silicone sealant with movement capability of at least plus/minus 25 percent and non-staining to stone when tested in accordance with ASTM C1248.

F. Joint Backer Rod: ASTM C1330 open cell polyurethane of size 40 to 50 percent larger in diameter than joint width.

G. Cleaning Solution: Type that will not harm stone, joint materials, or adjacent surfaces.

2.04 STONE FABRICATION

A. Thickness: 2 inch.

B. Panel Size: As indicated on drawings.

C. Fabrication Tolerances: In accordance with NBGQA (SPEC).

D. Fabricate units for uniform coloration between adjacent units and over the full area of the installation.

E. Slope exposed top surfaces of stone and horizontal sill surfaces for natural wash.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that support work and site conditions are ready to receive work of this section.

B. Verify that items built-in under other sections are properly located and sized.

3.02 PREPARATION

A. Clean stone prior to erection. Do not use wire brushes or implements that will mark or damage exposed surfaces.

3.03 INSTALLATION

A. Set stone with a consistent joint width of 1/2 inch.

B. Install anchors and place setting buttons to support stone and to establish joint dimensions.

C. Install weep/cavity vents in vertical stone joints at 24 inches on center horizontally, at bottom of walls; do not permit mortar accumulation in cavity space.

D. Joints in Exterior Work: Seal joints with joint sealant over backer rod, following sealant manufacturer's instructions; tool sealant surface to concave profile.

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E. Joints in Interior Work: Leave perimeter joints and expansion joints open for sealant; fill other joints with pointing mortar; pack and work into voids; tool surface to concave joint.

3.04 TOLERANCES

A. Positioning of Elements: Maximum 1/4 inch from true position.

B. Maximum Variation from Plane of Wall: 1/4 inch in 10 feet; 1/2 inch in 50 feet.

C. Maximum Variation Between Face Plane of Adjacent Panels: 1/16 inch.

D. Maximum Variation from Plumb: 1/4 inch per story non-cumulative; 1/2 inch in any two stories.

E. Maximum Variation from Level Coursing: 1/8 inch in 3 feet; 1/4 inch in 10 feet; 1/2 inch maximum.

F. Maximum Variation of Joint Thickness: 1/8 inch in 3 feet.

3.05 CUTTING AND FITTING

A. Obtain approval prior to cutting or fitting any item not so indicated on Drawings.

B. Do not impair appearance or strength of stone work by cutting.

3.06 CLEANING

A. Remove excess joint material upon completion of work.

B. Clean soiled surfaces with cleaning solution.

C. Use non-metallic tools in cleaning operations.

END OF SECTION

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DIVISION 07 THERMAL AND MOISTURE PROTECTION

SECTION 07 21 00 THERMAL INSULATION

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

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 which 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 Contract.

D. It is the intent of the Specifications and the Drawings to require that all the material, labor, and equipment be furnished complete in every respect, and that this Contractor shall provide all material, labor, and equipment needed and usually furnished in connection with such systems to provide a complete installation including all demolition, disposal, and patching of adjacent surfaces. Materials, equipment, and articles incorporated in the work shall be new and of the best grade of their respective kinds.

1.02 WORK TO BE PERFORMED

A. Provide all the Thermal Insulation work required to complete the work of the contract including all the Thermal Insulation work shown on the plans, listed in the specification, and needed to install a complete assembly in every way, with all reinforcing, pinning, and finishes. Coordinate the Thermal Insulation work with all the other trades for the project. Provide all demolition and disposal work to complete the work. Patch to match all adjacent surfaces that are disturbed, left exposed, or unfinished. All work of the contract is related. It is the General Contractor's responsibility to review all the work of each section, each sub-contractor, and each file sub-bidder for the entire project so that all the work can be properly and completely performed. Provide labor, materials and equipment necessary to complete the work of this section.

B. Thermal Insulation includes, but is not limited to:

1. Cafeteria
   a. No base bid scope.
2. Library Curtainwall
   a. Provide and install board insulation behind exterior granite stone veneer at base of Curtainwall A.

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3. Library Interior
    a. No base bid scope.
4. Alternate #1
    a. No scope in this section.
5. Alternate #2
    a. No scope in this section.
6. Alternate #3
    a. No scope in this section.

1.03 RELATED REQUIREMENTS

A. Section 04 42 00 - Exterior Stone Cladding

B. Section 07 25 00 - Weather Barriers: Separate air barrier and vapor retarder materials.

1.04 REFERENCE STANDARDS

A. ASTM C553 - Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications; 2013.

B. ASTM C612 - Standard Specification for Mineral Fiber Block and Board Thermal Insulation; 2014.

C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2017.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on product characteristics, performance criteria, and product limitations.

C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

PART 2 PRODUCTS

2.01 APPLICATIONS

A. Insulation Inside Masonry Cavity Walls: Fiber board.

2.02 FIBER BOARD INSULATION MATERIALS

A. Mineral Fiber Board Insulation: Rigid or semi-rigid mineral fiber, ASTM C612 or ASTM C553; unfaced flame spread index of 0 (zero) when tested in accordance with ASTM E84.

1. Smoke Developed Index: 450 or less, when tested in accordance with ASTM E84.
2. Board Thickness: 3 inches.

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3. Manufacturers:
   a. ROXUL, Inc; CAVITYROCK: www.roxul.com/#sle.
   b. Approved Equal.

2.03 ACCESSORIES

A. Insulation Fasteners: Impaling clip of galvanized steel with washer retainer and clips, to be adhered to surface to receive insulation, length to suit insulation thickness and substrate, capable of securely and rigidly fastening insulation in place.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate, adjacent materials, and insulation materials are dry and that substrates are ready to receive insulation.

B. Verify substrate surfaces are flat, free of honeycomb, fins, irregularities, or materials or substances that may impede adhesive bond.

3.02 BOARD INSTALLATION AT CAVITY WALLS

A. Secure impale fasteners to substrate at following frequency:

1. Six (6) per insulation board.

B. Install boards to fit snugly between wall ties.

C. Install boards horizontally on walls.

D. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

3.03 PROTECTION

A. Do not permit installed insulation to be damaged prior to its concealment.

END OF SECTION

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DIVISION 07 THERMAL AND MOISTURE PROTECTION

SECTION 07 25 00 WEATHER BARRIERS

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

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 which 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 Contract.

D. It is the intent of the Specifications and the Drawings to require that all the material, labor, and equipment be furnished complete in every respect, and that this Contractor shall provide all material, labor, and equipment needed and usually furnished in connection with such systems to provide a complete installation including all demolition, disposal, and patching of adjacent surfaces. Materials, equipment, and articles incorporated in the work shall be new and of the best grade of their respective kinds.

1.02 WORK TO BE PERFORMED

A. Provide all the Weather Barriers work required to complete the work of the contract including all the Weather Barriers work shown on the plans, listed in the specification, and needed to install a complete assembly in every way, with all reinforcing, pinning, and finishes. Coordinate the Weather Barriers work with all the other trades for the project. Provide all demolition and disposal work to complete the work. Patch to match all adjacent surfaces that are disturbed, left exposed, or unfinished. All work of the contract is related. It is the General Contractor's responsibility to review all the work of each section, each sub-contractor, and each file sub-bidder for the entire project so that all the work can be properly and completely performed. Provide labor, materials and equipment necessary to complete the work of this section.

B. Weather Barriers includes, but is not limited to:

1. Cafeteria
   a. No base bid scope.
2. Library Curtainwall
   a. Provide and install exterior granite stone veneer at base of Curtainwall A.
   b. Air and Moisture Barriers: Materials to make exterior walls water vapor retardant and air tight.

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3. Library Interior
    a. No base bid scope.
4. Alternate #1
    a. No scope in this section.
5. Alternate #2
    a. No scope in this section.
6. Alternate #3
    a. No scope in this section.

1.03 REFERENCE STANDARDS

A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2017.

B. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2016.

C. ASTM E2178 - Standard Test Method for Air Permeance of Building Materials; 2013.

PART 2 PRODUCTS

2.01 **AIR BARRIER MATERIALS (AIR AND MOISTURE BARRIER)**

A. Air and Vapor Barrier Sheet, Self-Adhered:

1. Air Permeance: 0.0002 cubic feet per minute per square foot, maximum, when tested in accordance with ASTM E2178.
2. Water Vapor Permeance: 0.02 perms, maximum, when tested in accordance with ASTM E96/E96M.
3. Ultraviolet and Weathering Resistance: Approved in writing by manufacturer for up to 30 days of weather exposure.
4. Surface Burning Characteristics: Flame spread index of 25 or less, smoke developed index of 450 or less (Class A), when tested in accordance with ASTM E84.
5. Seam and Perimeter Tape: As recommended by sheet manufacturer.
6. Products:
    a. Tremco Commercial Sealants & Waterproofing; ExoAir 110AT: www.tremcosealants.com/#sle.
    b. Approved Equal.

2.02 ACCESSORIES

A. Sealants, Tapes, and Accessories for Sealing Weather Barrier and Sealing Weather Barrier to Adjacent Substrates: As specified or as recommended by weather barrier manufacturer.

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B. Pre-formed Transition Membrane: Semi-rigid silicone composition, tapered edges, tear resistant.

1. Products:
   a. Tremco Commercial Sealants & Waterproofing; ProGlaze ETA System 1: www.tremcosealants.com/#sle.
   b. Approved Equal.

C. Thinners and Cleaners: As recommended by material manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces and conditions are ready to accept the work of this section.

3.02 PREPARATION

A. Remove projections, protruding fasteners, and loose or foreign matter that might interfere with proper installation.

B. Clean and prime substrate surfaces to receive adhesives in accordance with manufacturer's instructions.

3.03 INSTALLATION

A. Install materials in accordance with manufacturer's instructions.

B. Air Barriers: Install continuous air tight barrier over surfaces indicated, with sealed seams and with sealed joints to adjacent surfaces.

C. Apply sealants and adhesives within recommended application temperature ranges. Consult manufacturer if temperature is out of this range.

D. Self-Adhesive Sheets:

1. Prepare substrate in manner recommended by sheet manufacturer; fill and tape joints in substrate and between dissimilar materials.
2. Lap sheets shingle-fashion to shed water and seal laps air tight.
3. Once sheets are in place, press firmly into substrate with resilient hand roller; ensure that all laps are firmly adhered with no gaps or fishmouths.
4. Use same material, or other material approved by sheet manufacturer for the purpose, to seal to adjacent construction and as flashing.
5. At wide joints, provide extra flexible membrane allowing joint movement.

E. Openings and Penetrations in Exterior Weather Barriers:

1. Install flashing over sills, covering entire sill frame member, extending at least 5 inches onto weather barrier and at least 6 inches up jambs; mechanically fasten stretched edges.
2. At openings to be filled with frames having nailing flanges, seal head and jamb flanges using a continuous bead of sealant compressed by flange and cover flanges with sealing tape at least 4 inches wide; do not seal sill flange.

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3. At openings to be filled with non-flanged frames, seal weather barrier to all sides of opening framing, using flashing at least 9 inches wide, covering entire depth of framing.
4. At head of openings, install flashing under weather barrier extending at least 2 inches beyond face of jambs; seal weather barrier to flashing.
5. At interior face of openings, seal gap between window/door frame and rough framing, using joint sealant over backer rod.
6. Service and Other Penetrations: Form flashing around penetrating item and seal to weather barrier surface.

3.04 PROTECTION

A. Do not leave materials exposed to weather longer than recommended by manufacturer.

END OF SECTION

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DIVISION 07 THERMAL AND MOISTURE PROTECTION

SECTION 07 92 00 JOINT SEALANTS

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

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 which 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 Contract.

D. It is the intent of the Specifications and the Drawings to require that all the material, labor, and equipment be furnished complete in every respect, and that this Contractor shall provide all material, labor, and equipment needed and usually furnished in connection with such systems to provide a complete installation including all demolition, disposal, and patching of adjacent surfaces. Materials, equipment, and articles incorporated in the work shall be new and of the best grade of their respective kinds.

1.02 WORK TO BE PERFORMED

A. Provide all the Joint Sealants work required to complete the work of the contract including all the Joint Sealants work shown on the plans, listed in the specification, and needed to install a complete assembly in every way, with all reinforcing, pinning, and finishes. Coordinate the Joint Sealants work with all the other trades for the project. Provide all demolition and disposal work to complete the work. Patch to match all adjacent surfaces that are disturbed, left exposed, or unfinished. All work of the contract is related. It is the General Contractor's responsibility to review all the work of each section, each sub-contractor, and each file sub-bidder for the entire project so that all the work can be properly and completely performed. Provide labor, materials and equipment necessary to complete the work of this section.

B. Joint Sealants includes, but is not limited to:

1. Cafeteria
   a. No base bid scope.
2. Library Curtainwall
   a. Provide and install sealants and backers at all perimeter conditions of all curtainwall as shown on the drawings.
   b. Nonsag gunnable joint sealants.

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c. Joint backings and accessories.

3. Library Interior
   a. Provide and install acoustical sealants as shown on the drawings.
   b. Nonsag gunnable joint sealants.
   c. Joint backings and accessories.
4. Alternate #1
   a. No scope in this section.
5. Alternate #2
   a. Provide and install sealants and backers at all perimeter conditions of all windows and storefront at Cafeteria, as shown on the drawings.
   b. Nonsag gunnable joint sealants.
   c. Joint backings and accessories.
6. Alternate #3
   a. No scope in this section.

1.03 RELATED REQUIREMENTS

A. Section 07 25 00 - Weather Barriers: Sealants required in conjunction with air barriers and vapor retarders.

1.04 REFERENCE STANDARDS

A. ASTM C834 - Standard Specification for Latex Sealants; 2017.

B. ASTM C919 - Standard Practice for Use of Sealants in Acoustical Applications; 2012 (Reapproved 2017).

C. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2014a.

D. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2016.

E. ASTM C1248 - Standard Test Method for Staining of Porous Substrate by Joint Sealants; 2008 (Reapproved 2012).

F. SCAQMD 1168 - South Coast Air Quality Management District Rule No.1168; current edition.

1.05 SUBMITTALS

A. Product Data for Sealants: Submit manufacturer's technical data sheets for each product to be used that includes the following.
   1. Physical characteristics, including movement capability, VOC content, hardness, cure time, and color availability.
   2. List of backing materials approved for use with the specific product.
   3. Substrates that product is known to satisfactorily adhere to and with which it is compatible.
   4. Substrates the product should not be used on.

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5. Substrates for which use of primer is required.
6. Substrates for which laboratory adhesion and/or compatibility testing is required.
7. Installation instructions, including precautions, limitations, and recommended backing materials and tools.
8. Sample product warranty.

B. Product Data for Accessory Products: Submit manufacturer's technical data sheet for each product to be used, including physical characteristics, installation instructions, and recommended tools.

C. Color Cards for Selection: Where sealant color is not specified, submit manufacturer's color cards showing standard colors available for selection.

1.06 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Correct defective work within a five year period after Date of Substantial Completion.

C. Warranty: Include coverage for installed sealants and accessories that fail to achieve watertight seal , exhibit loss of adhesion or cohesion, or do not cure.

PART 2 PRODUCTS

2.01 JOINT SEALANT APPLICATIONS

A. Scope:

1. Exterior Joints: Seal open joints, whether or not the joint is indicated on the drawings, unless specifically indicated not to be sealed. Exterior joints to be sealed include, but are not limited to, the following items.
   a. Joints between door, window, and other frames and adjacent construction.
   b. Joints between different exposed materials.
2. Interior Joints: Do not seal interior joints unless specifically indicated to be sealed. Interior joints to be sealed include, but are not limited to, the following items.
   a. Joints between door, window, and other frames and adjacent construction.
   b. In sound-rated wall and ceiling assemblies, gaps at electrical outlets, wiring devices, piping, and other openings; between wall/ceiling and other construction; and other flanking sound paths.
3. Do not seal the following types of joints.
   a. Intentional weepholes in masonry.
   b. Joints indicated to be treated with manufactured expansion joint cover or some other type of sealing device.
   c. Joints where sealant is specified to be provided by manufacturer of product to be sealed.
   d. Joints where installation of sealant is specified in another section.

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e. Joints between suspended panel ceilings/grid and walls.

B. Exterior Joints: Use non-sag non-staining silicone sealant, unless otherwise indicated.

C. Interior Joints: Use non-sag polyurethane sealant, unless otherwise indicated.

1. Wall and Ceiling Joints in Non-Wet Areas: Acrylic emulsion latex sealant.
2. In Sound-Rated Assemblies: Acrylic emulsion latex sealant.

D. Sound-Rated Assemblies: Walls and ceilings identified as "STC-rated", "sound-rated", or "acoustical".

2.02 JOINT SEALANTS - GENERAL

A. Sealants and Primers: Provide products having lower volatile organic compound (VOC) content than indicated in SCAQMD 1168.

2.03 NONSAG JOINT SEALANTS

A. Non-Staining Silicone Sealant: ASTM C920, Grade NS, Uses M and A; not expected to withstand continuous water immersion or traffic.

1. Movement Capability: Plus and minus 50 percent, minimum.
2. Non-Staining To Porous Stone: Non-staining to light-colored natural stone when tested in accordance with ASTM C1248.
3. Dirt Pick-Up: Reduced dirt pick-up compared to other silicone sealants.
4. Color: To be selected by Architect from manufacturer's standard range.
5. Cure Type: Single-component, neutral moisture curing.
6. Service Temperature Range: Minus 65 to 180 degrees F.
7. Manufacturers:
   a. Dow Corning Corporation; 795 Silicone Building Sealant: www.dowcorning.com/construction/#sle.
   b. Pecora Corporation: www.pecora.com.
   c. Tremco Commercial Sealants & Waterproofing; Spectrem 1: www.tremcosealants.com/#sle.
   d. Approved Equal.

B. Polyurethane Sealant: ASTM C920, Grade NS, Uses M and A; single or multi-component; not expected to withstand continuous water immersion or traffic.

1. Movement Capability: Plus and minus 25 percent, minimum.
2. Color: To be selected by Architect from manufacturer's standard range.
3. Service Temperature Range: Minus 40 to 180 degrees F.
4. Manufacturers:
   a. Pecora Corporation: www.pecora.com.
   b. Sika Corporation: www.usa-sika.com/#sle.
   c. Tremco Commercial Sealants & Waterproofing: www.tremcosealants.com/#sle.

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d. Approved Equal.

C. Acrylic Emulsion Latex: Water-based; ASTM C834, single component, non-staining, non-bleeding, non-sagging; not intended for exterior use.

1. Color: To be selected by Architect from manufacturer's standard range.
2. Manufacturers:
   a. Hilti, Inc; CP 506 Smoke and Acoustical Sealant: www.us.hilti.com/#sle.
   b. Specified Technologies Inc; Smoke N' Sound Acoustical Sealant: www.stifirestop.com/#sle.
   c. Tremco Commercial Sealants & Waterproofing; Tremstop Smoke & Sound: www.tremcosealants.com/#sle.
   d. Approved equal.

2.04 ACCESSORIES

A. Backer Rod: Cylindrical cellular foam rod with surface that sealant will not adhere to, compatible with specific sealant used, and recommended by backing and sealant manufacturers for specific application.

B. Backing Tape: Self-adhesive polyethylene tape with surface that sealant will not adhere to and recommended by tape and sealant manufacturers for specific application.

C. Masking Tape: Self-adhesive, nonabsorbent, non-staining, removable without adhesive residue, and compatible with surfaces adjacent to joints and sealants.

D. Joint Cleaner: Non-corrosive and non-staining type, type recommended by sealant manufacturer; compatible with joint forming materials.

E. Primers: Type recommended by sealant manufacturer to suit application; non-staining.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that joints are ready to receive work.

B. Verify that backing materials are compatible with sealants.

C. Verify that backer rods are of the correct size.

3.02 PREPARATION

A. Remove loose materials and foreign matter that could impair adhesion of sealant.

B. Clean joints, and prime as necessary, in accordance with manufacturer's instructions.

C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.

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D. Mask elements and surfaces adjacent to joints from damage and disfigurement due to sealant work; be aware that sealant drips and smears may not be completely removable.

3.03 INSTALLATION

A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.

B. Perform installation in accordance with ASTM C1193.

C. Perform acoustical sealant application work in accordance with ASTM C919.

D. Install bond breaker backing tape where backer rod cannot be used.

E. Install sealant free of air pockets, foreign embedded matter, ridges, and sags, and without getting sealant on adjacent surfaces.

F. Do not install sealant when ambient temperature is outside manufacturer's recommended temperature range, or will be outside that range during the entire curing period, unless manufacturer's approval is obtained and instructions are followed.

G. Nonsag Sealants: Tool surface concave, unless otherwise indicated; remove masking tape immediately after tooling sealant surface.

3.04 POST-OCCUPANCY

A. Post-Occupancy Inspection: Perform visual inspection of entire length of project sealant joints at a time that joints have opened to their greatest width; i.e. at the low temperature in the thermal cycle. Report failures immediately and repair.

END OF SECTION

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DIVISION 08 WINDOWS AND DOORS

SECTION 08 11 16 ALUMINUM DOORS AND FRAMES

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

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 which 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 Contract.

D. It is the intent of the Specifications and the Drawings to require that all the material, labor, and equipment be furnished complete in every respect, and that this Contractor shall provide all material, labor, and equipment needed and usually furnished in connection with such systems to provide a complete installation including all demolition, disposal, and patching of adjacent surfaces. Materials, equipment, and articles incorporated in the work shall be new and of the best grade of their respective kinds.

1.02 WORK TO BE PERFORMED

A. Provide all the Aluminum Doors and Frames work required to complete the work of the contract including all the Aluminum Doors and Frames work shown on the plans, listed in the specification, and needed to install a complete assembly in every way, with all reinforcing, pinning, and finishes. Coordinate the Aluminum Doors and Frames work with all the other trades for the project. Provide all demolition and disposal work to complete the work. Patch to match all adjacent surfaces that are disturbed, left exposed, or unfinished. All work of the contract is related. It is the General Contractor's responsibility to review all the work of each section, each sub-contractor, and each file sub-bidder for the entire project so that all the work can be properly and completely performed. Provide labor, materials and equipment necessary to complete the work of this section.

B. Aluminum Doors and Frames includes, but is not limited to:

1. Cafeteria
   a. No base bid scope.
2. Library Curtainwall
   a. No base bid scope.

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3. Library Interior
    a. Provide and install interior aluminum doors, frames, and glazing at Library interior including Collaboration Space and Computer Lab.
    b. Interior glazed aluminum doors.
    c. Interior Aluminum frames.
    d. Interior glazing.
4. Alternate #1
    a. No scope in this section.
5. Alternate #2
    a. No scope in this section.
6. Alternate #3
    a. No scope in this section.

1.03 RELATED REQUIREMENTS

A. Section 07 92 00 - Joint Sealants: Sealing joints between door frames and adjacent construction.

B. Section 08 71 00 - Door Hardware: Hardware for aluminum doors.

1.04 REFERENCE STANDARDS

A. AAMA 609 & 610 - Cleaning and Maintenance Guide for Architecturally Finished Aluminum (Combined Document); 2015.

B. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2014 (2015 Errata).

C. AAMA 701/702 - Combined Voluntary Specifications for Pile Weatherstrip and Replaceable Fenestration Weatherseals; 2011.

D. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.

1.05 SUBMITTALS

A. Product Data: Manufacturer's descriptive literature for each type of door; include information on fabrication methods.

B. Shop Drawings: Include elevations of each opening type.
    1. Verify dimensions by field measurements before fabrication and indicate on shop drawings.

C. Selection Samples: Complete set of color and finish options, using actual materials, for Architect's selection.

D. Manufacturer's Qualification Statement.

E. Installer's Qualification Statement.

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1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with not less than five years of documented experience.

B. Installer Qualifications: Company specializing in performing work of type specified and with at least three years of documented experience.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver aluminum components in manufacturer's standard protective packaging, palleted, crated, or banded together.

B. Inspect delivered components for damage and replace. Repaired components will not be accepted.

C. Store components in clean, dry, indoor area, under cover in manufacturer's packaging until installation.

D. Protect materials and finish from damage during handling and installation.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Glazed Aluminum Doors:

1. Wilson Partitions; 487 Flush Slider: www.wilsonpart.com.
2. Or Approved Equal.

B. Aluminum Frames:

1. Wilson Partitions; Series 487: www.wilsonpart.com.
2. Or Approved Equal.

2.02 DOORS AND FRAMES

A. Glazed Aluminum Doors: Extruded aluminum tube frame, full glazed, with middle rail; factory glazed.

1. Thickness: 1-3/4 inches, nominal.
2. Stile Width: 5 inches, nominal.
3. Finish: Class I - Natural anodized.
4. Texture: Smooth.
5. Glazing, Interior Doors: Clear, 3/8 inch thick Category II laminated safety glass.

B. Aluminum Frames for Doors, Sidelights, or Transoms: Extruded aluminum, non-thermally broken hollow or C-shaped sections; no steel components.

1. Frame Depth: To fit wall thicknesses as indicated on drawings.
2. Finish: Same as doors.
3. Weatherstripping: Replaceable pile type; at jambs and head.

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4. Sidelight/Transom Glazing: Clear, single pane of 3/8 inch thick Category II laminated safety glass.

C. Dimensions and Shapes: As indicated on drawings; dimensions indicated are nominal.

1. Provide vision lites as indicated on drawings.
2. Provide the following clearances:
   a. Hinge and Lock Stiles: 1/8 inch.
   b. Between Meeting Stiles: 1/4 inch.
   c. At Top Rail and Bottom Rail: 1/8 inch.

2.03 COMPONENTS

A. Tubular Doors: Extruded aluminum tubing, 1/8 inch minimum thickness, with heavy-duty plated steel through bolts in rails, glazing stops, and glazing gaskets.

B. Frames: Extruded aluminum shapes, not less than 0.062 inch thick, reinforced at hinge and strike locations.

1. Corner Brackets: Extruded aluminum, fastened with stainless steel screws.
2. Trim: Extruded aluminum, not less than 0.062 inch thick, removable snap-in type without exposed fasteners.

C. Vision Lites: Extruded aluminum framed, gasket glazed.

1. Glazing: Clear, single pane of 3/8 inch thick Category II laminated safety glass.

D. Door Hardware: Refer to Section 08 71 00 for additional requirements.

2.04 FINISHES

A. Class I Natural Anodized Finish: Clear anodic coating; AAMA 611 AA-M12C22A41, minimum dry film thickness 0.7 mils.

2.05 ACCESSORIES

A. Replaceable Weatherstripping: AAMA 701/702 wool pile.

B. Fasteners: Aluminum, non-magnetic stainless steel, or other material warranted by manufacturer as non-corrosive and compatible with aluminum components.

C. Brackets and Reinforcements: Manufacturer's high-strength aluminum units where feasible, otherwise, non-magnetic stainless steel or steel hot-dip galvanized in compliance with ASTM A123/A123M.

D. Bituminous Coating: Cold-applied asphaltic mastic, compounded for 30-mil thickness per coat.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that wall surfaces and openings are ready to receive frames and are within tolerances specified in manufacturer's instructions.

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B. Verify that frames installed by other trades for installation of doors of this section are in strict accordance with recommendations and approved shop drawings and within tolerances specified in manufacturer's instructions.

3.02 PREPARATION

A. Perform cutting, fitting, forming, drilling, and grinding of frames as required for project conditions.

B. Replace components with damage to exposed finishes.

C. Separate dissimilar metals to prevent electrolytic action between metals.

3.03 INSTALLATION

A. Install doors and frames in accordance with manufacturer's instructions and approved shop drawings.

B. Set frames plumb, square, level, and aligned to receive doors. Anchor frames to adjacent construction in strict accordance with manufacturer's recommendations and within specified tolerances.

C. Where aluminum surfaces contact metals other than stainless steel, zinc, or small areas of white bronze, protect from direct contact by painting dissimilar metal with heavy coating of bituminous paint.

D. Hang doors and adjust hardware to achieve specified clearances and proper door operation.

E. Install door hardware as specified in Section 08 71 00.

F. Install glazing; set glazing stops and glazing gaskets flush with face of door or frame.

3.04 CLEANING

A. Upon completion of installation, thoroughly clean door and frame surfaces in accordance with AAMA 609 & 610.

B. Do not use abrasive, caustic, or acid cleaning agents.

3.05 PROTECTION

A. Protect products of this section from damage caused by subsequent construction until Date of Substantial Completion.

B. Replace damaged or defective components that cannot be repaired to a condition indistinguishable from undamaged components.

END OF SECTION

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DIVISION 08 WINDOWS AND DOORS

SECTION 08 43 13 ALUMINUM-FRAMED STOREFRONTS

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

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 which 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 Contract.

D. It is the intent of the Specifications and the Drawings to require that all the material, labor, and equipment be furnished complete in every respect, and that this Contractor shall provide all material, labor, and equipment needed and usually furnished in connection with such systems to provide a complete installation including all demolition, disposal, and patching of adjacent surfaces. Materials, equipment, and articles incorporated in the work shall be new and of the best grade of their respective kinds.

1.02 WORK TO BE PERFORMED

A. Provide all the Aluminum Framed Storefront work required to complete the work of the contract including all the Aluminum Framed Storefront work shown on the plans, listed in the specification, and needed to install a complete assembly in every way, with all reinforcing, pinning, and finishes. Coordinate the Aluminum Framed Storefront work with all the other trades for the project. Provide all demolition and disposal work to complete the Aluminum Framed Storefront work. Patch to match all adjacent surfaces that are disturbed, left exposed, or unfinished. All work of the contract is related. It is the General Contractor's responsibility to review all the work of each section, each sub-contractor, and each file sub-bidder for the entire project so that all the work can be properly and completely performed.

B. Aluminum Framed Storefront work includes, but is not limited to:

1. Cafeteria
   a. No base bid scope.
2. Library Curtainwall
   a. No base bid scope.

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3. Library Interior
    a. No base bid scope.
4. Alternate #1
    a. No scope in this section.
5. Alternate #2, Cafeteria
    a. Provide and install aluminum-framed storefront and doors at Cafeteria as shown on the drawings.
    b. Provide labor, materials and equipment necessary to complete the work of the storefront replacement, and without limiting the generality thereof include:
    c. Field observations and measurements of existing openings and conditions and furnishing of shop drawings and product submittals.
    d. Removal of all existing aluminum window, door and storefront systems in their entirety and existing adjacent building finishes and materials required for the removal of the windows (including removal and legal disposal of asbestos containing, lead-containing, and presumed pcb materials as identified in Section 02 82 00) shall be by the General Bidder.
    e. Removal of other existing work as required for the proper installation and operation of the new units.
    f. Removal from site and legal disposal of all removed materials, debris, packaging, banding and all other surplus materials and equipment.
    g. Treated wood blocking, fillers and nailers as required for secure installation. Bidders shall survey conditions of existing sills and jambs prior to bidding.
    h. Install continuous flexible membrane flashing at entire perimeter of all storefront openings.
    i. Provide new thermally-broken storefront windows, types as specified herein and on the drawings, together with necessary fixed and operable sash, insulated metal panels, mullions, receptors, panning, expanders, continuous clips and trim, operating hardware, installation hardware and all other accessories as detailed and required for a complete weatherproof assembly.
    j. Sealing of entire interior and exterior window systems at all intersections of metal-to-metal storefront system joints including sash frame, panning, trim, receptors and mullions.
    k. Furnish a warranty for all completed work as specified.
    l. Include wide style Aluminum doors where indicated on the Drawings. Refer to 08 71 00 and for Door Hardware and Hardware Schedule.
6. Alternate #3

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a. No scope in this section.

1.03 SECTION INCLUDES

A. Aluminum-framed storefront, with insulated tempered vision glass.

B. Infill panels of metal.

C. Aluminum frames for storefronts.

D. Weatherstripping, hardware, and accessories.

1.04 RELATED REQUIREMENTS

A. Section 01 91 17 - Building Exterior Commissioning Requirements

B. Section 07 92 00 - Joint Sealants: Perimeter sealant and back-up materials.

C. Section 08 71 00 - Door Hardware: Hardware items other than specified in this section.

D. Section 08 80 00 - Glass and Glazing: Glass and glazing accessories, including insulated panels.

E. Section 08 80 00 - Glazing: Glass and glazing accessories.

1.05 REFERENCE STANDARDS

A. AAMA CW-10 - Care and Handling of Architectural Aluminum From Shop to Site; 2015.

B. AAMA 501.2 - Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls, and Sloped Glazing Systems; 2015.

C. AAMA 609 & 610 - Cleaning and Maintenance Guide for Architecturally Finished Aluminum (Combined Document); 2015.

D. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections; 2009.

E. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2017a.

F. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; 2016.

G. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.

H. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.

I. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2014.

J. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric); 2014.

K. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.

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L. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2013.

M. ASTM E283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2004 (Reapproved 2012).

N. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2014.

O. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000 (Reapproved 2016).

1.06 ADMINISTRATIVE REQUIREMENTS

A. Coordinate with installation of other components that comprise the exterior enclosure.

B. Preinstallation Meeting: Conduct a preinstallation meeting one week before starting work of this section; require attendance by all affected installers.

1.07 SUBMITTALS

A. Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, glass and infill, internal drainage details .

B. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related Work, expansion and contraction joint location and details, and field welding required. Include all Enlarged Elevations, and Details indicating system components and all surrounding conditions and items to which the work of this Secion will be attached, with dimensions. Shop Drawings must be certified by a Massachusetts Registered Professional Engineer.

C. Samples: Submit two samples 12x12 inches in size illustrating finished aluminum surface, glass, infill panels, glazing materials.

D. Design Data: Provide framing member structural and physical characteristics, engineering calculations, and dimensional limitations.

E. Hardware Schedule: Complete itemization of each item of hardware to be provided for each door, cross-referenced to door identification numbers in Contract Documents.

F. Manufacturer's Certificate: Certify that the products supplied meet or exceed the specified requirements.

G. Report of field testing for water leakage.

H. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

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1.08 QUALITY ASSURANCE

A. Designer Qualifications: Design structural support framing components under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in the State in which the Project is located.

B. Manufacturer and Installer Qualifications: Company specializing in manufacturing aluminum glazing systems with minimum five years of documented experience.

1.09 DELIVERY, STORAGE, AND HANDLING

A. Handle products of this section in accordance with AAMA CW-10.

B. Protect finished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond to aluminum when exposed to sunlight or weather.

1.10 FIELD CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

B. Check dimensions of openings in the actual framing work, by accurate field measurement before fabrication. Show recorded measurements on shop drawings. Coordinate fabrication schedule with construction progress as directed by the Contractor.

1.11 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Contractor Shall correct defective Work within a two (2) year period after Date of Substantial Completion.

C. Provide ten year manufacturer warranty against failure of glass seal on insulating glass units, including interpane dusting or misting. Include provision for replacement of failed units.

D. Provide five year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking.

PART 2 PRODUCTS

2.01 BASIS OF DESIGN -- FRAMING FOR INSULATING GLAZING

A. Center-Set Style, Thermally-Broken:

1. Basis of Design: Kawneer: Trifab 451 UT, Thermal Storefront Framing.

2. Vertical Mullion Dimensions: 2 inches wide by 4-1/2 inches deep.

B. Other Manufacturers: Provide either the product identified as "Basis of Design" or an equivalent product of one of the manufacturers listed below:

1. EFCO, a Pella Company: www.efcocorp.com.

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2. Wasau Window and Wall Systems.
3. Or Approved Equal.

2.02 BASIS OF DESIGN -- SWINGING DOORS

A. Wide Stile, Insulating Glazing, Thermally-Broken:
   1. Basis of Design: Kawneer; Insulclad Door 560.
   2. Thickness: 2-1/4 inch.

B. Other Manufacturers: Provide either the product identified as "Basis of Design" or an equivalent product of one of the manufacturers listed below:
   1. EFCO, a Pella Company; _____: www.efcocorp.com/#sle.
   2. Or Approved Equal.

2.03 STOREFRONT

A. Aluminum-Framed Storefront: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices.
   1. Glazing Rabbet: For 1 inch insulating glazing.
   2. Glazing Position: Centered (front to back).
   3. Finish: Superior performing organic coatings.
      a. Factory finish all surfaces that will be exposed in completed assemblies.
      b. Touch-up surfaces cut during fabrication so that no natural aluminum is visible in completed assemblies, including joint edges.
   4. Finish Color: Approved by Owner and Architect from manufacturer's full line of colors..
   5. Fabrication: Joints and corners flush, hairline, and weatherproof, accurately fitted and secured; prepared to receive anchors and hardware; fasteners and attachments concealed from view; reinforced as required for imposed loads.
   6. Construction: Eliminate noises caused by wind and thermal movement, prevent vibration harmonics, and prevent "stack effect" in internal spaces.
   7. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.
   8. Expansion/Contraction: Provide for expansion and contraction within system components caused by cycling temperature range of 170 degrees F over a 12 hour period without causing detrimental effect to system components, anchorages, and other building elements.
   9. Movement: Allow for movement between storefront and adjacent construction, without damage to components or deterioration of seals.
   10. Perimeter Clearance: Minimize space between framing members and adjacent construction while allowing expected movement.

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11. Air and Vapor Seal: Maintain continuous air barrier and vapor retarder throughout assembly, primarily in line with inside pane of glazing and inner sheet of infill panel and heel bead of glazing compound.
12. Preparation for Window Treatments: Provide reinforced interior horizontal head rail. Refer to Drawings for locations.

B. Performance Requirements:

1. Wind Loads: Design and size components to withstand the specified load requirements without damage or permanent set, when tested in accordance with ASTM E330/E330M, using loads 1.5 times the design wind loads and 10 second duration of maximum load.
   a. Design Wind Loads: Comply with requirements of applicable code.
   b. Member Deflection: Limit member deflection to flexure limit of glass in any direction, with full recovery of glazing materials.
2. Water Penetration Resistance: No uncontrolled water on interior face, when tested in accordance with ASTM E331 at pressure differential of 10 psf.
3. Air Leakage: Maximum of 0.06 cu ft/min sq ft of wall area, when tested in accordance with ASTM E283 at 1.57 psf pressure differential across assembly.
4. Condensation Resistance Factor of Framing: 68, minimum, measured in accordance with AAMA 1503.
5. Overall U-value Including Glazing: 0.38 Btu/(hr sq ft deg F), maximum for fixed windows.
6. All glazing must have a solar heat gain coefficient of not more than 0.40

2.04 COMPONENTS

A. Aluminum Framing Members: Tubular aluminum sectionswith double thermal breaks, drainage holes and internal weep drainage system.

1. Glazing Stops: Flush.
2. Cross-Section: As indicated on drawings.
3. Structurally Reinforced Members: Extruded aluminum with internal reinforcement of structural steel member.

B. Glazing: As specified in Section 08 80 00.

C. Infill Panels: Insulated, aluminum sheet face and back, with edges formed to fit glazing channel and sealed.

1. Core: Mineral fiber insulation core.
2. Exterior Finish: High performance organic coatings.
3. Interior Finish: High performance organic coatings.

D. Swing Doors: Glazed aluminum.

1. Thickness: 1-3/4 inches.

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2. Top Rail: 5 inches wide.
3. Vertical Stiles: 5 inches wide.
4. Intermediate Rail: 6 inches wide.
5. Bottom Rail: 10 inches wide.
6. Glazing Stops: Square.
7. Finish: Same as storefront.

2.05 MATERIALS

A. Extruded Aluminum: ASTM B221 (ASTM B221M).

B. Sheet Aluminum: ASTM B209 (ASTM B209M); nominal .062 inch (1.6 mm) wall; with exposed surfaces finished to match window color and finish performance; concealed fasteners; required weather seals; designed for unrestricted expansion and contraction. All aluminum brake metal fastened with continuous metal cleat shall be .040 inch, with .063 inch cleat, minimum. All brake metal without continuous cleat shall be .063 inch, minimum.

C. Structural Steel Sections: ASTM A36/A36M; galvanized in accordance with requirements of ASTM A123/A123M.

D. Fasteners: Stainless steel.

E. Sealant for Setting Thresholds: Non-curing butyl type.

F. Glazing Gaskets: Type to suit application to achieve weather, moisture, and air infiltration requirements.

G. Glazing Accessories: As specified in Section 08 80 00.

H. All aluminum brake metal fastened with continuous metal cleat shall be .040 inch with .063 inch cleat. All brake metal without continuous cleat shall be .063 inch.

2.06 FINISHES

A. Superior Performing Organic Coatings: AAMA 2605 multiple coat, thermally cured polyvinylidene fluoride (PVDF) system.

1. Polyvinylidene fluoride (PVDF) multi-coat thermoplastic fluoropolymer coating system, including minimum 70 percent PVDF color topcoat and minimum total dry film thickness of 0.9 mil; color and gloss as selected from manufacturer's full line.

B. Color: As selected by Architect from manufacturer's standard range.

2.07 HARDWARE

A. For each door, include weatherstripping, sill sweep strip, and threshold.

B. Weatherstripping: Wool pile, continuous and replaceable; provide on all doors.

C. Sill Sweep Strips: Resilient seal type, retracting, of neoprene; provide on all doors.

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D. Threshold: Extruded aluminum, thermally broken, one piece per door opening, ribbed surface; provide on all doors.

E. Refer to Section 08 71 00 and 08 71 06 for additional Door Requirements.

2.08 MEMBRANE FLASHING

A. Self-adhering, flexible air and vapor barrier membrane flashing: Tremco ExoAir III, or approved equal.

2.09 INSULATION

A. Unfaced Mineral Wool BATT insulation to fill all voids between the window or storefront units and openings and as detailed on the Drawings: ROXUL ComfortBatt; or approved equal.

B. Low-Rise spray Foam insualtion at the full perimeter of the openings and at all exposed wall cavities: HILTI CF812, or approval equal.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify dimensions, tolerances, and method of attachment with other work.

B. Verify that wall openings and adjoining air and vapor seal materials are ready to receive work of this section.

3.02 INSTALLATION

A. Install wall system in accordance with manufacturer's instructions.

B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.

C. Provide alignment attachments and shims to permanently fasten system to building structure.

D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.

E. Provide thermal isolation where components penetrate or disrupt building insulation.

F. Install continuous sill flashings as detailed. Turn up and pan ends and edges; seal to adjacent work to form water tight dam.

G. Where fasteners penetrate sill flashings, make watertight by seating and sealing fastener heads to sill flashing.

H. Coordinate attachment and seal of perimeter air and vapor barrier materials.

I. Pack mineral wool insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.

J. Set thresholds in bed of sealant and secure.

K. Install hardware using templates provided.

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L. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.

3.03 FIELD QUALITY CONTROL

A. See Section 01 4000 - Quality Requirements, and Section 01 91 10 - Commissioning for independent testing and inspection requirements. Inspection will monitor quality of installation and glazing.

3.04 ADJUSTING

A. Adjust operating hardware and sash for smooth operation.

3.05 CLEANING

A. Remove protective material from pre-finished aluminum surfaces.

B. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.

C. Upon completion of installation, thoroughly clean aluminum surfaces in accordance with AAMA 609 & 610.

D. Remove excess sealant by method acceptable to sealant manufacturer.

3.06 PROTECTION

A. Protect installed products from damage until Date of Substantial Completion.

END OF SECTION

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DIVISION 08 WINDOWS AND DOORS

SECTION 08 44 13 GLAZED ALUMINUM CURTAINWALLS

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

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 which 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 Contract.

D. It is the intent of the Specifications and the Drawings to require that all the material, labor, and equipment be furnished complete in every respect, and that this Contractor shall provide all material, labor, and equipment needed and usually furnished in connection with such systems to provide a complete installation including all demolition, disposal, and patching of adjacent surfaces. Materials, equipment, and articles incorporated in the work shall be new and of the best grade of their respective kinds.

1.02 WORK TO BE PERFORMED

A. Provide all the Glazed Aluminum Curtain Walls work required to complete the work of the contract including all the Glazed Aluminum Curtain Walls work shown on the plans, listed in the specification, and needed to install a complete assembly in every way, with all reinforcing, pinning, and finishes. Coordinate the Glazed Aluminum Curtain Walls work with all the other trades for the project. Provide all demolition and disposal work to complete the work. Patch to match all adjacent surfaces that are disturbed, left exposed, or unfinished. All work of the contract is related. It is the General Contractor's responsibility to review all the work of each section, each sub-contractor, and each file sub-bidder for the entire project so that all the work can be properly and completely performed. Provide labor, materials and equipment necessary to complete the work of this section.

B. Glazed Aluminum Curtain Walls includes, but is not limited to:

1. Cafeteria
   a. No base bid scope.
2. Library Curtainwall
   a. Provide and install aluminum curtainwall at Curtainwalls A, B, and C as shown on the drawings.

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3. Library Interior
    a. No base bid scope.
4. Alternate #1
    a. Provide and coordinate installation of electrochromic glazing with installation of Curtainwall A.
5. Alternate #2
    a. No scope in this section.
6. Alternate #3
    a. Provide and coordinate installation of electrochromic glazing with installation of Curtainwalls B and C

1.03 RELATED REQUIREMENTS

A. Section 04 42 00 - Exterior Stone Cladding: Stone for base panels.

B. Section 07 92 00 - Joint Sealants: Sealing joints between frames and adjacent construction.

C. Section 08 80 00 - Glazing.

1.04 REFERENCE STANDARDS

A. AAMA CW-10 - Care and Handling of Architectural Aluminum From Shop to Site; 2015.

B. AAMA 501.2 - Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls, and Sloped Glazing Systems; 2015.

C. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2017a.

D. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.

E. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.

F. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2013.

G. ASTM E283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2004 (Reapproved 2012).

H. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2014.

1.05 ADMINISTRATIVE REQUIREMENTS

A. Coordinate with installation of other components that comprise the exterior enclosure.

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B. Preinstallation Meeting: Conduct a preinstallation meeting one week before starting work of this section; require attendance by all affected installers.

1.06 SUBMITTALS

A. Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, internal drainage details, glazing, and infill.

B. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related Work, expansion and contraction joint location and details, and field welding required.

C. Test Reports: Submit results of full-size mock-up testing. Reports of tests previously performed on the same design are acceptable.

D. Field Quality Control Submittals: Report of field testing for water leakage.

E. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.07 QUALITY ASSURANCE

A. Designer Qualifications: Design structural support framing components under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed at the State in which the Project is located.

B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with not less than three years of documented experience.

C. Installer Qualifications: Company specializing in performing work of type specified and with at least three years of documented experience.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Handle products of this section in accordance with AAMA CW-10.

B. Protect finished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond to aluminum when exposed to sunlight or weather.

1.09 FIELD CONDITIONS

A. Do not install sealants when ambient temperature is less than 40 degrees F. Maintain this minimum temperature during and 48 hours after installation.

1.10 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Correct defective Work within a five year period after Date of Substantial Completion.

C. Provide five year manufacturer warranty against failure of glass seal on insulating glass units, including interpane dusting or misting. Include provision for replacement of failed units.

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D. Provide five year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking.

PART 2 PRODUCTS

2.01 BASIS OF DESIGN

A. Pressure Cap Four Sides; Not Unitized, Field Assembled:

1. Basis of Design: Kawneer; 1600 System 1, 2-1/2 inch wide face, 10-1/2 inch system depth..
2. Or approved equal.

2.02 CURTAIN WALL

A. Aluminum-Framed Curtain Wall: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices.

1. Finish: Superior performing organic coatings.
   a. Factory finish surfaces that will be exposed in completed assemblies.
   b. Touch-up surfaces cut during fabrication so that no natural aluminum is visible in completed assemblies, including joint edges.
   c. Coat concealed metal surfaces that will be in contact with cementitious materials or dissimilar metals with bituminous paint.
2. Provide flush joints and corners, weathersealed, accurately fitted and secured; prepared to receive anchors; fasteners and attachments concealed from view; reinforced as required for imposed loads.
3. Construction: Eliminate noises caused by wind and thermal movement, prevent vibration harmonics, and prevent "stack effect" in internal spaces.
4. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.

B. Structural Performance Requirements: Design and size components to withstand the following load requirements without damage or permanent set.

1. Design Wind Loads: 35 psf Positive, -40 psf Negative.
   a. Member Deflection: For spans less than 13 feet 6 inches, limit member deflection to flexure limit of glass in any direction, and maximum of 1/175 of span or 3/4 inch, whichever is less and with full recovery of glazing materials.
   b. Member Deflection: For spans over 13 feet 6 inches and less than 40 feet, limit member deflection to flexure limit of glass in any direction, and maximum of 1/240 of span plus 1/4 inch, with full recovery of glazing materials.

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2. Movement: Accommodate the following movement without damage to components or deterioration of seals:
   a. Expansion and contraction caused by 180 degrees F surface temperature.
   b. Expansion and contraction caused by cycling temperature range of 170 degrees F over a 12 hour period.
   c. Movement of curtain wall relative to perimeter framing.
   d. Deflection of structural support framing, under permanent and dynamic loads.

C. Water Penetration Resistance: No uncontrolled water on indoor face when tested as follows:

1. Test Pressure Differential: 10 psf.

D. Air Leakage: Maximum of 0.06 cu ft/min sq ft of wall area, when tested in accordance with ASTM E283 at 6.27 psf pressure differential across assembly.

2.03 COMPONENTS

A. Aluminum Framing Members: Tubular aluminum sections, thermally broken with interior section insulated from exterior, drainage holes and internal weep drainage system.

1. Structurally Reinforced Members: Extruded aluminum with internal reinforcement of structural steel member.

B. Glazing: As specified in Section 08 80 00.

2.04 MATERIALS

A. Extruded Aluminum: ASTM B221 (ASTM B221M).

B. Structural Steel Sections: ASTM A36/A36M; shop primed.

C. Fasteners: Stainless steel; type as required or recommended by curtain wall manufacturer.

D. Exposed Flashings: Aluminum sheet, 20 gage, 0.032 inch minimum thickness; finish to match framing members.

E. Concealed Flashings: Silicone sheet; Dow 1-2-3, Tremco ProGlaze ETA, or Approved Equal.

F. Glazing Gaskets: Type to suit application to achieve weather, moisture, and air infiltration requirements.

G. Pressure Plates: pultruded fiberglass or manufacturer equivalent thermally improved pressure plate.

H. Glazing Accessories: As specified in Section 08 80 00.

I. Shop and Touch-Up Primer for Steel Components: Zinc oxide, alkyd, linseed oil primer appropriate for use over hand cleaned steel.

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2.05 FINISHES

A. Superior Performing Organic Coatings: AAMA 2605 multiple coat, thermally cured polyvinylidene fluoride system.

1. Polyvinylidene fluoride (PVDF) multi-coat thermoplastic fluoropolymer coating system, including minimum 70 percent PVDF color topcoat and minimum total dry film thickness of 0.9 mil; color and gloss as selected by architect from manufacturer's full line incluiding mica finish..
2. Manufacturers:
   a. PPG Metal Coatings; Duranar: www.ppgmetalcoatings.com/#sle.
   b. Sherwin-Williams Company; SHER-NAR 5000: oem.sherwin-williams.com/#sle.
   c. Approved Equal.

B. Touch-Up Materials: As recommended by coating manufacturer for field application.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify dimensions, tolerances, and method of attachment with other related work.

B. Verify that curtain wall openings and adjoining air and vapor seal materials are ready to receive work of this section.

C. Verify that anchorage devices have been properly installed and located.

3.02 INSTALLATION

A. Install curtain wall system in accordance with manufacturer's instructions.

B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.

C. Provide alignment attachments and shims to permanently fasten system to building structure.

D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.

E. Provide thermal isolation where components penetrate or disrupt building insulation.

F. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.

G. Pressure Plate Framing: Install glazing and infill panels in accordance with Section 08 80 00, using exterior dry glazing method.

H. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.

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3.03 TOLERANCES

A. Maximum Variation from Plumb: 0.06 inches every 3 ft non-cumulative or 0.5 inches per 100 ft, whichever is less.

B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch.

C. Sealant Space Between Curtain Wall Mullions and Adjacent Construction: Maximum of 3/4 inch and minimum of 1/4 inch.

3.04 FIELD QUALITY CONTROL

A. Provide services of manufacturer's field representative to observe installation and submit report.

B. Test installed curtain wall for water leakage in accordance with AAMA 501.2.

C. Replace curtain wall components that have failed field testing and retest until performance is satisfactory.

3.05 CLEANING

A. Remove protective material from pre-finished aluminum surfaces.

B. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.

3.06 PROTECTION

A. Protect installed products from damage until Date of Substantial Completion.

END OF SECTION

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DIVISION 08 WINDOWS AND DOORS

SECTION 08 51 13 ALUMINUM WINDOWS

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

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 which 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 Contract.

D. It is the intent of the Specifications and the Drawings to require that all the material, labor, and equipment be furnished complete in every respect, and that this Contractor shall provide all material, labor, and equipment needed and usually furnished in connection with such systems to provide a complete installation including all demolition, disposal, and patching of adjacent surfaces. Materials, equipment, and articles incorporated in the work shall be new and of the best grade of their respective kinds.

1.02 WORK TO BE PERFORMED

A. Provide all the Aluminum Windows work required to complete the work of the contract including all the Aluminum Windows work shown on the plans, listed in the specification, and needed to install a complete assembly in every way, with all reinforcing, pinning, and finishes. Coordinate the Aluminum Windows work with all the other trades for the project. Provide all demolition and disposal work to complete the Aluminum Windows work. Patch to match all adjacent surfaces that are disturbed, left exposed, or unfinished. All work of the contract is related. It is the General Contractor's responsibility to review all the work of each section, each sub-contractor, and each file sub-bidder for the entire project so that all the work can be properly and completely performed.

B. Aluminum Windows work includes, but is not limited to:

1. Cafeteria
   a. No base bid scope.
2. Library Curtainwall
   a. No base bid scope.
3. Library Interior
   a. No base bid scope.

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4. Alternate #1
    a. No scope in this section.
5. Alternate #2, Cafeteria
    a. Provide and install aluminum windows at Cafeteria as shown on the drawings.
    b. Provide labor, materials and equipment necessary to complete the work of the Replacement Window Contract, and without limiting the generality thereof include:
    c. Removal of all existing aluminum window sash, fixed glazing, and other accessories as required by the proposed replacement system at the South Elevation of the Barnstable High School Cafeteria.
    d. Removal of other existing work as required for the proper installation and operation of the new work.
    e. Removal from site and legal disposal of all removed materials, debris, packaging, banding and all other surplus materials and equipment.
    f. Removal of asbestos containing and pcb materials. Refer to Sections 02 82 13 and 02 84 33.
    g. Provide new thermally-broken aluminum windows, types as specified herein and on the drawings, together with necessary receptors, panning, expanders, installation hardware and all other accessories.
    h. Treated wood blocking, fillers and nailers as required for secure installation. Bidders shall survey conditions of existing sills, jambs, and heads prior to bidding.
    i. Install continuous flexible membrane flashing at entire perimeter of all window openings (pocketed, and sealed at all ends), aluminum sill pan flashings with panned end dams, and other waterproofing and vapor/air barrier materials at window openings indicated on the drawings.
    j. Sealing of entire interior and exterior perimeter of window units and at connection of panning, trim, receptors and mullions at all window systems.
    k. Field observations and measurements of existing openings and conditions and furnishing of shop drawings and product submittals.
    l. Furnish a warranty for all completed work as specified.
6. Alternate #3
    a. No scope in this section.

1.03 RELATED REQUIREMENTS

A. Section 06 10 00 - Rough Carpentry: Rough opening framing.

B. Section 07 90 05 - Joint Sealers: Perimeter sealant and back-up materials.

1.04 REFERENCE STANDARDS

A. AAMA/WDMA/CSA 101/I.S.2/A440 - North American Fenestration Standard/Specification for windows, doors, and skylights; 2011.

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B. AAMA CW-10 - Care and Handling of Architectural Aluminum From Shop to Site; 2015.

C. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2014 (2015 Errata).

D. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections; 2009.

E. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2017a.

F. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2017a.

G. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2017a.

H. AAMA CW-10 - Care and Handling of Architectural Aluminum From Shop to Site; American Architectural Manufacturers Association; 2012.

I. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.

J. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2013.

K. ASTM E283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2004 (Reapproved 2012).

L. ASTM E330 - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2002 (Reapproved 2010).

M. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000 (Reapproved 2016).

N. ASTM F588 - Standard Test Methods for Measuring the Forced Entry Resistance of Window Assemblies, Excluding Glazing Impact; 2014.

1.05 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene one week before starting work of this section.

B. General: Coordinate the work of this Section with the respective trades responsible for installing interfacing and adjoining work for proper sequence of installation, and ensure that the work performed hereunder is acceptable to such trades for the installation of their work.

C. Contractor shall relocate loose furniture as required for contractor to perform work. Contractor shall not move books, periodicals, computers or other

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equipment or circulating library materials, but shall ensure that all materials and finishes are protected until the work is completed.

D. Sequencing:

1. Field Measurements:
   a. Take field measurements before preparation of shop drawings and fabrication to ensure proper fitting of Work.
   b. Allow for adjustments within specified tolerances wherever taking of field Sequence installation of installation of windows with fluid-applied membrane. Closely coordinate with installation of abutting materials, including open-cell and closed-cell spray insulation, wood block1ng and masonry repairs.

1.06 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide component dimensions, information on glass and glazing, internal drainage details, and descriptions of hardware and accessories.

C. Shop Drawings: Indicate opening dimensions, elevations of different types, framed opening tolerances, method for achieving air and vapor barrier seal to adjacent construction, anchorage locations, and installation requirements.

D. Samples: Submit two samples, 12 x 12 inch in size illustrating typical corner construction, accessories, and finishes. For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.

E. Submit one sample of operating hardware.

F. Grade Substantiation: Prior to submitting shop drawings or starting fabrication, submit one of the following showing compliance with specified grade:

1. Evidence of AAMA Certification.
2. Evidence of WDMA Certification.
3. Evidence of CSA Certification.
4. Test report(s) by independent testing agency itemizing compliance and acceptable to authorities having jurisdiction.

G. Test Reports: Prior to submitting shop drawings or starting fabrication, submit test report(s) by independent testing agency showing compliance with performance requirements in excess of those prescribed by specified grade.

H. Certificates: Certify that windows meet or exceed specified requirements.

I. Manufacturer's Installation Instructions: Include complete preparation, installation, and cleaning requirements.

J. Manufacturer's sample warranties.

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1. Schedule: A complete schedule of windows, to be furnished hereunder, coordinated with the schedule contained in the Contract Drawings, submitted for record only to Architect.

1.07 QUALITY ASSURANCE

A. Manufacturer, Installer and Superintendent Qualifications: Company specializing in fabrication of commercial aluminum windows of types required, with not fewer than five years of documented experience.

B. DO NOT EXECUTE CONTRACT WITH WINDOW FABRICATOR OR PLACE ORDER FOR WINDOWS WITHOUT RECEIVING ALL OF THE ARCHITECT'S APPROVALS.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of AAMA CW-10.

B. Store products in manufacturer's unopened packaging until ready for installation.

C. Protect finished surfaces with wrapping paper or strippable coating during installation. Do not use adhesive papers or sprayed coatings that bond to substrate when exposed to sunlight or weather.

D. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.09 FIELD CONDITIONS & MEASUREMENTS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

B. Check dimensions of openings in the actual framing work, by accurate field measurement before fabrication. Show recorded measurements on shop drawings. Coordinate fabrication schedule with construction progress as directed by the Contractor.

1.10 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Correct defective Work within a five year period after Date of Substantial Completion.

C. Provide ten (10) year manufacturer warranty against failure of glass seal on insulating glass units, including interpane dusting or misting. Include provision for replacement of failed units.

D. Provide five year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking.

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PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Aluminum Windows:

1. Graham Thermal Products Model GT-6200 fixed and GT-6200 operable, EFCO, TRACO, or approved equal. Products listed are Graham but may be by approved equal.
2. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 WINDOWS

A. Windows: Tubular aluminum sections, factory fabricated, factory finished, thermally broken, vision glass, related flashings, anchorage and attachment devices. AAMA Designation: AP-AW90

1. Frame Depth: 2-3/4" minimum frame depth; extruded aluminum with dual strut glass reinforced polyamide nylon thermal break frame; finish factory-applied; frames and sash factory-assembled.. Provide weeps in glazing pockets and internal heel bead seal.
2. Operable Units: Double weatherstripped.
3. Provide units factory glazed.
4. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.

B. Performance Requirements: Provide products that comply with the following:

1. Grade: AAMA/WDMA/CSA 101/I.S.2/A440 requirements for specific window type:
   a. Performance Class (PC): AW.
2. Design Pressure (DP):
   a. Positive Design Wind Load: 35 psf.
   b. Negative Design Wind Load: -40 psf.
3. Member Deflection: Limit member deflection to flexure limit of glass in any direction, with full recovery of glazing materials.
4. Water Leakage: No uncontrolled leakage on interior face when tested in accordance with ASTM E331 at differential pressure of 12.11 psf.
5. Air Leakage: Maximum of 0.1 cu ft/min sq ft per unit area of outside frame dimension, with 6.27 psf differential pressure when tested in accordance with ASTM E283.
6. Condensation Resistance Factor of Frame: 50, measured in accordance with AAMA 1503.
7. Overall U-value, Including Glazing: 0.35, maximum, measured on the window size required for this project.

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8. Forced Entry Resistance: Tested to comply with ASTM F588 requirements for performance level of Grade 10 for specific window style required.

C. Fixed, Non-Operable Type:

1. Construction: Frame shall be constructed of extruded aluminum with 2 thermal struts, consisting of glass reinforced polyamide nylon, mechanically crimped in raceways extruded in the exterior and interior extrusions. Corners shall be double keyed, staked and sealed.. Sash shall be reglazable without dismantling or removing the sash and without the use of special tools. Sash and frame shall be dry glazed to simplify reglazing. Exterior of sash and frame shall contain a continuous preset EPDM gasket. Interior of frame and sash shall contain a removable wedge gasket.
2. Glazing: insulated glazing, argon filled; clear; low-e #272 consisting of 3/16" clear annealed, 5/8" air space, 3/16" clear annealed with low-e coating on the #2 surface.

2.03 COMPONENTS

A. Reinforced Mullion: 4 inch profile of extruded thermally-broken 3-piece aluminum with integral reinforcement of shaped steel structural section.

B. Sills:.062 inch thick, brake formed aluminum; sloped for positive wash; fit under sash leg to 3-1/2 inch beyond wall face; one piece full width of opening and extended where indicated on the drawings, jamb angles to terminate sill end.

C. Fasteners: Stainless steel.

D. Sealant for Setting Sills and Sill Flashing: Non-curing butyl type.

E. Sealant and Backing Materials: As specified in Section 07 90 05.

2.04 MATERIALS

A. Extruded Aluminum: ASTM B221 (ASTM B221M), 6063 alloy, T6 temper.

B. Sheet Material: Extruded aluminum; nominal .062 inch (1.6 mm) wall; with exposed surfaces finished to match window color and finish performance; concealed fasteners; required weather seals; designed for unrestricted expansion and contraction.

C. Interior Trim: Provide continuous clips and continuous two-piece snap-trim around the entire interior window perimeter.

D. Mullions: Provide thermally broken mullion as indicated on the drawings.

2.05 FINISHES

A. Exterior: PPG DURANAR or approved equal Superior Performance Organic Coating System: AAMA 2605 multiple coat, thermally cured polyvinylidene fluoride system; Color to be selected from Manufacturer's Standard Colors..

B. Interior: PPG DURACRON or approved equal Pigmented Organic Coating System: AAMA 2603; polyester or acrylic baked enamel finish; Color to be selected from Manufacturer's Standard Colors..

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C. Pretreatment: Five-stage; zinc chromate conversion coating.

D. Application: Electrostatic spray and oven bake by approve applicator.

2.06 MEMBRANE FLASHING

A. Self-adhering, flexible membrane flashing: WR Grace Vycor, or approved equal.

2.07 INSULATION

A. Unfaced Fiberglass BATT insulation: Fill all voids at the entire perimeter of the replacement windows.

2.08 MAINTENANCE MATERIAL

A. Upon delivery, obtain signed receipt from Owner's representative. Include copy of receipt with closeout submittals.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that wall openings and adjoining air and vapor seal materials are ready to receive aluminum windows.

B. Verify openings are in tolerance, plumb, level and provide for secure anchorage in accordance with approved shop drawings.

3.02 INSTALLATION

A. Do not install until flashing of each opening is complete and reviewed and approved by Architect and Owner.

B. Install windows in accordance with manufacturer's instructions and approved shop drawings with skilled craftspeople who have a successful history of installing windows in similar applications for a minimum of five years. Do not install windows until unsatisfactory conditions have been corrected.

C. Attach window frame and shims to perimeter opening to accommodate construction tolerances and other irregularities.

D. Align window plumb and level, free of warp or twist. Maintain dimensional tolerances and alignment with adjacent work.

E. Install sill and sill end angles.

F. Set subsill and window in a bed of sealant.

G. Apply sealant and backer rod per sealant manufacturer's recommendations at joints. Wipe off excess, and leave exposed sealant surfaces clean and smooth.

H. Verify that weeps are not obstructed. Remove any sealant that could impede the flow of water.

I. Provide thermal isolation where components penetrate or disrupt building insulation. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.

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J. Aluminum that is not organically coated shall be insulated from direct contact with steel, masonry, concrete or other non-compatible materials by applying bituminous paint, zinc chromate primer or other suitable insulating material.

K. Coordinate attachment and seal of perimeter air barrier and vapor retarder materials.

L. Install perimeter sealant in accordance with requirements specified in Section 07 90 05.

3.03 TOLERANCES

A. Maximum Variation from Level or Plumb: 1/16 inches every 3 ft non-cumulative or 1/8 inches per 10 ft, whichever is less.

3.04 ADJUSTING

A. Adjust windows and hardware for smooth operation and secure weathertight closure, and leave windows clean and free of construction debris.

3.05 CLEANING

A. Remove protective material from factory finished aluminum surfaces.

B. Remove excess glazing sealant by moderate use of mineral spirits or other solvent acceptable to sealant and window manufacturer.

3.06 PROTECTION

A. Protect finished work to ensure that windows will be without damage or deterioration at the time of substantial completion, and under the provisions of Section 01 50 00- TEMPORARY FACILITIES AND CONTROLS.

1. The manufacturer shall advise the Contractor of protective treatment and other precautions required by him through the remainder of construction to ensure that the work of this Section will be without damage or deterioration at the time of Substantial Completion of the Contract.
2. Protect glass from breakage immediately upon installation. Use streamers or ribbons suitably attached to framing and held free of the glass. Do not apply warning markings directly to the glass.
3. Cover glass to protect it from activities that might abrade the glass surface.

B. Repair Broken Glass:

1. Replace in kind and thickness all glass breakage caused by the work performed under this Section, and bare all costs therefor.
2. Prior to Date of Substantial Completion, the Contractor shall replace in kind and thickness all glass breakage, caused by the work, weather, vandalism, accidents, negligence or any other reasons, with the costs being borne by the trade at fault, or the Contractor, as applicable.

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3.07 SCHEDULE

A. Do not remove any existing windows that cannot be replaced in the same day. No temporary window protection panels will be allowed overnight.

END OF SECTION

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DIVISION 08 OPENINGS

SECTION 08 71 00 DOOR HARDWARE

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

A. The general provisions of the Contract, including General and Supplementary Conditions and Division 1- General Requirements, apply to work specified in this Section.

1.02 SUMMARY OF WORK

A. This section specifies hardware for doors, including electro-mechanical and electronic hardware. Riser and point to point wiring diagrams shall be part of this Section. Furnish and install hardware for doors except as listed below as "related work" or otherwise noted on door schedule or Drawings.

B. Related Work Specified in Other Sections:

1. Fiberglass Doors: Section 08 16 13
2. Flush Wood doors: Section 08 14 16
3. Aluminum Framed Entrances: Section 08 11 16
4. Electrical power and final connections to electro-mechanical and electronic hardware: Division 26 00 00

1.03 REFERENCED STANDARDS

A. National Fire Protection Association (NFPA):

1. NFPA-80 Fire Doors and Other Openings Protective
2. NFPA-101 Life Safety Code

B. Door and Hardware Institute (DHI)

1. DHI Installation Guide (1986 Edition)
2. DHI Keying Terminology (1989 Edition)

C. ANSI/BHMA Standards

D. Massachusetts State Building Code, 780 CMR

E. MAAB: Rules and Regulations of the Massachusetts Architectural Access Board.

F. ANSI A117.1 – Accessible and Usable Buildings and Facilities

1.04 SUBMITTALS

A. Hardware Schedules and Product Data: Submit 6 copies of a typed hardware schedule including catalog cuts in the scheduling format recommended by DHI. The Architect's approval will not relieve the contractor of the responsibility of providing required hardware needed to complete the project.

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B. Samples: Upon request from the Architect, submit 1 sample of each proposed hardware item to be used in this project. Samples remain the property of the supplier and will be returned after completion of the project.

C. Furnish templates needed by door and frame manufacturer to enable proper machining for the required template hardware.

D. Supply a complete keying schedule for approval by Architect. This should be done after keying meeting has been held with owner's representative. Submit this keying schedule using the reference manual from DHI.

E. Closeout Submittals: Furnish the following for inclusion in the Owner's Operation and Maintenance Manual, specified in Section 01 77 00. Place in a binder as specified in Section 01 77 00.

1. A final copy of the approved and as-built hardware schedule.
2. A final copy of the approved keying schedule.
3. Catalog cuts for each item used in the project.
4. Parts list and numbers for each item used.
5. Maintenance instructions for all items.

1.05 QUALITY ASSURANCE

A. Manufacturer's model numbers listed in sets are to establish the standard of quality, similar items by manufacturers other than those listed that conform to this quality standard may be accepted upon prior approval by Architect provided required data and physical samples are submitted in accordance with Section 01 63 00.

B. Hardware supplier must be engaged in regularly contracting work and be staffed to expedite the work. The firm shall have been furnishing finish hardware on similar projects in the vicinity of this project for no less than five years. The firm shall also employ a certified Architectural Hardware Consultant (AHC) to inspect periodically and direct detailing, setting, applying of architectural grade finish hardware. This person shall be a member in good standing in the Door and Hardware Institute and be part of the accreditation program. Same individual shall apply their seal to schedules and documentation.

1.06 DELIVERY, STORAGE AND HANDLING

A. Hardware shall be delivered to the job site in the manufacturer's original packages, marked to correspond with the approved hardware schedule door numbers.

B. Provide a clean, dry, locked and lighted room with shelves exclusively used to store hardware.

C. A delivery document shall be signed by both the distributor representative and an authorized representative of the contractor after verification of the quantities delivered.

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1.07 WARRANTIES

A. Supply written manufacturer's warranties, agreeing to repair or replace door hardware which is defective in manufacture or installation, or which fails to operate in accordance with the specifications during the warranty period. Warranty periods shall be as follows:

1. Door Closers: Life of installation.
2. Door Operators: Two years on complete unit, 10 years on closer body.
3. Locks and Exit Devices: Life of installation.
4. Electronic Portion of the hardware: One year.
5. Hinges butt and continuous type: Life of the installation.
6. Other hardware items: One year.

1.08 MAINTENANCE MATERIALS

A. Fasteners: Furnish 6 extra screws or fasteners of each type size and of the same finish used for hinges, closers and exit devices in this project.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A.	Continuous Geared Hinges	Roton/Hager	St Louis, MO
		Bommer	Landrum, SC
		Pemko	Ventura, CA
B.	Butt Type Hinges	Hager Companies	St Louis, MO
		Bommer Industries	Landrum, SC
		McKinney	Scranton, PA
C.	Locks/Latches	Hager Companies	St Louis, MO
		Sargent	New Haven, CT
		Schlage	San Francisco, CA
D.	Exit Devices	Von Duprin	Indianapolis, IN
		Hager Companies	St Louis, MO
		Sargent	New Haven, CT
E.	Door Closing Devices	Hager Companies	St Louis, MO
		Sargent	New Haven, CT
		LCN	Princeton, IL
F.	Door Operators	Hager Companies	St Louis, MO
		Besam	Berlin, CT
		Horton	Corpus Cristy, TX
G.	Push Pulls	Hager Companies	St Louis, MO

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		Rockwood	Rockwood, IL
		Don Jo	Sterling, MA
H.	Protection Plates	Hager Companies	St Louis, MO
		Rockwood	Rockwod, IL
		Ives	New Haven, CT
I.	Stops	Hager Companies	St Louis, MO
		Rockwood	Rockwood, IL
		Ives	New Haven, CT
J.	Thresholds & Gasketing, Misc.	Hager Companies	St Louis, MO
		National Guard	Memphis, TN
		Pemko	Memphis, TN
K.	Silencers	Hager Companies	St Louis, MO
		Glynn Johnson	Indianapolis, IN
		Ives	New Haven, CT

2.02 MATERIALS

A. Continuous geared hinges: Continuous geared hinges shall be manufactured by the same manufacturer of 6063-T6 anodized aluminum non-handed manufactured of three interlocking components. Door leaf and jamb leaf shall be geared together for the entire length of the hinge and joined by a cover channel. Use concealed leafs; surface applied leafs are NOT acceptable. Unexposed working metal surfaces shall be coated with TFE dry lubricant. Vertical door load shall be carried on a minimum of 32 Lubriloy RLR bearings through a full 180degree opening. Piano type hinges are NOT acceptable. Provide a minimum of 54 flat head, under cut, self-drilling fasteners at all hinges. Provide UL ratings as required in sets also provide a Lifetime Warranty on geared hinges. Electrify them as listed in sets and provide proper mortar boxes. Subject to compliance to this specification provide continuous geared hinges from one of the following manufacturers:

1. Roton/Hager, 780-112HD ULFF or as listed in sets.
2. Bommer, FM 83 HD series.
3. Pemko, CFM 83 HD series.

B. Butt Type Hinges: Unless otherwise noted, hinges when listed in sets shall be the five knuckles type and they shall meet or exceed ANSI/BHMA 156.1. Hinges shall have a lifetime warranty and all must be from the same manufacturer. Electrify hinges as listed in and provide proper mortar boxes. Swing clear electrified hinges shall be from the same manufacturer as the other hinges needed on the project.

1. Hager, BB1168, series or as listed in sets.

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2. Bommer, BB5004 series.
3. McKinney, T4A3786 series.

C. Locks/Latches: Provide mortise locks/latches from the manufacturer that conform to ANSI/BHMA standard A156.13 series 1000 Operational Grade 1 and Security Grade 2. Provide KNURLING on levers when required by code. Provide curved lip strikes. Provide an SDC MS20D or equal monitoring strike when listed in sets. Cylinders and keying is described in 2.4 of this Specification.

1. Hager 3800ESC series with August (AUG) trim design.
2. Sargent, 8200 series with ENL trim.
3. Schlage, L9000 series with 01A trim.

D. Exit devices: Subject to compliance with this article, provide heavy duty, security, fire rated and non-fire rated exit devices from the same manufacturer as listed below that conforms to ANSI/BHMA A156.3 Standard Grade 1 and shall have the proper UL listings and labels. Electrify devices as listed in sets include switches and power supplies/controllers these shall be from same manufacturer to keep the proper warrantee and labeling. Device bodies shall be smooth steel extruded aluminum bodies are not acceptable. Provide KNURLING as required by code. Types and functions as listed in sets.

1. Egress and Fire Safety Exit Devices:
   a. Von Duprin, 98, series as listed in sets.
   b. Hager 4500 series.
   c. Sargent, 80 series.
2. Unless otherwise noted, when trims are listed they shall be Heavy Duty. Provide KNURLING as required by code.
   a. Von Duprin, HD 994L x 01 trim lever as listed in sets.
   b. Hager HD 45 trim with AUG.
   c. Sargent, ENL with Freewheeling lever.
3. Keyed removable mullions and the proper stabilizers shall be from the same manufacturer as the exit devices.

E. Door Closer: Provide surface mounted door closers from the same manufacturers as listed below that comply with ANSI/BHMA A156.4 grade 1 standard C02011or C02021. Provide mounting brackets as required for proper installation. Provide options as listed in sets. Install closing devices away from public view when possible. Provide heavy-duty spring-cush arms when listed as in sets.

1. Hager 5100, 5200 series as listed in sets.
2. Sargent, 351 series.
3. LCN, 4000, 1400 series.

F. Door Operators: Provide low energy closer/opener device that conforms to ANSI A156.19 standards and UL requirements. Provide a ten-year warranty on the closer body and a two-year warranty on the complete system. Provide HD arms

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that contain a spring action stop to prevent damage. Provide any mounting plates needed for the proper installation and use of these units.

1. Hager 8400 series as listed in sets.
2. Besam, 350/450 series.
3. Horton, 7000 series.

G. Push/Pulls: Provide solid stainless steel pulls that comply with ANSI/BHMA A156.6 standard J401, and will be 1" inch in diameter with 12" inches on-center. Push bars will be 1"inch in diameter and solid stainless steel. Push/Pull Plates will be .050 thick, 4" wide x 16" high.

1. Hager, 160D or 12L or 34G as listed in sets.
2. Rockwood, 112 or series equal to above.
3. Don Jo, 21 or series equal to above.

H. Protection plates: Provide kick, armor and mop plates from one of the listed manufacturer that conforms to ANSI 156.6 standard J102 or J103. Thickness shall be .050. Height of protection plates shall be as listed in sets. The width of the kick plates shall be less -2" inches for single doors and less - 1" inch for pairs of doors. Mop plates shall be less -1" inch for singles and less - 1/2" inch for pairs. Fasteners shall be countersunk, regardless of how they are listed in sets.

1. Hager, 190 S series or as listed in sets.
2. Rockwood, .050 thick materials.
3. Ives, 8400 series.

I. Door Stops: Provide doorstops from one of the listed manufacturer that conforms to ANSI 156.16 grade 1. Furnish floor stops, with risers if needed, only when wall stops are not practical. Provide adequate internal wall blocking for wall stops. When listed in sets or when a wall or floor stop will not work provide heavy duty surface overhead holder or stops equal to Hager 7000 series regardless of how stops are listed in sets.

1. Hager, 236 W, 243 F stops, or as listed.
2. Rockwood, 400, 443 series.
3. Ives, 402, 438 series.

J. Thresholds, weather-stripping, gasketing and miscellaneous items; Provide perimeter gasketing, door bottoms, thresholds, astragals, etc, from one on the listed manufacturers that conforms with ANSI/BHMA A156.22 standard and to the Energy Code requirements for air infiltration per ASTM E283-91. Where listed in sets provide wall mounted wall magnets equal to Hager 380S series.

1. Thresholds: (Where shown on drawings provide expansion or other needed cover plates equal to Hager 626S x proper width and fasteners, see details on drawings).
   a. Hager, 626S or as listed in sets.
   b. National Guard, equal to above

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c. Pemko, equal to above

2. Door sweeps, exterior openings:
   a. Hager, 756S V as listed in sets.
   b. National Guard, 110 series
   c. Pemko, 307 V series
3. Exterior weatherstripping:
   a. Hager, 896S V as listed in sets.
   b. National Guard, 156 series
   c. Pemko, 297 series
4. Smoke gasketing:
   a. Hager, 726S as listed in sets
   b. National Guard, 5050
   c. Pemko, S88

K. Silencers: At openings that do not have /weather stripping/gasketing, provide rubber silencers. Comply with ASNI/BHMA A156.16 standard L03011. Supply 3 silencers for a single opening and 2 for pairs.
   1. Hager, 307 D
   2. Glynn Johnson, GJ64 series
   3. Ives, 20 series

L. All Sliding Door hardware by door manufacturer

2.03 FINISHES

A. Conform to ANSI/BHMA A156.18 Standard for architectural finishes, brush stainless steel 630 (US32D) or 689 (AL/CLR), as listed in sets. Use brushed chrome 626 or 652 (US26D) only as listed in sets.

2.04 KEYING

A. Cylinders will be prepared for small format interchangeable core type cylinders (SFIC) Cores and keys shall be Schlage and will be the same type as existing and a continuum of the existing school system. Contact project manager for details. Provide construction keying for the project, construction cores and keying shall be returned to supplier.
   1. Keying System:
      a. Construction cylinders shall be keyed alike.
      b. Keys:
         1) CMK - Masters: 4
         2) MK - 6
         3) Change keys: 3 per keyed cylinder

B. Provide (2) extra keyed cores and tag them maintenance.

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PART 3 - EXECUTION

3.01 EXAMINATION

A. Installer shall examine doors, frames and existing conditions under which the work is to be performed and notify the Architect in writing of any detrimental conditions to the proper completion of the installation. Do not proceed until unsatisfactory conditions have been corrected. Starting the Work means the installer has accepted substrates and existing conditions and the responsibility.

3.02 INSTALLATION

A. Comply with manufacturer's installation instructions. Install door-closing devices away from public view when possible.

B. Mount the finish hardware at the recommended location listed in DHI' s document on installation, except where required by law.

C. Install surface closer and exit devices with trough bolts and grommet nuts.

3.03 ADJUSTING AND CLEANING

A. At completion of installation, hardware shall be left clean and free from disfigurement. Make final adjustments to closing devices after HVAC system has been activated and balanced. Where hardware is found defective or not in conformance with the specifications, repair or replace as instructed by the Designer.

B. The mechanical hardware installer shall be present when the electronic systems are connected to provide the mechanical adjustments needed for the opening to operate properly.

3.04 PROTECTION

A. Provide proper protection of hardware items until the Architect accepts the project as complete and the building is being turned over to the owner.

3.05 FIELD QUALITY CONTROL

A. After final installation and adjustments are made, provide for the manufacturer's representative of each major group of hardware to determine if their products were installed according to their recommended guidelines and the approved hardware schedules. This task shall be supervised by a certified AHC chosen by the Designer. This Individual shall provide a written report confirming that the hardware has been installed properly and that it is operating as intended.

3.06 HARDWARE SETS

A. Text in brackets are prompts for information which is to be determined by the hardware supplier and shown on the hardware schedule.

B. Hardware sets:

END OF SECTION

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DIVISION 08 WINDOWS AND DOORS

SECTION 08 80 00 GLAZING

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

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 which 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 Contract.

D. It is the intent of the Specifications and the Drawings to require that all the material, labor, and equipment be furnished complete in every respect, and that this Contractor shall provide all material, labor, and equipment needed and usually furnished in connection with such systems to provide a complete installation including all demolition, disposal, and patching of adjacent surfaces. Materials, equipment, and articles incorporated in the work shall be new and of the best grade of their respective kinds.

1.02 WORK TO BE PERFORMED

A. Provide all the Glazing work required to complete the work of the contract including all the Glazing work shown on the plans, listed in the specification, and needed to install a complete assembly in every way, with all reinforcing, pinning, and finishes. Coordinate the Glazing work with all the other trades for the project. Provide all demolition and disposal work to complete the work. Patch to match all adjacent surfaces that are disturbed, left exposed, or unfinished. All work of the contract is related. It is the General Contractor's responsibility to review all the work of each section, each sub-contractor, and each file sub-bidder for the entire project so that all the work can be properly and completely performed. Provide labor, materials and equipment necessary to complete the work of this section.

B. Glazing includes, but is not limited to:

1. Cafeteria
   a. No base bid scope.
2. Library Curtainwall
   a. Provide and install insulated glazing units at Curtainwalls A, B, and C as shown on the drawings.

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3. Library Interior
    a. No base bid scope.
4. Alternate #1
    a. Delete base bid scope of this section at Curtainwall A.
5. Alternate #2, Cafeteria
    a. Provide and install insulated glazing units at aluminum windows and aluminum storefronts at Cafeteria as shown on the drawings.
6. Alternate #3
    a. Delete base bid scope of this section at Curtainwalls B and C.

1.03 RELATED REQUIREMENTS

A. Section 08 43 13 - Aluminum-Framed Storefronts: Glazing furnished as part of storefront assembly.

B. Section 08 44 13 - Glazed Aluminum Curtain Walls: Glazing furnished as part of wall assembly.

C. Section 08 88 36.21 - Electrochromic Tintable Glass

1.04 REFERENCE STANDARDS

A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials; current edition.

B. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test; 2015.

C. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2012.

D. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2016.

E. ASTM C1376 - Standard Specification for Pyrolytic and Vacuum Deposition Coatings on Flat Glass; 2015.

F. ASTM E1300 - Standard Practice for Determining Load Resistance of Glass in Buildings; 2016.

G. ASTM E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation; 2010.

H. GANA (GM) - GANA Glazing Manual; 2009.

I. GANA (SM) - GANA Sealant Manual; 2008.

J. GANA (LGRM) - Laminated Glazing Reference Manual; 2009.

K. IGMA TM-3000 - North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial & Residential Use; 1990 (2004).

L. NFRC 100 - Procedure for Determining Fenestration Product U-factors; 2014.

M. NFRC 200 - Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence; 2014.

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N. NFRC 300 - Test Method for Determining the Solar Optical Properties of Glazing Materials and Systems; 2014.

1.05 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by each of the affected installers.

1.06 SUBMITTALS

A. Product Data on Insulating Glass Unit Glazing Types: Provide structural, physical and environmental characteristics, size limitations, special handling and installation requirements.

B. Product Data on Glazing Compounds and Accessories: Provide chemical, functional, and environmental characteristics, limitations, special application requirements. Identify available colors.

C. Samples: Submit two samples 12 by 12 inch in size of glass units.

D. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.07 QUALITY ASSURANCE

A. Perform Work in accordance with GANA (GM), GANA (SM), GANA (LGRM), and IGMA TM-3000 for glazing installation methods. Maintain one copy on site.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

C. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years documented experience.

1.08 FIELD CONDITIONS

A. Do not install glazing when ambient temperature is less than 40 degrees F.

B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.09 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Insulating Glass Units: Provide a five (5) year manufacturer warranty to include coverage for seal failure, interpane dusting or misting, including providing products to replace failed units.

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PART 2 PRODUCTS

2.01 PERFORMANCE REQUIREMENTS - EXTERIOR GLAZING ASSEMBLIES

A. Provide type and thickness of exterior glazing assemblies to support assembly dead loads, and to withstand live loads caused by positive and negative wind pressure acting normal to plane of glass.

1. Design Pressure: 35 psf Positive, -40 psf Negative.
2. Comply with ASTM E1300 for design load resistance of glass type, thickness, dimensions, and maximum lateral deflection of supported glass.
3. Provide glass edge support system sufficiently stiff to limit the lateral deflection of supported glass edges to less than 1/175 of their lengths under specified design load.
4. Glass thicknesses listed are minimum.

B. Vapor Retarder and Air Barrier Seals: Provide completed assemblies that maintain continuity of building enclosure vapor retarder and air barrier.

1. In conjunction with vapor retarder and joint sealer materials described in other sections.
2. To maintain a continuous vapor retarder and air barrier throughout the glazed assembly from glass pane to heel bead of glazing sealant.

C. Thermal and Optical Performance: Provide exterior glazing products with performance properties as indicated. Performance properties are in accordance with manufacturer's published data as determined with the following procedures and/or test methods:

1. Center of Glass U-Value: Comply with NFRC 100 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 6.3 computer program.
2. Center of Glass Solar Heat Gain Coefficient (SHGC): Comply with NFRC 200 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 6.3 computer program.
3. Solar Optical Properties: Comply with NFRC 300 test method.

2.02 GLASS MATERIALS

A. Float Glass: Provide float glass based glazing unless noted otherwise.

1. Fully Tempered Types: ASTM C1048, Kind HS and FT.
2. Fully Tempered Safety Glass: Complies with ANSI Z97.1 and 16 CFR 1201 criteria.

2.03 INSULATING GLASS UNITS

A. Manufacturers:

1. Vitro Glass (formerly PPG Glass); Solarban 70XL: www.vitroglazings.com/#sle.
2. Approved Equal.

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B. Insulating Glass Units: Types as indicated.

1. Durability: Certified by an independent testing agency to comply with ASTM E2190.
2. Coated Glass: Comply with requirements of ASTM C1376 for pyrolytic (hard-coat) or magnetic sputter vapor deposition (soft-coat) type coatings on flat glass; coated vision glass, Kind CV; coated overhead glass, Kind CO; or coated spandrel glass, Kind CS.
3. Metal Edge Spacers: Stainless steel, bent and spot welded corners.
4. Spacer Color: Black.
5. Edge Seal:
   a. Dual-Sealed System: Provide polyisobutylene sealant as primary seal applied between spacer and glass panes, and silicone sealant as secondary seal applied around perimeter.
6. Color: Black.
7. Purge interpane space with dry air, hermetically sealed.

C. Type IG-1 - Insulating Glass Units: Vision glass, double glazed.

1. Applications: Exterior glazing at all curtain walls (Library).
2. Space between lites filled with argon.
3. Outboard Lite: Fully tempered float glass, 1/4 inch thick, minimum.
   a. Tint: Clear.
   b. Coating: Low-E (solar control type), on #2 surface.
      1) Low-E Coating Type: Solarban 70 XL, or Approved Equal.
4. Inboard Lite: Fully tempered float glass, 1/4 inch thick, minimum.
   a. Tint: Clear.
5. Total Thickness: 1 inch.
6. Thermal Transmittance (U-Value), Winter - Center of Glass: 0.24, nominal.
7. Visible Light Transmittance (VLT): 64 percent, nominal.
8. Solar Heat Gain Coefficient (SHGC):.27, nominal.
9. Glazing Method: Dry glazing method, gasket glazing.

D. Type IG-2 - Insulating Glass Units: Vision glass, double glazed.

1. Applications: Exterior glazing at all windows and storefront (Cafeteria).
2. Space between lites filled with argon.
3. Outboard Lite: Fully tempered float glass, 1/4 inch thick, minimum.
   a. Tint: Clear.
   b. Coating: Low-E (passive type), on #2 surface.
      1) Low-E Coating Type: Solarban 60, or Approved Equal.
4. Inboard Lite: Fully tempered float glass, 1/4 inch thick, minimum.
   a. Tint: Clear.

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5. Total Thickness: 1 inch.
6. Thermal Transmittance (U-Value), Winter - Center of Glass: 0.24, nominal.
7. Visible Light Transmittance (VLT): 70 percent, nominal.
8. Solar Heat Gain Coefficient (SHGC): 0.39, nominal.
9. Glazing Method: Dry glazing method, gasket glazing.

PART 3 EXECUTION

3.01 VERIFICATION OF CONDITIONS

A. Verify that openings for glazing are correctly sized and within tolerances, including those for size, squareness, and offsets at corners.

B. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and support framing is ready to receive glazing system.

C. Verify that sealing between joints of glass framing members has been completed effectively.

D. Proceed with glazing system installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Clean contact surfaces with appropriate solvent and wipe dry within maximum of 24 hours before glazing. Remove coatings that are not tightly bonded to substrates.

B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.

C. Prime surfaces scheduled to receive sealant where required for proper sealant adhesion.

3.03 INSTALLATION, GENERAL

A. Install glazing in compliance with written instructions of glass, gaskets, and other glazing material manufacturers, unless more stringent requirements are indicated, including those in glazing referenced standards.

B. Install glazing sealants in accordance with ASTM C1193, GANA (SM), and manufacturer's instructions.

C. Do not exceed edge pressures around perimeter of glass lites as stipulated by glass manufacturer.

D. Set glass lites of system with uniform pattern, draw, bow, and similar characteristics.

E. Set glass lites in proper orientation so that coatings face exterior or interior as indicated.

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F. Prevent glass from contact with any contaminating substances that may be the result of construction operations such as, and not limited to the following; weld splatter, fire-safing, plastering, mortar droppings, etc.

3.04 INSTALLATION - DRY GLAZING METHOD (GASKET GLAZING)

A. Application - Exterior and/or Interior Glazed: Set glazing infills from either the exterior or the interior of the building.

B. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.

C. Rest glazing on setting blocks and push against fixed stop with sufficient pressure on gasket to attain full contact.

D. Install removable stops without displacing glazing gasket; exert pressure for full continuous contact.

3.05 INSTALLATION - PRESSURE GLAZED SYSTEMS

A. Application - Exterior Glazed: Set glazing infills from the exterior of the building.

B. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.

C. Rest glazing on setting blocks and push against fixed stop with sufficient pressure on gasket to attain full contact.

D. Install pressure plates without displacing glazing gasket; exert pressure for full continuous contact.

E. Install cover plate.

3.06 FIELD QUALITY CONTROL

A. Glass and Glazing product manufacturers to provide field surveillance of the installation of their products.

B. Monitor and report installation procedures and unacceptable conditions.

3.07 CLEANING

A. Remove excess glazing materials from finish surfaces immediately after application using solvents or cleaners recommended by manufacturers.

B. Remove non-permanent labels immediately after glazing installation is complete.

C. Clean glass and adjacent surfaces after sealants are fully cured.

D. Clean glass on both exposed surfaces not more than 4 days prior to Date of Substantial Completion in accordance with glass manufacturer's written recommendations.

3.08 PROTECTION

A. After installation, mark pane with an 'X' by using removable plastic tape or paste; do not mark heat absorbing or reflective glass units.

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B. Remove and replace glass that is damaged during construction period prior to Date of Substantial Completion.

END OF SECTION

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DIVISION 08 WINDOWS AND DOORS

SECTION 08 88 36.21 ELECTROCHROMIC TINTABLE GLASS

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

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 which 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 Contract.

D. It is the intent of the Specifications and the Drawings to require that all the material, labor, and equipment be furnished complete in every respect, and that this Contractor shall provide all material, labor, and equipment needed and usually furnished in connection with such systems to provide a complete installation including all demolition, disposal, and patching of adjacent surfaces. Materials, equipment, and articles incorporated in the work shall be new and of the best grade of their respective kinds.

1.02 WORK TO BE PERFORMED

A. Provide all the Electrochromic Tintable Glass work required to complete the work of the contract including all the Electrochromic Tintable Glass work shown on the plans, listed in the specification, and needed to install a complete assembly in every way, with all reinforcing, pinning, and finishes. Coordinate the Electrochromic Tintable Glass work with all the other trades for the project. Provide all demolition and disposal work to complete the work. Patch to match all adjacent surfaces that are disturbed, left exposed, or unfinished. All work of the contract is related. It is the General Contractor's responsibility to review all the work of each section, each sub-contractor, and each file sub-bidder for the entire project so that all the work can be properly and completely performed. Provide labor, materials and equipment necessary to complete the work of this section.

B. Electrochromic Tintable Glass includes, but is not limited to:

1. Cafeteria
   a. No base bid scope.
2. Library Curtainwall
   a. No base bid scope.

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3. Library Interior
    a. No base bid scope.
4. Alternate #1
    a. Provide and install electrochromic tintable insulated glazing units and associated controls at Curtainwall A.
5. Alternate #2
    a. No scope in this section.
6. Alternate #3
    a. Provide and install electrochromic tintable insulated glazing units and associated controls at Curtainwalls B and C.

1.03 RELATED REQUIREMENTS

A. Section 07 84 00 - Firestopping.

B. Section 08 44 13 - Glazed Aluminum Curtain Walls: Supporting framework for EC tintable IGU.

C. Section 08 80 00 - Glazing: Additional glazing requirements and other types of glass.

D. Section 26 05 53 - Identification for Electrical Systems: Identification products and requirements for control system cabling and other components.

1.04 ABBREVIATIONS AND ACRONYMS

A. EC - Electrochromic.

B. IGU - Insulating Glass Units.

C. LBNL (IGDB) - Lawrence Berkley National Laboratory (The International Glazing Database).

D. NFRC - National Fenestration Rating Council.

1.05 DEFINITIONS

A. Bite: Width that edge of glass product is engaged into glazing channel.

B. Busbar: Thin narrow strip of metal that conducts electricity, and is used to apply voltage across the EC surface of the IGU.

C. Fenestration: Openings in building's envelope including windows, doors, and skylights.

D. Frame Cable: Cable that runs through framing system and connects IGU pigtail to low voltage wiring on interior of building.

E. Framing System: Basic rigid supporting structure of IGU.

F. Glazing Performance Characteristics and Criteria:

1. Center of Glass Characteristics: Performance values that take only center portion of IGU into account and not framing members.

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2. Fenestration Performance: Performance based on total fenestration, including glass and framing members, with values that are validated and certified by NFRC.
3. Clear: Inactive (Off) state, with highest visible light transmission.
4. Tinted: Active (On) state, with lowest visible light transmission.
5. Variable Tint: Intermediate levels of tint ranging from full tint to clear.
6. Inboard Lite: Pane of IGU that faces interior of building.
7. Outboard Lite: Pane of IGU that faces exterior of building.

G. IGU Surfaces: Based on one outboard pane of glass, air space, and one inboard pane of glass.
1. Surface 1: Outdoor surface of outboard pane of glass.
2. Surface 2: Indoor surface of outboard pane of glass and facing air space.
3. Surface 3: Outdoor surface of inboard pane of glass and facing air space.
4. Surface 4: Indoor surface of inboard pane of glass.

H. Pigtail: Wire that extends from individual EC tintable IGU.

1.06 REFERENCE STANDARDS

A. ASTM C864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers; 2005 (Reapproved 2015).

B. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2012.

C. ASTM C1376 - Standard Specification for Pyrolytic and Vacuum Deposition Coatings on Flat Glass; 2015.

D. ASTM E1300 - Standard Practice for Determining Load Resistance of Glass in Buildings; 2016.

E. ASTM E2141 - Standard Test Method for Accelerated Aging of Electrochromic Devices in Sealed Insulating Glass Units; 2014.

F. ASTM E2188 - Standard Test Method for Insulating Glass Unit Performance; 2010.

G. ASTM E2189 - Standard Test Method for Testing Resistance to Fogging in Insulating Glass Units; 2010, with Editorial Revision (2012).

H. ASTM E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation; 2010.

I. GANA (GIB 01-0300) - Glass Informational Bulletin (Proper Procedures for Cleaning Architectural Glass Products); 2010.

J. GANA (GIB TD-02-0402) - Glass Informational Bulletin (Heat-Treated Glass Surfaces are Different); 2008.

K. GANA (GM) - GANA Glazing Manual; 2009.

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L. IGMA TB-1201 - Sealant Manufacturers Minimum Sealant Dimensions and Placement Survey; 1989 (2005).

M. IGMA TM-3000 - North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial & Residential Use; 1990 (2004).

N. IGMA TM-4000 - Insulating Glass Manufacturing Quality Procedures; 2002 (2007).

O. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.

P. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.07 ADMINISTRATIVE REQUIREMENTS

A. Coordination: Coordinate the installation of EC tintable IGU as required for project configuration with the following related building elements:

1. Cables in framing system of exterior fenestration.
2. Cables in wall and ceiling systems.
3. Control system components.
4. Electrical power supply.

B. Preinstallation Meeting: Conduct a preinstallation meeting one week prior to start of this Work to review procedures, schedules, safety, and coordination with other elements of project; attendance required by the following:

1. Owner's Representative.
2. Architect.
3. EC tintable IGU manufacturer's representative.
4. Other installers affected by this Work.

1.08 SUBMITTALS

A. Product Data: Manufacturer's product data sheets including installation instructions.

B. Shop Drawings: Submit the following for EC tintable IGU overall system in accordance with project configuration indicated.

1. Support Framing System: Submit shop drawings of framing system and accommodations for cables, components, cable routing, location of connectors, and exits from framing system.
2. Control System: Submit shop drawings indicating location of system components, proposed routing of system cabling, and associated power requirements.
   a. Include schematic wiring diagram showing field connections.
   b. Include requirements for interface with other systems.

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C. Sequence of Operations: Define conditions (e.g. occupancy, time of day, heating or cooling mode, and presence of glare, etc) and corresponding EC tintable IGU system response.

D. Designer's Qualification Statement.

E. Manufacturer's Qualification Statement.

F. Operation and Maintenance Data.

G. Installer Qualification Statement.

H. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

I. Specimen Warranty.

1.09 QUALITY ASSURANCE

A. Designer Qualifications: Perform design under direct supervision of a Professional Engineer experienced in design of this type of work and licensed in the State in which the Project is located.

B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than five (5) years of documented experience.

C. Installer Qualifications: Company specializing in performing the work of this section and approved by manufacturer.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Comply with manufacturer's instruction for receiving, handling, storing, and protecting materials.

B. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

C. Store materials in original packaging, protected from exposure to harmful environmental conditions including static electricity, and at temperature and humidity conditions recommended by manufacturer.

D. After removal from EC tintable IGU manufacturer's packaging, remove any labels on glazing within 30 days after exposure to sunlight or other ultra-violet light sources.

E. Exercise care to prevent edge damage to glass, wiring, and coatings on glass.

1.11 FIELD CONDITIONS

A. Ambient Conditions: Ensure that substrate surface and ambient air temperature are at least 40 degrees F and rising, and remain above that temperature for at least 24 hours after application of sealants.

B. Maintain ambient temperature at greater than 32 degrees F during installation of system related cabling.

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C. Provide an activated climate-controlled interior environment for installation of EC control system components.

1.12 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Provide warranty of EC tintable IGU without laminated glass products against defects in material or workmanship causing material obstruction of vision as a result of fogging or film formation of the internal glass as a result of failure of the hermetic seal for a period of ten (10) years from the Date of Substantial Completion.

C. Provide warranty of EC tintable IGU against defects in material or workmanship, resulting in failure to tint, for a period of five (5) years from the Date of Substantial Completion.

D. Provide warranty of EC tintable IGU controls against defects in material or workmanship for a period of five (5) years from the Date of Substantial Completion.

E. Correct defective Work within a five (5) year period from the Date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Basis of Design - Electrochromic (EC) Tintable IGU Systems: View Inc.

B. Electrochromic (EC) Tintable IGU Systems - Other Acceptable Manufacturers:

1. View Inc; Dynamic Glass: www.viewglass.com.
2. Or Approved Equal.

C. Products other than Basis of Design are subject to compliance with specified requirements and prior approval of Architect. By using products other than Basis of Design, the Contractor accepts responsibility for costs associated with any necessary modifications to related work, including any design fees.

D. Source Limitations: Provide EC tintable IGU and associated control system components produced by a single manufacturer and obtained from a single supplier.

2.02 PERFORMANCE REQUIREMENTS

A. EC Tintable IGU System Control Requirements:

1. Provide system capable of four tint levels (fully tinted, fully clear, and two intermediate levels) in each glazing pane.
2. Configure zones for independent control of specific areas of glazing.
3. Automatic Control:
   a. Capable of automatic control of designated fenestration zones based on:
      1) Daylight sensor input.

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2) Time of day.
3) Solar angle.

b. Manual Override:
1) Provide local control of designated fenestration zones to specific tint levels via manual control switch.

4. Provide custom event programming configuration as required for project in coordination with Owner.

B. Framing and Other Glazing Systems: Comply with the following requirements for framing used for EC tintable IGU, and other adjacent non-EC tintable IGU that are not considered part of this Work.

1. Refer to Section(s) 08 44 13 for additional framing system requirements.
2. Framing and glazing system compatibility shall be approved by EC tintable IGU manufacturer.
3. Glazing and framing systems shall withstand normal thermal movements, wind loads, and impact loads, without failure; this includes loss due to defective manufacture, fabrication, installation, deterioration of glazing materials, and other construction defects.
4. Provide holes in framing system to run pigtails and frame cables, sized per manufacturer's requirements, with grommets to protect cables from damage.

C. Sizes and shapes of EC tintable IGU to comply with glazing manufacturer's guideline requirements and limitations as indicated.

D. Provide type and thickness of exterior glazing assemblies to support assembly dead loads, and to withstand live loads caused by positive and negative wind pressure acting normal to plane of glass.

1. Design Pressure: Calculated in accordance with applicable codes.
2. Comply with ASTM E1300 for design load resistance of glass type, thickness, dimensions, and maximum lateral deflection of supported glass.
3. Provide glass edge support system sufficiently stiff to limit the lateral deflection of supported glass edges to less than 1/175 of their lengths under specified design load.
4. Glass thicknesses listed are minimum.

E. Provide specified glass products in thicknesses and strengths as required to meet or exceed the criteria based on project loads and in-service conditions in accordance with ASTM E1300.

1. Probability of failure not to exceed the following:
a. Eight breaks per 1,000 for glass installed vertically or not over 15 degrees from vertical plane and under wind action.

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2.03 CONTROLS

A. Unless specifically indicated to be excluded, provide required equipment, conduit, boxes, wiring, connectors, hardware, supports, accessories, software, and system programming, etc. as necessary for a complete EC tintable IGU operating system.

B. Provide control system and associated components that achieve system control requirements described under PERFORMANCE REQUIREMENTS article above.

C. Daylight Sensor: Photosensor to measure available daylight, and used for automatic control of tint level to achieve consistent daylighting.

1. Illuminance Range, Exterior Sensor: 0 to 9200 footcandles.
2. Illuminance Range, Interior Sensor: 0 to 300 footcandles.

D. Class 2 Low Voltage Cables: Plenum rated.

E. Use weather tight connectors for connection of frame cables to IGU pigtails.

2.04 GLASS MATERIALS

A. Float Glass: Glazing to be float glass unless otherwise indicated.

1. Kind FT - Fully Tempered in accordance with ASTM C1048.
2. Thicknesses: As indicated; for exterior glazing comply with specified requirements for wind load design regardless of specified thickness.

B. Insulating Glass Units: Types as indicated; in compliance with ASTM E2188 and ASTM E2189 requirements.

1. Durability: Certified by an independent testing agency to comply with ASTM E2190, IGMA TB-1201, and IGMA TM-4000.
2. EC Glass Coating: Comply with requirements in accordance with ASTM C1376 and ASTM E2141.
3. Low-E Coated Glass: Comply with quality requirements for cut size of ASTM C1376 for pyrolytic (hard-coat) or magnetic sputter vapor deposition (soft-coat) type coatings on flat glass; coated vision glass, Kind CV; coated overhead glass, Kind CO; or coated spandrel glass, Kind CS.
4. Sealed Cavity Spacer: Austenitic stainless steel; filled with 3A desiccant and sealed; spacer color - black.
   a. Cavity Width: 1/2 inch.
   b. Provide hermetically sealed IGU with dehydrated airspace, with black polyisobutylene primary seal and secondary silicone edge seal.

C. Busbar: Provide along edge of glass only, in accordance with EC tintable IGU performance requirements indicated.

D. Pigtails: Multi-conductor sheathed cable extending from edge of EC tintable IGU and terminated with weatherproof connector for connection to frame cable within glazing pocket.

1. Pigtail Length: 6 inch, minimum.

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2. Provide 7/16 inch minimum diameter hole through framing.

2.05 ELECTROCHROMIC TINTABLE INSULATING GLASS UNITS

A. Type EIG-1, EC Tintable IGU: Maximum size of 72 inch by 120 inch.

1. Applications: Exterior vertical glazing.
2. Cavity space between lites filled with argon, 90 percent.
3. EC coating applied to manufacturer's standard surface of outboard lite assembly.
4. Outboard Lite:
   a. Glass Type: Kind FT - Fully Tempered float glass.
      1) Thickness: 0.236 inch, nominal.
      2) Glass Color: Class 1 - Clear.
5. Inboard Lite:
   a. Glass Type: Kind FT - Fully Tempered float glass.
      1) Thickness: 0.236 inch, nominal.
      2) Glass Color: Class 1 - Clear.
6. Overall Thickness of Double Glazed IGU: 1 inch.

B. Thermal and optical properties of manufacturer's EC tintable IGU shall comply with requirements of NFRC and LBNL (IGDB) criteria.

2.06 ACCESSORIES

A. Glazing Materials: Compatible with EC tintable IGU components.

B. Setting Blocks: Silicone, with 80 to 90 Shore A durometer hardness; ASTM C864, Option II.

1. Size: Length of 0.1 inch for each square foot of glazing or at least 4 inch long by width of glazing pocket space less 1/16 inch wide by height to suit glazing method, IGU pane weight and area.

C. Edge Spacer Shims/Blocks: Silicone, with 50 to 60 Shore A durometer hardness; ASTM C864, Option II.

1. Size: At least 3 inch long by one half the depth of the glazing stop by thickness to suit application, self-adhesive on one face.

PART 3 EXECUTION

3.01 VERIFICATION OF CONDITIONS

A. Verify that site conditions are acceptable for installation of EC tintable IGU system components.

B. Verify openings for installation of EC tintable IGU are correctly sized and within acceptable tolerances.

C. Verify that framing weep system is operating properly and in accordance with GANA (GM) recommendations.

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D. Verify that required minimum face and edge clearances are being maintained.

E. Verify that glazing channels, weeps and recesses are clear and free of obstructions and ready for glazing.

F. Verify that glazing pocket is dry where EC tintable IGU pigtail and frame cable connection are required to be made.

G. Verify that framing system is sized appropriately for EC tintable IGU thickness and proper precautions are taken to not over compress the edge seals upon installation.

H. Verify that EC tintable IGU secondary seal is compatible with glazing sealants.

I. Verify frame channel dimensions are adequate for required cable runs to be made.

J. Verify locations of penetrations within framing system are acceptable for frame cables and sensor cables into building.

K. Verify electrical rough-in of any conduits and/or boxes required for installation of cables and system devices is complete.

L. Correct any conditions deemed unsatisfactory, and do not proceed with this glazing Work until unsatisfactory conditions have been properly corrected and are complete.

3.02 PREPARATION

A. Prepare glazing channels and other framing members to receive EC tintable IGU, pigtails, and frame cable in accordance with manufacturer's recommendations and project requirements.

B. Remove coatings and other harmful materials from glazing substrates that may inhibit specified EC tintable IGU performance requirements.

C. Ensure that system related cabling is conditioned at room temperature for at least 24 hours prior to installation.

3.03 ELECTROCHROMIC TINTABLE INSULATING GLASS UNITS INSTALLATION

A. Install system components in accordance with manufacturer's recommendations for IGU, sealants, gaskets and other glazing materials, pigtails, and frame cables and in compliance with more stringent requirements as indicated in GANA (GM).

B. Comply with framing manufacturer's and referenced industry recommendations regarding installation of expansion joints and anchors, accommodation of thermal movement, glass openings, use of setting blocks and spacer shims, and weep system layout.

C. Install EC tintable IGU in prepared glazing channels and framing members in compliance with glass manufacturer's labels and glass orientation as indicated.

D. Active tintable areas of IGU shall extend from edge to edge of finished window system opening without visible light transmittance at full perimeter of IGU.

E. Protect glass from edge damage during handling and installation.

F. Protect IGU pigtail, frame and sensor cables from any damage during installation.

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1. Use grommets during installation to protect pigtails and cables routed through framing.
2. When frame cable or connector is damaged during installation, replace in accordance with EC tintable IGU manufacturer's approved method.
3. When IGU pigtail connector is damaged during installation, notify EC tintable IGU manufacturer for repair or replacement of damaged components using manufacturer's approved method.

G. Install cabling so that it will not be exposed to direct sunlight, even through glass. If installation in an exposed location is necessary, cover or paint cable using a latex water based paint in accordance with manufacturer's approved method.

H. Install setting blocks in glazing pocket as recommended by referenced glazing standards in the GANA (GM), IGMA TM-3000 and EC tintable IGU manufacturer's glazing guidelines.

I. Install edge spacer shims at each side glazing pocket to prevent IGU's from moving horizontally upon installation.

J. Provide bite on glass, minimum edge and face clearances, and glazing material tolerances as indicated in GANA (GM) and as approved by manufacturer.

K. Provide fully functional weep system throughout IGU framing system as indicated in GANA (GM).

L. Distribute weight of IGU along entire bottom edge rather than only at corners.

M. Install IGU's in accordance with IGMA TM-3000, and as follows:

1. For dry glazed systems, provide an adequate seal consisting of at least 4 lbs per inch and not exceeding 10 lbs per inch pressure applied to the edges of IGU's by gaskets or other acceptable glazing materials.

3.04 CONTROL SYSTEM INSTALLATION

A. Perform control system installation work in accordance with NECA 1 and in compliance with NFPA 70 requirements.

B. Install system components in accordance with manufacturer's requirements.

C. Mounting Locations:

1. Interior Daylight Sensors: Mounted on or near the interior of the framing system.
2. Exterior Daylight Sensors: Mounted on or near the exterior of the framing system.

D. Class 2 Low Voltage Wiring Method: Unless noted otherwise, use cables not installed in conduit where possible.

1. Install Class 2 low voltage wiring in conduit where required for rough-in, where required by authorities having jurisdiction, and where exposed to damage.
2. Conceal cables unless specifically indicated to be exposed.

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E. Provide grounding and bonding in accordance with Section _____.

F. Install firestopping to maintain fire resistance rating as indicated for partitions and other elements, using materials and methods specified in Section 07 84 00.

G. Identify system wiring and components in accordance with Section 26 05 53.

3.05 FIELD QUALITY CONTROL

A. Verify that EC tintable IGU and corresponding pigtail cables are installed in proper orientation in accordance with approved shop drawings.

B. Test to verify wiring is free of shorts and grounds.

C. Prepare and start system in accordance with manufacturer's instructions.

D. Program system according to project requirements.

E. Test system for proper operation.

F. Test for proper interface with other systems, where applicable.

G. Correct defective work, adjust for proper operation, and retest until entire system complies with contract documents.

H. Submit detailed reports indicating inspection and testing results and corrective actions taken.

3.06 CLEANING

A. Clean IGU inside and outside glass surfaces immediately after installation and curing of sealants in accordance with EC glass manufacturer's, GANA (GIB 01-0300) and GANA (GIB TD-02-0402) requirements.

1. Remove labels and markings from glass.
2. Do not use scrapers or other metal tools to clean glass.

3.07 CLOSEOUT ACTIVITIES

A. Training: Train Owner's personnel on operation and maintenance of system.

1. Use operation and maintenance manual as training reference, supplemented with additional training materials as required.
2. Provide minimum of two hours of training.
3. Instructor: Manufacturer's training personnel.
4. Location: At project site.

3.08 PROTECTION

A. IGU Argon Analyzer Testing: Do not allow the use of high voltage spark type inert gas analyzers on EC tintable IGU as this may damage the film and controls, and potentially void the warranty.

B. Protect EC tintable IGU installations from subsequent construction operations until the Date of Substantial Completion.

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C. Remove damaged glass that is broken, chipped, cracked, or damaged in any way, and replace with new materials.

1. Damaged Glass: Glass with edge damage or other imperfections that when installed could weaken the glass and impair performance and/or appearance.

END OF SECTION

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DIVISION 09 FINISHES

SECTION 09 21 16 GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

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 which 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 Contract.

D. It is the intent of the Specifications and the Drawings to require that all the material, labor, and equipment be furnished complete in every respect, and that this Contractor shall provide all material, labor, and equipment needed and usually furnished in connection with such systems to provide a complete installation including all demolition, disposal, and patching of adjacent surfaces. Materials, equipment, and articles incorporated in the work shall be new and of the best grade of their respective kinds.

1.02 WORK TO BE PERFORMED

A. Provide all the Gypsum Board Assemblies work required to complete the work of the contract including all the Gypsum Board Assemblies work shown on the plans, listed in the specification, and needed to install a complete assembly in every way, with all reinforcing, pinning, and finishes. Coordinate the Gypsum Board Assemblies work with all the other trades for the project. Provide all demolition and disposal work to complete the Gypsum Board Assemblies work. Patch to match all adjacent surfaces that are disturbed, left exposed, or unfinished. All work of the contract is related. It is the General Contractor's responsibility to review all the work of each section, each sub-contractor, and each file sub-bidder for the entire project so that all the work can be properly and completely performed.

B. Gypsum Board Assemblies work includes, but is not limited to:

1. Cafeteria
   a. No base bid scope.
2. Library Curtainwall
   a. Provide and install gypsum wallboard replacement adjacent to curtainwall removals, to match and align with existing adjacent gypsum wallboard.

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All installed gypsum wallboard shall be taped, spackled, and sanded at all boards, ready for paint.

3. Library Interior
   a. Provide and install gypsum wallboard at new soffits as indicated on the drawings. All installed gypsum wallboard shall be taped, spackled and sanded at all boards, ready for paint.
4. Alternate #1
   a. No scope in this section.
5. Alternate #2, Cafeteria
   a. Provide and install gypsum wallboard replacement adjacent to window and storefront removals, to match and align with existing adjacent gypsum wallboard. All installed gypsum wallboard shall be taped, spackled and sanded at all boards, ready for paint.
6. Alternate #3
   a. No scope in this section.

1.03 REFERENCE STANDARDS

A. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board; 2015.

B. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board; 2013.

C. ASTM C954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness; 2015.

D. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs; 2014.

E. ASTM C1658/C1658M - Standard Specification for Glass Mat Gypsum Panels; 2013.

F. GA-216 - Application and Finishing of Gypsum Board; 2013.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on metal framing, gypsum board, accessories, and joint finishing system.

1.05 QUALITY ASSURANCE

A. Single-Source Responsibility for Panel Products: Obtain each type of gypsum board and other panel products from a single manufacturer.

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B. Single-Source Responsibility for Finishing Materials: Obtain finishing materials from either the same manufacturer that supplies gypsum board and other panel products or from a manufacturer acceptable to gypsum board manufacturer.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in original packages, containers, or bundles bearing brand name and identification of manufacturer or supplier.

B. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic, and other causes. Neatly stack gypsum panels flat to prevent sagging.

1.07 PROJECT CONDITIONS

A. Environmental Conditions, General: Establish and maintain environmental conditions for applying and finishing gypsum board to comply with ASTM C 840 requirements or gypsum board manufacturer's recommendations, whichever are more stringent.

B. Room Temperatures: For non-adhesive attachment of gypsum board to framing, maintain not less than 40 deg F (4 deg C). For adhesive attachment and finishing of gypsum board, maintain not less than 50 deg F (10 deg C) for 48 hours before application and continuously after until dry. Do not exceed 95 deg F (35 deg C) when using temporary heat sources.

C. Ventilation: Ventilate building spaces as required to dry joint treatment materials. Avoid drafts during hot, dry weather to prevent finishing materials from drying too rapidly.

PART 2 PRODUCTS

2.01 GYPSUM BOARD ASSEMBLIES

A. Provide completed assemblies complying with ASTM C840 and GA-216.

2.02 BOARD MATERIALS

A. Manufacturers - Gypsum-Based Board:

1. Georgia-Pacific Gypsum: www.gpgypsum.com.
2. National Gypsum Company: www.nationalgypsum.com/#sle.
3. USG Corporation: www.usg.com.
4. Approved equal.
5. Substitutions: See Section 01 60 00 - Product Requirements.

B. Gypsum Wallboard: Glass mat faced gypsum panels as defined in ASTM C1658/C1658M, suitable for paint finish.

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2.03 ACCESSORIES

A. Joint Materials: ASTM C475/C475M and as recommended by gypsum board manufacturer for project conditions.

1. Tape: 2 inch wide, coated glass fiber tape for joints and corners, except as otherwise indicated.
2. Ready-mixed vinyl-based joint compound.

B. Screws for Fastening of Gypsum Panel Products to Cold-Formed Steel Studs Less than 0.033 inch in Thickness and Wood Members: ASTM C1002; self-piercing tapping screws, corrosion resistant.

C. Screws for Fastening of Gypsum Panel Products to Steel Members from 0.033 to 0.112 inch in Thickness: ASTM C954; steel drill screws, corrosion resistant.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that project conditions are appropriate for work of this section to commence.

3.02 BOARD INSTALLATION

A. Comply with ASTM C840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.

B. Exposed Gypsum Board in Interior Wet Areas: Seal joints, cut edges, and holes with water-resistant sealant.

3.03 INSTALLATION OF TRIM AND ACCESSORIES

A. Control Joints: Place control joints consistent with lines of building spaces and as indicated.

1. Not more than 30 feet apart on walls and ceilings over 50 feet long.
2. At exterior soffits, not more than 30 feet apart in both directions.

B. Corner Beads: Install at external corners, using longest practical lengths.

3.04 JOINT TREATMENT

A. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:

1. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated.
2. Level 1: Fire rated wall areas above finished ceilings, whether or not accessible in the completed construction.

B. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.

1. Feather coats of joint compound so that camber is maximum 1/32 inch.

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3.05 TOLERANCES

A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet in any direction.

END OF SECTION