

## SECTION 011000 - SUMMARY

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

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

## 1.2 SUMMARY

- A. Section includes:
  - B. 1. Work covered by Contract Documents.  
2. Contractor use of premises.  
3. Coordination with occupants.  
4. Work restrictions.  
5. Specification and drawing conventions.
  - C. Related Section:
    - 1. Division 1 Section "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

## 1.3 WORK COVERED BY CONTRACT DOCUMENTS

- A. Project Identification: Middlebrook School – Window Replacement
  - 1. Project Location: 220 Middlebrooks Avenue, Trumbull, Connecticut.
- B. Owner: Town of Trumbull, 5688 Main Street, Trumbull, Connecticut.
- C. Architect: Antinozzi Associates, P.C.
- D. The Work consists of the following:
  - 1. The Base Bid Work includes removal of existing and installation of new windows including associated work as indicated in the drawings and technical specifications.

## 1.4 CONTRACTOR USE OF PREMISES

- A. General: Contractor shall have limited use of Project site for construction operations during construction period. Contractor's use of Project site is limited to the areas where work is taking place at any particular time and to common areas required for access to work areas. All other

areas shall be restricted. Do not disturb portions of Project site beyond areas in which the Work is indicated.

1. Limits: Confine construction operations to work areas within elevator lobby and machine room.
2. Limits: Limit site disturbance. All areas disturb by the general contractors, subcontractors, vendors, deliveries, etc. shall be repaired by the contractor.
3. Driveways, Walkways and Entrances: Keep driveways and entrances serving premises clear and available to Owner, Owner's employees, Tenants and emergency vehicles at all times. Do not use these areas for parking or storage of materials.
  - a. Schedule deliveries to minimize use of driveways and entrances by construction operations.
  - b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

B. Condition of Existing Building: Maintain portions of existing building affected by construction operations in an acceptable condition throughout construction period. Repair damage caused by construction operations.

C. The Contractor shall conduct his operations under this Contract in such a manner as to allow, at all times during the performance of the work ingress and egress for the tenants and the public with the Owner's representative to coordinate his work to meet this condition.

D. The Contractor shall provide all necessary safety equipment, material, and personnel to protect the public walks, entrance to buildings and grounds within the work areas of this Contract in order that pedestrians, tenants and the public be protected at all times.

E. Contractor must preserve as much of existing parking as possible for owner use during construction.

F. At all times, the occupants must have safe and full access to all parts of the facility including all the exit stairs and corridors.

## 1.5 COORDINATION WITH OCCUPANTS

A. Full Occupancy: Owner will occupy site and existing building during entire construction period. Cooperate with Owner and occupants during construction operations to minimize conflicts and facilitate Owner and occupant's usage. Perform the Work so as not to interfere with Owner's and occupant's day-to-day operations. Maintain existing exits unless otherwise indicated.

1. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Owner and approval of authorities having jurisdiction.
2. Notify the Owner not less than 72 hours in advance of activities that will affect Owner's and occupant's operations.

## 1.6 WORK RESTRICTIONS

- A. Work Restrictions, General: Comply with restrictions on construction operations.
  - 1. Comply with limitations on use of public streets and other requirements of authorities having jurisdiction.
- B. On-Site Work Hours: Limit work in the existing building to normal business working hours of 8:00 a.m. to 5:00 p.m., Monday through Friday, except as otherwise indicated.
  - 1. Weekend Hours: Only with prior approval from the owner.
  - 2. Early Morning Hours: Only with prior approval from owner.
  - 3. Hours for Utility Shutdowns: 48 hours notice and approval from owner.
- C. Excessive Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to the occupants with Owner.
  - 1. Notify Owner not less than two days in advance of proposed disruptive operations.
  - 2. Obtain Owner's written permission before proceeding with disruptive operations.
- D. Nonsmoking Building: Smoking is not permitted within the building or within 25 feet of entrances, operable windows, or outdoor air intakes.
- E. Controlled Substances: Use of tobacco products and other controlled substances within the existing building or on the Project site is not permitted.
- F. Employee Identification: Provide identification tags for Contractor personnel working on the Project site. Require personnel to utilize identification tags at all times.
- G. Employee Screening: Comply with Owner's requirements regarding screening of Contractor personnel working on the Project site.
  - 1. Maintain list of approved screened personnel with Owner's Representative.
- I. Security: The Owner will not provide security guard service, watchman or escorts for this project. The employment of a security guard service to guard the contractor's employees, equipment or materials shall be at the discretion of the Contractor. However, the Contractor shall be solely responsible for theft, vandalism or similar acts at no extra cost to the Owner.

## 1.7 SCHEDULING OF WORK

- A. The window replacement work will be carried on while the existing facility is occupied.
- B. The Contractor shall be given reasonable latitude in scheduling of the work. The Town of Trumbull officials will cooperate mutually with the general contractor in adjusting to situations, which may arise during the construction. The Town Officials will make every effort to allow

access to areas requested by the Contractor in advance. In no case will the existing building or any portion of the existing building be vacated.

- C. The Contractor shall include in his base bid any overtime work that may be required to perform work that can not be completed during regular working hours. If overtime work is required the contractor must pay the clerk of the works employed by the Owner, Town of Trumbull for all hours when overtime is in force. No overtime work can take place without the clerk of the works present.
- D. It is the intent of the Contractor to prosecute the work as rapidly as possible. The final construction schedule will be subject to the approval of the Owner and Architect.

## 1.8 SPECIFICATIONS AND DRAWING CONVENTIONS

- A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
  - 1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
  - 2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.
- B. Division 1 General Requirements: Requirements of Sections in Division 1 apply to the Work of all Sections in the Specifications.
- C. Drawing Coordination: Requirements for materials and products identified on the Drawings are described in detail in the Specifications. One or more of the following are used on the Drawings to identify materials and products:
  - 1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
  - 2. Abbreviations: Materials and products are identified by abbreviations published as part of the U.S. National CAD Standard and scheduled on Drawings.
  - 3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

## PART 2 - PRODUCTS (Not Used)

## PART 3 - EXECUTION (Not Used)

END OF SECTION 011000

## SECTION 012200 - UNIT PRICES

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

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

## 1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for unit prices.
- B. Related Sections include the following:

1. Division 1 Section "Contract Modification Procedures" for procedures for submitting and handling Change Orders.

## 1.3 DEFINITIONS

- A. Unit price is a price per unit of measurement for materials or services added to or deducted from the Contract Sum by appropriate modification, if estimated quantities of Work required by the Contract Documents are increased or decreased.

## 1.4 PROCEDURES

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

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Town of Trumbull

Middlebrook School  
Window Replacement  
State Project # TMP-144-CVSZ

**PART 2 - PRODUCTS (Not Used)**

**PART 3 - EXECUTION**

**3.1 SCHEDULE OF UNIT PRICES**

A. Refer to Bid Form for complete list of Unit Prices.

END OF SECTION 012200

## SECTION 012300 - ALTERNATES

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

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

## 1.2 SUMMARY

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

## 1.3 DEFINITIONS

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

## 1.4 PROCEDURES

- A. Coordination: Modify or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.
  - 1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.
- B. Notification: Immediately following award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated modifications to alternates.
- C. Execute accepted alternates under the same conditions as other work of the Contract.
- D. Schedule: A Schedule of Alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

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**PART 2 - PRODUCTS (Not Used)**

**PART 3 - EXECUTION**

**3.1 SCHEDULE OF ALTERNATES**

A. Refer to Bid Form for complete list of Alternates.

END OF SECTION 012300

**SECTION 012600 - CONTRACT MODIFICATION PROCEDURES****PART 1 - GENERAL****1.1 RELATED DOCUMENTS**

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

**1.2 SUMMARY**

- A. This Section specifies administrative and procedural requirements for handling and processing Contract modifications.
- B. Related Sections include the following:
  1. Division 1 Section "Product Requirements" for administrative procedures for handling requests for substitutions made after Contract award.

**1.3 MINOR CHANGES IN THE WORK**

- A. Architect will issue supplemental instructions authorizing Minor Changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, within this specification.

**1.4 PROPOSAL REQUESTS**

- A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
  1. Proposal Requests issued by Architect are for information only. Do not consider them instructions either to stop work in progress or to execute the proposed change.
  2. Within 5 days after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
    - a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
    - b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
    - c. Include costs of labor and supervision directly attributable to the change.
    - d. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and

finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

B. Contractor-Initiated Proposals: If latent or unforeseen conditions require modifications to the Contract, Contractor may propose changes by submitting a request for a change to Architect.

1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
4. Include costs of labor and supervision directly attributable to the change.
5. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
6. Comply with requirements in Division 1 Section "Product Requirements" if the proposed change requires substitution of one product or system for product or system specified.

C. Proposal Request Form: Recommended form is AIA Document G709 for Proposal Requests.

#### 1.5 CHANGE ORDER PROCEDURES

A. On Owner's approval of a Proposal Request, Architect will issue a Change Order for signatures of Owner and Contractor on AIA Document G701 (or similar format).

#### 1.6 CONSTRUCTION CHANGE DIRECTIVE

A. Construction Change Directive: Architect may issue a Construction Change Directive on AIA Document G714 (or similar format). Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.

1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.

B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.

1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

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PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012600

## SECTION 012900 - PAYMENT PROCEDURES

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

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

## 1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements necessary to prepare and process Applications for Payment.
- B. Related Sections include the following:
  1. Division 1 Section "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.

## 1.3 DEFINITIONS

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

## 1.4 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the Schedule of Values with preparation of Contractor's Construction Schedule.
  1. Correlate line items in the Schedule of Values with other required administrative forms and schedules, including the following:
    - a. Application for Payment forms with Continuation Sheets.
    - b. Submittals Schedule.
    - c. Contractor's Construction Schedule.
  2. Submit the Schedule of Values to Architect at earliest possible date but no later than seven days before the date scheduled for submittal of initial Applications for Payment.
- B. Format and Content: Use the Project Manual table of contents as a guide to establish line items for the Schedule of Values. Provide at least one line item for each Specification Section.
  1. Identification: Include the following Project identification on the Schedule of Values:

- a. Project name and location.
- b. Name of Architect.
- c. Architect's project number.
- d. Contractor's name and address.
- e. Date of submittal.

2. Arrange the Schedule of Values in tabular form with separate columns to indicate the following for each item listed:
  - a. Related Specification Section or Division.
  - b. Description of the Work.
  - c. Name of subcontractor.
  - d. Name of manufacturer or fabricator.
  - e. Name of supplier.
  - f. Change Orders (numbers) that affect value.
  - g. Dollar value.
    - 1) Percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.
3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Provide several line items for principal subcontract amounts, where appropriate.
4. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
5. Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
  - a. Differentiate between items stored on-site and items stored off-site. If specified, include evidence of insurance or bonded warehousing.
6. Schedule Updating: Update and resubmit the Schedule of Values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

C. Retainage: Owner shall retain 10% of each progress payment until proof of the project's substantial completion. Upon substantial completion, Owner shall retain 5% of the remaining project completion cost. Upon final project completion and closeout, the Owner will then proceed to release the remaining retainage amount and make final payment to the Contractor.

## 1.5 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.
- B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction Work covered by each Application for Payment is the period indicated in the Agreement.

- C. Payment Application Forms: Use AIA Document G702 and AIA Document G703 Continuation Sheets as form for Applications for Payment.
- D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.
  - 1. Entries shall match data on the Schedule of Values and Contractor's Construction Schedule. Use updated schedules if revisions were made.
  - 2. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
- E. Transmittal: Submit 3 signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt. One copy shall include waivers of lien and similar attachments if required.
- F. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's liens from subcontractors, sub-subcontractors, and suppliers for construction period covered by the previous application.
  - 1. When an application shows completion of an item, submit final or full waivers.
  - 2. Owner reserves the right to designate which entities involved in the Work must submit waivers.
  - 3. Submit final Application for Payment with or preceded by final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
  - 4. Waiver Forms: Submit waivers of lien on forms, executed in a manner acceptable to Owner.
- G. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
  - 1. List of subcontractors.
  - 2. Schedule of Values.
  - 3. Contractor's Construction Schedule (preliminary if not final).
  - 4. Products list.
  - 5. Schedule of unit prices.
  - 6. Submittals Schedule (preliminary if not final).
  - 7. List of Contractor's staff assignments.
  - 8. List of Contractor's principal consultants.
  - 9. Copies of building permits.
  - 10. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
  - 11. Initial progress report.
  - 12. Report of preconstruction conference.
  - 13. Certificates of insurance and insurance policies.
  - 14. Performance and payment bonds.
  - 15. Data needed to acquire Owner's insurance.
  - 16. Initial settlement survey and damage report if required.

H. Application for Payment at Substantial Completion: After issuing the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.

1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
2. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.

I. Final Payment Application: Submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:

1. Evidence of completion of Project closeout requirements.
2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
3. Updated final statement, accounting for final changes to the Contract Sum.
4. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
5. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
6. AIA Document G707, "Consent of Surety to Final Payment."
7. Evidence that claims have been settled.
8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
9. Final, liquidated damages settlement statement.

**PART 2 - PRODUCTS (Not Used)****PART 3 - EXECUTION (Not Used)**

END OF SECTION 012900

**SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION****PART 1 - GENERAL****1.1 RELATED DOCUMENTS**

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

**1.2 SUMMARY**

A. This Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:

1. Coordination
2. Administrative and supervisory personnel.
3. Project meetings.
4. Requests for Interpretation (RFIs).

B. Related Sections include the following:

1. Division 1 Section "Construction Progress Documentation" for preparing and submitting Contractor's Construction Schedule.
2. Division 1 Section "Execution Requirements" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
3. Division 1 Section "Closeout Procedures" for coordinating closeout of the Contract.

**1.3 DEFINITIONS**

A. RFI: Request from Contractor seeking interpretation or clarification of the Contract Documents.

**1.4 COORDINATION**

A. Coordination: Each contractor shall coordinate its construction operations with those of other contractors and entities to ensure efficient and orderly installation of each part of the Work. Each contractor shall coordinate its operations with operations, included in different Sections, that depend on each other for proper installation, connection, and operation.

1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.

2. Coordinate installation of different components with other contractors to ensure maximum accessibility for required maintenance, service, and repair.
3. Make adequate provisions to accommodate items scheduled for later installation.
4. Where availability of space is limited, coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair of all components, including mechanical and electrical.

B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.

1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.

C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

1. Preparation of Contractor's Construction Schedule.
2. Preparation of the Schedule of Values.
3. Installation and removal of temporary facilities and controls.
4. Delivery and processing of submittals.
5. Progress meetings.
6. Preinstallation conferences.
7. Project closeout activities.
8. Startup and adjustment of systems.

D. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials.

## 1.5 SUBMITTALS

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

B. Coordination Drawings: Prepare Coordination Drawings where space availability necessitates maximum utilization of space for efficient installation of different components or if coordination is required for installation of products and materials fabricated by separate entities.

1. Indicate relationship of components shown on separate Shop Drawings.
2. Indicate required installation sequences.

## 1.6 PROJECT MEETINGS

- A. General: Schedule and conduct meetings and conferences at Project site, unless otherwise indicated.
  - 1. Minutes: Architect will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Contractor, within three days of the meeting.
- B. Preconstruction Conference: Schedule a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than 15 days after execution of the Agreement. Hold the conference at Project site or another convenient location. Conduct the meeting to review responsibilities and personnel assignments.
  - 1. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
  - 2. Agenda: Discuss items of significance that could affect progress, including the following:
    - a. Tentative construction schedule.
    - b. Phasing.
    - c. Critical work sequencing and long-lead items.
    - d. Designation of key personnel and their duties.
    - e. Procedures for processing field decisions and Change Orders.
    - f. Procedures for RFIs.
    - g. Procedures for testing and inspecting.
    - h. Procedures for processing Applications for Payment.
    - i. Distribution of the Contract Documents.
    - j. Submittal procedures.
    - k. Preparation of Record Documents.
    - l. Use of the premises.
    - m. Work restrictions.
    - n. Owner's occupancy requirements.
    - o. Responsibility for temporary facilities and controls.
    - p. Construction waste management and recycling.
    - q. Parking availability.
    - r. Office, work, and storage areas.
    - s. Equipment deliveries and priorities.
    - t. First aid.
    - u. Security.
    - v. Progress cleaning.
    - w. Working hours.
  - 3. Minutes: Architect will record and distribute meeting minutes.
- C. Progress Meetings: Conduct progress meetings at regular intervals not exceeding every 2 weeks. Coordinate dates of meetings with preparation of payment requests.

1. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
2. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
  - a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's Construction Schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
    - 1) Review schedule for next period.
  - b. Review present and future needs of each entity present, including the following:
    - 1) Interface requirements.
    - 2) Sequence of operations.
    - 3) Status of submittals.
    - 4) Deliveries.
    - 5) Off-site fabrication.
    - 6) Access.
    - 7) Site utilization.
    - 8) Temporary facilities and controls.
    - 9) Work hours.
    - 10) Hazards and risks.
    - 11) Progress cleaning.
    - 12) Quality and work standards.
    - 13) Status of correction of deficient items.
    - 14) Field observations.
    - 15) RFIs.
    - 16) Status of proposal requests.
    - 17) Pending changes.
    - 18) Status of Change Orders.
    - 19) Pending claims and disputes.
    - 20) Documentation of information for payment requests.
3. Minutes: Architect will record and distribute the meeting minutes to the Project team.
4. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present.
  - a. Schedule Updating: Revise Contractor's Construction Schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

## 1.7 REQUESTS FOR INTERPRETATION (RFIs)

- A. Procedure: Immediately on discovery of the need for interpretation of the Contract Documents, and if not possible to request interpretation at Project meeting, prepare and submit an RFI in the form specified.
  - 1. RFIs shall originate with Contractor. RFIs submitted by entities other than Contractor will be returned with no response.
  - 2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.
- B. Content of the RFI: Include a detailed, legible description of item needing interpretation and the following:
  - 1. Project name.
  - 2. Date.
  - 3. Name of Contractor.
  - 4. Name of Architect.
  - 5. RFI number, numbered sequentially.
  - 6. Specification Section number and title and related paragraphs, as appropriate.
  - 7. Drawing number and detail references, as appropriate.
  - 8. Field dimensions and conditions, as appropriate.
  - 9. Contractor's suggested solution(s). If Contractor's solution(s) impact the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
  - 10. Contractor's signature.
  - 11. Attachments: Include drawings, descriptions, measurements, photos, Product Data, Shop Drawings, and other information necessary to fully describe items needing interpretation.
    - a. Supplementary drawings prepared by Contractor shall include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments.
- C. Hard-Copy RFIs: CSI Form 13.2A.
  - 1. Identify each page of attachments with the RFI number and sequential page number.
- D. Software-Generated RFIs: Software-generated form with substantially the same content as indicated above.
  - 1. Attachments shall be electronic files in Adobe Acrobat PDF format.
- E. Architect's Action: Architect will review each RFI, determine action required, and return it. Allow five working days for Architect's response for each RFI. RFIs received after 3:00 p.m. will be considered as received the following working day.
  - 1. The following RFIs will be returned without action:
    - a. Requests for approval of submittals.
    - b. Requests for approval of substitutions.

- c. Requests for coordination information already indicated in the Contract Documents.
- d. Requests for adjustments in the Contract Time or the Contract Sum.
- e. Requests for interpretation of Architect's actions on submittals.
- f. Incomplete RFIs or RFIs with numerous errors.

2. Architect's action may include a request for additional information, in which case Architect's time for response will start again.
3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Division 1 Section "Contract Modification Procedures."
  - a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within 10 days of receipt of the RFI response.

F. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within seven days if Contractor disagrees with response.

G. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log at each progress meeting. Include the following:

1. Project name.
2. Name and address of Contractor.
3. Name and address of Architect.
4. RFI number including RFIs that were dropped and not submitted.
5. RFI description.
6. Date the RFI was submitted.
7. Date Architect's response was received.
8. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.

**PART 2 - PRODUCTS (Not Used)****PART 3 - EXECUTION (Not Used)**

END OF SECTION 013100

## SECTION 013200 - CONSTRUCTION PROGRESS DOCUMENTATION

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

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

## 1.2 SUMMARY

A. This Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:

1. Contractor's Construction Schedule.
2. Submittals Schedule.
3. Special reports.

B. Related Sections include the following:

1. Division 1 Section "Payment Procedures" for submitting the Schedule of Values.
2. Division 1 Section "Project Management and Coordination" for submitting and distributing meeting and conference minutes.
3. Division 1 Section "Submittal Procedures" for submitting schedules and reports.

## 1.3 DEFINITIONS

A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.

1. Critical activities are activities on the critical path. They must start and finish on the planned early start and finish times.
2. Predecessor Activity: An activity that precedes another activity in the network.
3. Successor Activity: An activity that follows another activity in the network.

B. Cost Loading: The allocation of the Schedule of Values for the completion of an activity as scheduled. The sum of costs for all activities must equal the total Contract Sum, unless otherwise approved by Architect.

C. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.

D. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.

- E. Event: The starting or ending point of an activity.
- F. Float: The measure of leeway in starting and completing an activity.
  - 1. Float time is not for the exclusive use or benefit of either Owner or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.
  - 2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
  - 3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.
- G. Fragnet: A partial or fragmentary network that breaks down activities into smaller activities for greater detail.
- H. Major Area: A story of construction, a separate building, or a similar significant construction element.
- I. Milestone: A key or critical point in time for reference or measurement.
- J. Network Diagram: A graphic diagram of a network schedule, showing activities and activity relationships.
- K. Resource Loading: The allocation of manpower and equipment necessary for the completion of an activity as scheduled.

#### 1.4 SUBMITTALS

- A. Submittals Schedule: Submit three copies of schedule. Arrange the following information in a tabular format:
  - 1. Scheduled date for first submittal.
  - 2. Specification Section number and title.
  - 3. Submittal category (action or informational).
  - 4. Name of subcontractor.
  - 5. Description of the Work covered.
  - 6. Scheduled date for Architect's final release or approval.
- B. Contractor's Construction Schedule: Submit two opaque copies of initial schedule, large enough to show entire schedule for entire construction period.
- C. Special Reports: Submit two copies at time of unusual event.

#### 1.5 QUALITY ASSURANCE

- A. Prescheduling Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination." Review methods and procedures related to the Preliminary Construction Schedule and Contractor's Construction Schedule, including, but not limited to, the following:

1. Review software limitations and content and format for reports.
2. Verify availability of qualified personnel needed to develop and update schedule.
3. Discuss constraints.
4. Review delivery dates for Owner-furnished products.
5. Review schedule for work of Owner's separate contracts.
6. Review time required for review of submittals and resubmittals.
7. Review requirements for tests and inspections by independent testing and inspecting agencies.
8. Review time required for completion and startup procedures.
9. Review and finalize list of construction activities to be included in schedule.
10. Review submittal requirements and procedures.
11. Review procedures for updating schedule.

## 1.6 COORDINATION

- A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.

## PART 2 - PRODUCTS

### 2.1 SUBMITTALS SCHEDULE

- A. Preparation: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, resubmittal, ordering, manufacturing, fabrication, and delivery when establishing dates.
  1. Coordinate Submittals Schedule with list of subcontracts, the Schedule of Values, and Contractor's Construction Schedule.
  2. Final Submittal: Submit concurrently with the first complete submittal of Contractor's Construction Schedule.

### 2.2 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

- A. Procedures: Comply with procedures contained in AGC's "Construction Planning & Scheduling."
- B. Time Frame: Extend schedule from date established for commencement of the Work to date of Final Completion.
  1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.
- C. Activities: Treat each separate area as a separate numbered activity for each principal element of the Work. Comply with the following:

1. Activity Duration: Define activities so no activity is longer than **20** days, unless specifically allowed by Architect.
2. Procurement Activities: Include procurement process activities for long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
3. Submittal Review Time: Include review and resubmittal times indicated in Division 1 Section "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with Submittals Schedule.
4. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Architect's administrative procedures necessary for certification of Substantial Completion.

D. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.

1. Work Restrictions: Show the effect of the following items on the schedule:
  - a. Use of premises restrictions.
  - b. Work Sequence.

E. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and Final Completion.

F. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using fragnets to demonstrate the effect of the proposed change on the overall project schedule.

## 2.3 CONTRACTOR'S CONSTRUCTION SCHEDULE (GANTT CHART)

- A. Gantt-Chart Schedule: Submit a comprehensive, fully developed, horizontal Gantt-chart-type, Contractor's Construction Schedule within 30 days of date established for the Notice to Proceed. Base schedule on the Preliminary Construction Schedule and whatever updating and feedback was received since the start of Project.
- B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line.

## 2.4 SPECIAL REPORTS

- A. General: Submit special reports directly to Owner within one day of an occurrence. Distribute copies of report to parties affected by the occurrence.
- B. Reporting Unusual Events: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, response by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.

## PART 3 - EXECUTION

## 3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Contractor's Construction Schedule Updating: At bi-monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule at each regularly scheduled progress meeting.
  - 1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
  - 2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
  - 3. As the Work progresses, indicate Actual Completion percentage for each activity.
- B. Distribution: Distribute copies of approved schedule to Architect, Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
  - 1. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

END OF SECTION 013200

## SECTION 013300 - SUBMITTAL PROCEDURES

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

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

## 1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.
- B. Related Sections include the following:
  1. Division 1 Section "Payment Procedures" for submitting Applications for Payment and the Schedule of Values.
  2. Division 1 Section "Closeout Procedures" for submitting warranties.

## 1.3 DEFINITIONS

- A. Action Submittals: Written and graphic information that requires Architect's responsive action. Submittals may be rejected for not complying with requirements.
- B. Informational Submittals: Written information that does not require Architect's responsive action. Submittals may be rejected for not complying with requirements.

## 1.4 SUBMITTAL PROCEDURES

- A. General: Electronic copies of CAD Drawings of the Contract Drawings may be provided by Architect for Contractor or sub-contractor use in preparing submittals. Fees and disclaimers will be requested.
- B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
  1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that requires sequential activity.
  2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
    - a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

C. Processing Time: Allow enough time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's and Architect's Consultants receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.

1. Initial Review: Allow 10 working days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
3. Resubmittal Review: Allow 10 working days for review of each resubmittal.
4. Sequential Review: Where sequential review of submittals by Architect's consultants, Owner, or other parties is indicated, allow 15 working days for initial review of each submittal.
5. Concurrent Consultant Review: Where the Contract Documents indicate that submittals may be transmitted simultaneously to Architect and to Architect's consultants, allow 10 working days for review of each submittal. Submittal will be returned to Architect before being returned to Contractor.
6. Submittals requiring color selections will be reviewed for compliance only. Colors will be released all at the same time once approved by the Client.

D. Identification: Place a permanent label or title block on each submittal for identification.

1. Indicate name of firm or entity that prepared each submittal on label or title block.
2. Provide a space approximately **6 by 8 inches (150 by 200 mm)** on label or beside title block to record Contractor's review and approval markings and action taken by Architect or Architect's Consultant.
3. Include the following information on label for processing and recording action taken:
  - a. Project name and Architect's Project number.
  - b. Date.
  - c. Name and address of Architect.
  - d. Name and address of Contractor.
  - e. Name and address of subcontractor.
  - f. Name and address of supplier.
  - g. Name of manufacturer.
  - h. Submittal number or other unique identifier, including revision identifier.
    - 1) Submittal numbers must be coordinated with the Architect's submittal procedures. Standard transmittal and memorandum to Contractors regarding submittal procedure will be provided by Architect, if necessary, upon award of Contract.
      - i. Number and title of appropriate Specification Section.
      - j. Drawing number and detail references, as appropriate.
      - k. Location(s) where product is to be installed, as appropriate.
      - l. Other necessary identification.

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

F. Additional Copies: Unless additional copies are required for final submittal, and unless Architect observes noncompliance with provisions in the Contract Documents, initial submittal may serve as final submittal.

1. Submit one original and (2) copies of submittal to Architect in addition to specified number of copies to concurrent reviewer.
2. Additional copies submitted for maintenance manuals will not be marked with action taken and will be returned.

G. Transmittal: Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Architect and Architect's Consultants will return submittals, without review, received from sources other than General Contractor or Construction Manager.

1. Transmittal Form: Provide locations on form for the following information:
  - a. Project name.
  - b. Date.
  - c. Destination (To:).
  - d. Source (From:).
  - e. Names of subcontractor, manufacturer, and supplier.
  - f. Category and type of submittal.
  - g. Submittal purpose and description.
  - h. Specification Section number and title.
  - i. Drawing number and detail references, as appropriate.
  - j. Transmittal number, numbered consecutively.
  - k. Submittal and transmittal distribution record.
  - l. Remarks.
  - m. Typed name and signature of transmitter.
2. On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Architect and Architect's Consultant on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same label information as related submittal.

H. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.

1. Note date and content of previous submittal.
2. Note date and content of revision in label or title block and clearly indicate extent of revision.

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

J. Use for Construction: Use only final submittals with mark indicating "No Exceptions Taken" or "Make Corrections Noted" by Architect or Architect's Consultant.

## 1.5 CONTRACTOR'S USE OF ARCHITECT'S CAD FILES

A. General: At Contractor's written request, copies of Architect's CAD files will be provided to Contractor for Contractor's use in connection with Project, subject to the following conditions:

1. Review, approval and signing of disclaimer form regarding use of drawings.
2. Fees will be requested as deemed appropriate per drawing sheet or file.

## PART 2 - PRODUCTS

## 2.1 ACTION SUBMITTALS

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

B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.

1. If information must be specially prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
2. Mark each copy of each submittal to show which products and options are applicable.
3. Include the following information, as applicable:
  - a. Manufacturer's written recommendations.
  - b. Manufacturer's product specifications.
  - c. Manufacturer's installation instructions.
  - d. Standard color charts.
  - e. Manufacturer's catalog cuts.
  - f. Wiring diagrams showing factory-installed wiring.
  - g. Printed performance curves.
  - h. Operational range diagrams.
  - i. Mill reports.
  - j. Standard product operation and maintenance manuals.
  - k. Compliance with specified referenced standards.
  - l. Testing by recognized testing agency.
  - m. Application of testing agency labels and seals.
  - n. Notation of coordination requirements.
4. Submit Product Data before or concurrent with Samples.
5. Number of Copies: Submit four (4) copies of Product Data, unless otherwise indicated. Architect will return three (3) copies.

C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Construction Documents, unless submittals of Architect's CAD Drawings are otherwise permitted.

1. Preparation: Fully illustrate requirements as shown in the Contract Documents. Include the following information, as applicable:

- a. Dimensions.
- b. Identification of products.
- c. Fabrication and installation drawings.
- d. Roughing-in and setting diagrams.
- e. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring.
- f. Shopwork manufacturing instructions.
- g. Templates and patterns.
- h. Schedules.
- i. Design calculations.
- j. Compliance with specified standards.
- k. Notation of coordination requirements.
- l. Notation of dimensions established by field measurement.
- m. Relationship to adjoining construction clearly indicated.
- n. Seal and signature of professional engineer if specified.
- o. Wiring Diagrams: Differentiate between manufacturer-installed and field-installed wiring.

2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least **8-1/2 by 11 inches (215 by 280 mm)** but no larger than **30 by 40 inches (750 by 1000 mm)**.
3. Number of Copies: Submit four (4) copies of each submittal, where copies are not required for operation and maintenance manuals. Submit five (5) copies where copies are required for operation and maintenance manuals. Architect and Consultant will retain one copy each; remainder will be returned to Contractor.

D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed. Color photos or digital images are not accepted.

1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
2. Identification: Attach label on unexposed side of Samples that includes the following:
  - a. Generic description of Sample.
  - b. Product name and name of manufacturer.
  - c. Sample source.
  - d. Number and title of appropriate Specification Section.
3. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
  - a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
  - b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.

4. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
  - a. Number of samples: Submit two (2) full sets of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.
5. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
  - a. Number of Samples: Submit three (3) sets of Samples. Architect will retain two (2) Sample sets; remainder will be returned.
    - 1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
    - 2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.
6. Paint samples:
  - a. General Contractor to provide one 2'x2' color sample for each color painted in finish as specified.
  - b. All colors to be submitted at once.
  - c. Five (5) day notice required prior to submitting paint samples.
  - d. Architect reserves the right to change color.

E. Product Schedule or List: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:

1. Type of product. Include unique identifier for each product.
2. Number and name of room or space.
3. Location within room or space.
4. Number of Copies: Submit three (3) copies of product schedule or list, unless otherwise indicated. Architect will return two (2) copies.

F. Contractor's Construction Schedule: Comply with requirements specified in Division 1 Section "Construction Progress Documentation."

G. Submittals Schedule: Comply with requirements specified in Division 1 Section "Construction Progress Documentation."

- H. Application for Payment: Comply with requirements specified in Division 1 Section "Payment Procedures."
- I. Schedule of Values: Comply with requirements specified in Division 1 Section "Payment Procedures."

## 2.2 INFORMATIONAL SUBMITTALS

- A. General: Prepare and submit Informational Submittals required by other Specification Sections.
  - 1. Number of Copies: Submit two (2) copies of each submittal, unless otherwise indicated. Architect will not return copies.
  - 2. Certificates and Certifications: Provide a notarized statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
  - 3. Test and Inspection Reports: Comply with requirements specified in Division 1 Section "Quality Requirements."
- B. Contractor's Construction Schedule: Comply with requirements specified in Division 1 Section "Construction Progress Documentation."
- C. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
- D. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification (WPS) and Procedure Qualification Record (PQR) on AWS forms. Include names of firms and personnel certified.
- E. Installer Certificates: Prepare written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
- F. Manufacturer Certificates: Prepare written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
- G. Product Certificates: Prepare written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
- H. Material Certificates: Prepare written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
- I. Material Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.

- J. Product Test Reports: Prepare written reports indicating current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
- K. Schedule of Tests and Inspections: Comply with requirements specified in Division 1 Section "Quality Requirements."
- L. Preconstruction Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
- M. Compatibility Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
- N. Field Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
- O. Maintenance Data: Prepare written and graphic instructions and procedures for operation and normal maintenance of products and equipment. Comply with requirements specified in Division 1 Section "Operation and Maintenance Data."
- P. Design Data: Prepare written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.
- Q. Manufacturer's Instructions: Prepare written or published information that documents manufacturer's recommendations, guidelines, and procedures for installing or operating a product or equipment. Include name of product and name, address, and telephone number of manufacturer. Include the following, as applicable:
  - 1. Preparation of substrates.
  - 2. Required substrate tolerances.
  - 3. Sequence of installation or erection.
  - 4. Required installation tolerances.
  - 5. Required adjustments.
  - 6. Recommendations for cleaning and protection.
- R. Manufacturer's Field Reports: Prepare written information documenting factory-authorized service representative's tests and inspections. Include the following, as applicable:
  - 1. Name, address, and telephone number of factory-authorized service representative making report.
  - 2. Statement on condition of substrates and their acceptability for installation of product.
  - 3. Statement that products at Project site comply with requirements.

4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
6. Statement whether conditions, products, and installation will affect warranty.
7. Other required items indicated in individual Specification Sections.

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

### PART 3 - EXECUTION

#### 3.1 CONTRACTOR'S REVIEW

- A. Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.
- B. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

#### 3.2 ARCHITECT'S AND ARCHITECT'S CONSULTANT ACTION

- A. General: Architect and Architect's Consultant will NOT review submittals that do not bear Contractor's approval stamp and will return them without action.
- B. Action Submittals: Architect and Architect's Consultant will review each submittal, make marks to indicate corrections or modifications required, and return it. Architect or Architect's Consultant will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken, as follows:
- C. Informational Submittals: Architect and Architect's Consultant will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.
- D. Partial submittals are not acceptable, will be considered non-responsive, and will be returned without review.
- E. Submittals not required by the Contract Documents may not be reviewed and may be discarded.

END OF SECTION 013300

## SECTION 014000 – QUALITY CONTROL

### PART 1 - GENERAL

#### 1.01 REQUIREMENTS INCLUDED

- A. General Quality Control.
- B. Workmanship.
- C. Mockups
- D. Manufacturers' Instructions.
- E. Manufacturers' Certificates.
- F. Testing Laboratory Services.

#### 1.02 QUALITY CONTROL - GENERAL

- A. Maintain quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of specified quality.
- B. Submit to the owner safety data sheets for all materials delivered to the site.

#### 1.03 WORKMANSHIP

- A. Comply with industry standards except when more restrictive tolerances or specified requirements indicate more rigid standards or more precise workmanship.
- B. Employ persons qualified to produce workmanship of specified quality.
- C. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, and racking.

#### 1.04 MOCKUPS

- A. Mockups: Before installing portions of the Work, build mockups for each item listed below and for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
  1. Build mockups of the following prior to proceeding with any further work:
    - a. Windows
    - b. Siding
    - c. Kitchens
    - d. Bathrooms

- e. Boilers & Associated Components
- f. Domestic Water Heaters & Associated Components.

- 2. Build mockups in location and of size indicated or, if not indicated, as directed by Architect.
- 3. Notify Architect seven days in advance of dates and times when mockups will be constructed.
- 4. Employ supervisory personnel who will oversee mockup construction. Employ workers that will be employed during the construction at the Project.
- 5. Demonstrate the proposed range of aesthetic effects and workmanship.
- 6. Obtain Architect's approval of mockups before starting work, fabrication, or final construction.
  - a. Allow two days for initial review and each re-review of each mockup.
- 7. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
- 8. Mockups can become part of the completed work.

#### 1.05 MANUFACTURERS' INSTRUCTIONS

- A. When required by individual specification sections, submit manufacturer's printed instructions in the number of copies the Contractor requires plus three (3) which will be retained by Architect.
- B. Comply with instructions in full detail and include each step in sequence. Should instructions conflict with Contract Documents, request clarification from Architect before proceeding.

#### 1.06 MANUFACTURERS' CERTIFICATES

- A. When required by individual Specification Sections, submit manufacturers' certificate, in duplicate, that products meet or exceed specified requirements.

#### 1.07 TESTING LABORATORY SERVICES

- A. Employ and pay for services of an independent testing laboratory to perform inspections and tests, when so specified in individual Specification Sections.
- B. Services shall be performed in accordance with requirements of governing authorities and with specified standards.
- C. Reports shall be submitted to Architect giving observations and results of tests, indicating compliance or non-compliance with specified standards and with Contract Documents.
- D. Contractor shall cooperate with testing laboratory personnel; furnish tools, samples of materials, design mix, equipment, storage, and assistance as requested.
  - 1. Notify Architect and testing laboratory 24 hours prior to expected time for operations requiring testing services.

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2. Make arrangements with testing laboratory and pay for additional samples and tests ordered for Contractor's convenience.

E. When reports indicate non-compliance, take appropriate corrective measures and request for inspection or retesting. The costs of corrective work, reinspections, and retesting shall be paid by the Contractor at no extra cost to the Owner.

## PART 2 - PRODUCTS

## PART 3 - EXECUTION Not used

END OF SECTION 01 40 00

## SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

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

## 1.2 SUMMARY

- A. This Section includes requirements for temporary facilities and controls.
- B. Temporary utilities include, but are not limited to, the following:

1. Electric power service.
2. Lighting.
3. Telephone service.
4. Water Service
5. Sanitary Facilities.
6. Protection Facilities.

## 1.3 USE CHARGES

- A. Temporary Utilities Service: With the exception of toilet facilities and telephone service, the owner will pay for service use charges for usage of temporary utilities, by all parties engaged in construction, at Project site for construction operations for this project.

## 1.4 QUALITY ASSURANCE

- A. Standards: Comply with ANSI A10.6, NECA's "Temporary Electrical Facilities," and NFPA 241.
  - 1. Trade Jurisdictions: Assigned responsibilities for installation and operation of temporary utilities are not intended to interfere with trade regulations and union jurisdictions.
  - 2. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
- B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

## 1.5 PROJECT CONDITIONS

- A. Conditions of Use: The following conditions apply to use of temporary services and facilities by all parties engaged in the Work:

1. Keep temporary services and facilities clean and neat.
2. Relocate temporary services and facilities as required by progress of the Work.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. General: Provide new materials. Provide materials suitable for use intended.
- B. Tarpaulins: Fire-resistive labeled with flame-spread rating of 15 or less.

### 2.2 EQUIPMENT

- A. General: Provide equipment suitable for use intended.
- B. Fire Extinguishers: Hand carried, portable, UL rated. Provide class and extinguishing agent as indicated or a combination of extinguishers of NFPA-recommended classes for exposures.
  1. Comply with NFPA 10 and NFPA 241 for classification, extinguishing agent, and size required by location and class of fire exposure.

## PART 3 - EXECUTION

### 3.1 INSTALLATION, GENERAL

- A. Water Service: Use of Owner's existing water service facilities will be permitted, as long as facilities are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.
- B. Sanitary Facilities: Contractor shall provide temporary toilets, wash facilities and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.
- C. Electric Power Service: Use of Owner's existing electric power service will be permitted, as long as equipment is maintained in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.
- D. Lighting: If required, provide temporary lighting that provides adequate illumination to allow for safe working conditions during normal working hours.

### 3.2 TEMPORARY FACILITIES INSTALLATION

- A. Lighting: If required, provide temporary lighting that provides adequate illumination for construction operations and traffic conditions.

B. Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, and odors from entering occupied areas.

1. Prior to commencing work, isolate the HVAC system in area where work is to be performed in accordance with procedures approved by the architect.
  - a. Disconnect supply and return ductwork in work area from HVAC systems servicing occupied areas as required.
  - b. Maintain negative air pressure within work area using HEPA-equipped air filtration units, starting with commencement of temporary partition construction, and continuing until removal of temporary partitions is complete.
2. Maintain dust partitions during the Work. Use vacuum collection attachments on dust-producing equipment. Isolate limited work within occupied areas using portable dust containment devices.
3. Perform daily construction cleanup and final cleanup using approved, HEPA-filter-equipped vacuum equipment.

### 3.3 OPERATION, TERMINATION, AND REMOVAL

A. Maintenance: Maintain facilities in good operating condition until removal. Protect from damage.

B. Termination and Removal: Remove each temporary facility when need for its service has ended.

1. Materials and facilities that constitute temporary facilities are the property of Contractor. Owner reserves right to take possession of Project identification signs.
2. At Substantial Completion, clean and renovate permanent facilities used during construction period. Comply with final cleaning requirements in Division 1 Section "Closeout Procedures."

END OF SECTION 015000

## SECTION 016000 - PRODUCT REQUIREMENTS

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

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

## 1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; product substitutions; and comparable products.
- B. Related Sections include the following:
  1. Division 1 Section "Closeout Procedures" for submitting warranties for Contract closeout.

## 1.3 DEFINITIONS

- A. Products: Items purchased for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
  1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature, that is current as of date of the Contract Documents.
  2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
  3. Comparable Product: Product that is demonstrated and approved through submittal process, or where indicated as a product substitution, to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- B. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
- C. Basis-of-Design Product Specification: Where a specific manufacturer's product is named and accompanied by the words "basis of design," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of other named manufacturers.

## 1.4 SUBMITTALS

A. Product List: Submit a list, in tabular form, showing specified products. Include generic names of products required. Include manufacturer's name and proprietary product names for each product.

1. Coordinate product list with Contractor's Construction Schedule and the Submittals Schedule.
2. Completed List: Within 30 days after date of commencement of the Work, submit 3 copies of completed product list. Include a written explanation for omissions of data and for variations from Contract requirements.
3. Architect's Action: Architect will respond in writing to Contractor within 15 days of receipt of completed product list. Architect's response will include a list of unacceptable product selections and a brief explanation of reasons for this action. Architect's response, or lack of response, does not constitute a waiver of requirement to comply with the Contract Documents.

B. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Substitution Request Form: Use CSI Form 13.1A.
2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
  - a. Statement indicating why specified material or product cannot be provided.
  - b. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors, that will be necessary to accommodate proposed substitution.
  - c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
  - d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
  - e. Samples, where applicable or requested.
  - f. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
  - g. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
  - h. Research/evaluation reports evidencing compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.
  - i. Detailed comparison of Contractor's Construction Schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating lack of availability or delays in delivery.

- j. Cost information, including a proposal of change, if any, in the Contract Sum.
- k. Contractor's certification that proposed substitution complies with requirements in the Contract Documents and is appropriate for applications indicated.
- l. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within 7 days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or 7 days of receipt of additional information or documentation, whichever is later.
  - a. Form of Acceptance: Change Order.
  - b. Use product specified if Architect cannot make a decision on use of a proposed substitution within time allocated.

C. Comparable Product Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within one week of receipt of a comparable product request. Architect will notify Contractor of approval or rejection of proposed comparable product request within 15 days of receipt of request, or 7 days of receipt of additional information or documentation, whichever is later.
  - a. Form of Approval: As specified in Division 1 Section "Submittal Procedures."
  - b. Use product specified if Architect cannot make a decision on use of a comparable product request within time allocated.

D. Basis-of-Design Product Specification Submittal: Comply with requirements in Division 1 Section "Submittal Procedures." Show compliance with requirements.

## 1.5 QUALITY ASSURANCE

A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, product selected shall be compatible with products previously selected, even if previously selected products were also options.

1. Each contractor is responsible for providing products and construction methods compatible with products and construction methods of other contractors.
2. If a dispute arises between contractors over concurrently selectable but incompatible products, Architect will determine which products shall be used.

## 1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft. Comply with manufacturer's written instructions.
- B. Delivery and Handling:
  - 1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
  - 2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses. Coordinate delivery with Owner.
  - 3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
  - 4. Inspect products on delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.
- C. Storage:
  - 1. Store products to allow for inspection and measurement of quantity or counting of units.
  - 2. Store materials in a manner that will not endanger Project structure.
  - 3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
  - 4. Store cementitious products and materials on elevated platforms.
  - 5. Store foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
  - 6. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
  - 7. Protect stored products from damage and liquids from freezing.
  - 8. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

## 1.7 PRODUCT WARRANTIES

- A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
  - 1. Manufacturer's Warranty: Preprinted written warranty published by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
  - 2. Special Warranty: Written warranty required by or incorporated into the Contract Documents, either to extend time limit provided by manufacturer's warranty or to provide more rights for Owner.

B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution. Submit a draft for approval before final execution.

1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
2. Specified Form: When specified forms are included with the Specifications, prepare a written document using appropriate form properly executed.
3. Refer to Divisions 2 through 16 Sections for specific content requirements and particular requirements for submitting special warranties.

C. Submittal Time: Comply with requirements in Division 1 Section "Closeout Procedures."

## PART 2 - PRODUCTS

### 2.1 PRODUCT SELECTION PROCEDURES

A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, that are new at time of installation.

1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
4. Where products are accompanied by the term "as selected," Architect will make selection.
5. Where products are accompanied by the term "match sample," sample to be matched is Architect's.
6. Descriptive, performance, and reference standard requirements in the Specifications establish "salient characteristics" of products.
7. Or Equal: Where products are specified by name and accompanied by the term "or equal" or "or approved equal" or "or approved," comply with provisions in Part 2 "Comparable Products" Article to obtain approval for use of an unnamed product.

B. Product Selection Procedures:

1. Product: Where Specifications name a single product and manufacturer, provide the named product that complies with requirements.
2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements.
3. Products: Where Specifications include a list of names of both products and manufacturers, provide one of the products listed that complies with requirements.
4. Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements.
5. Available Products: Where Specifications include a list of names of both products and manufacturers, provide one of the products listed, or an unnamed product, that complies

with requirements. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product.

6. Available Manufacturers: Where Specifications include a list of manufacturers, provide a product by one of the manufacturers listed, or an unnamed manufacturer, that complies with requirements. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product.
7. Product Options: Where Specifications indicate that sizes, profiles, and dimensional requirements on Drawings are based on a specific product or system, provide the specified product or system. Comply with provisions in Part 2 "Product Substitutions" Article for consideration of an unnamed product or system.
8. Basis-of-Design Product: Where Specifications name a product and include a list of manufacturers, provide the specified product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product by the other named manufacturers.
9. Visual Matching Specification: Where Specifications require matching an established Sample, select a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.
  - a. If no product available within specified category matches and complies with other specified requirements, comply with provisions in Part 2 "Product Substitutions" Article for proposal of product.
10. Visual Selection Specification: Where Specifications include the phrase "as selected from manufacturer's colors, patterns, textures" or a similar phrase, select a product that complies with other specified requirements.
  - a. Standard Range: Where Specifications include the phrase "standard range of colors, patterns, textures" or similar phrase, Architect will select color, pattern, density, or texture from manufacturer's product line that does not include premium items.
  - b. Full Range: Where Specifications include the phrase "full range of colors, patterns, textures" or similar phrase, Architect will select color, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

## 2.2 PRODUCT SUBSTITUTIONS

- A. Timing: Architect will consider requests for substitution if received within 60 days after commencement of the Work. Requests received after that time may be considered or rejected at discretion of Architect.
- B. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
  1. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner

must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.

2. Requested substitution does not require extensive revisions to the Contract Documents.
3. Requested substitution is consistent with the Contract Documents and will produce indicated results.
4. Substitution request is fully documented and properly submitted.
5. Requested substitution will not adversely affect Contractor's Construction Schedule.
6. Requested substitution has received necessary approvals of authorities having jurisdiction.
7. Requested substitution is compatible with other portions of the Work.
8. Requested substitution has been coordinated with other portions of the Work.
9. Requested substitution provides specified warranty.
10. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

## 2.3 COMPARABLE PRODUCTS

A. Conditions: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:

1. Evidence that the proposed product does not require extensive revisions to the Contract Documents, that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
3. Evidence that proposed product provides specified warranty.
4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
5. Samples, if requested.

## PART 3 - EXECUTION (Not Used)

END OF SECTION 016000

## SECTION 017300 - EXECUTION REQUIREMENTS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

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

1. Construction layout.
2. General installation of products.
3. Progress cleaning.
4. Protection of installed construction.
5. Correction of the Work.

- B. Related Sections include the following:

1. Division 1 Section "Project Management and Coordination" for procedures for coordinating field engineering with other construction activities.
2. Division 1 Section "Submittal Procedures" for submitting surveys.
3. Division 1 Section "Cutting and Patching" for procedural requirements for cutting and patching necessary for the installation or performance of other components of the Work.
4. Division 1 Section "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.

### PART 2 - PRODUCTS (Not Used)

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Acceptance of Conditions: Examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

1. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
2. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

### 3.2 PREPARATION

- A. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- B. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- C. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to Architect. Include a detailed description of problem encountered, together with recommendations for changing the Contract Documents.

### 3.3 CONSTRUCTION LAYOUT

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings. If discrepancies are discovered, notify Architect promptly.

### 3.4 INSTALLATION

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
  1. Make vertical work plumb and make horizontal work level.
  2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.

- F. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- G. Anchors and Fasteners: Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the Work.
  - 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
  - 2. Allow for building movement, including thermal expansion and contraction.
  - 3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- H. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
- I. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

### 3.5 PROGRESS CLEANING

- A. General: Project work area is located in an occupied functioning building. Contractor shall use the utmost care to eliminate, when possible, or diminish all noise, water, dust, odors, etc. from the Project work area. Clean Project work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. Enforce requirements strictly. Dispose of materials lawfully.
  - 1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
  - 2. Do not hold materials more than 7 days during normal weather or 3 days if the temperature is expected to rise above **80 deg F (27 deg C)**.
  - 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
- B. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
  - 1. Remove liquid spills promptly.
  - 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- C. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

- D. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- E. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- F. Waste Disposal: Washing waste materials down drains will not be permitted.
- G. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- H. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- I. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

### 3.6 PROTECTION OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
- B. Comply with manufacturer's written instructions for temperature and relative humidity.

### 3.7 CORRECTION OF THE WORK

- A. Repair or remove and replace defective construction. Restore damaged substrates and finishes. Comply with requirements in Division 1 Section "Cutting and Patching."
  - 1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.
- B. Restore permanent facilities used during construction to their specified condition.
- C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.

END OF SECTION 017300

## SECTION 017329 - CUTTING AND PATCHING

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

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

## 1.2 SUMMARY

- A. This Section includes procedural requirements for cutting and patching.

## 1.3 DEFINITIONS

- A. Cutting: Removal of in-place construction necessary to permit installation or performance of other Work.
- B. Patching: Fitting and repair work required to restore surfaces to original conditions after installation of other Work.

## 1.4 QUALITY ASSURANCE

- A. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio.
- B. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety. Operating elements include the following:
  1. Primary operational systems and equipment.
  2. Mechanical systems piping and ducts.
  3. Control systems.
  4. Communication systems.
  5. Electrical wiring systems.
- C. Miscellaneous Elements: Do not cut and patch miscellaneous elements or related components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety. Miscellaneous elements include the following:
  1. Equipment supports.
  2. Piping, ductwork, vessels, and equipment.
  3. Noise- and vibration-control elements and systems.

D. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

A. General: Comply with requirements specified in other Sections.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.

1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with in-place finishes or primers.
2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

A. Temporary Support: Provide temporary support of Work to be cut. Provide temporary dams to contain water and moisture.

B. Protection: Protect in-place construction during cutting and patching to prevent damage. Protect fixtures and personal property on other occupied floors in building from moisture, dust and impact damage.

C. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

### 3.3 PERFORMANCE

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

1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

B. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.

1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
3. Concrete / Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
4. Proceed with patching after construction operations requiring cutting are complete.

C. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections.

1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.
2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
  - a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
  - b. Restore damaged pipe covering to its original condition.

D. Cleaning: Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar materials.

END OF SECTION 017329

## SECTION 017700 - CLOSEOUT PROCEDURES

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

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

## 1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
  - 1. Inspection procedures.
  - 2. Final cleaning.
- B. Related Sections include the following:
  - 1. Division 1 Section "Payment Procedures" for requirements for Applications for Payment for Substantial and Final Completion.
  - 2. Division 1 Section "Execution Requirements" for progress cleaning of Project site.

## 1.3 SUBSTANTIAL COMPLETION

- A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.
  - 1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
  - 2. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
  - 3. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
  - 4. Advise Owner of changeover in heat and other utilities.
  - 5. Complete final cleaning requirements, including touchup painting.
  - 6. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- B. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Results of completed inspection will form the basis of requirements for Final Completion.

#### 1.4 FINAL COMPLETION

- A. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:
  1. Submit a final Application for Payment according to Division 1 Section "Payment Procedures."
  2. Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
- B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
  1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected. Expenses incurred by the Architect for more than one reinspection will be the responsibility of the Contractor and will be invoiced directly.

#### 1.5 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- A. Preparation: Submit one copy of list. Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
  1. Organize list of spaces in sequential order, starting with exterior areas first and proceeding into the building in order of the room numbers indicated on the Drawings.
  2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
  3. Include the following information at the top of each page:
    - a. Project name.
    - b. Date.
    - c. Name of Architect.
    - d. Name of Contractor.
    - e. Page number.

**PART 2 - PRODUCTS****2.1 MATERIALS**

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

**PART 3 - EXECUTION****3.1 FINAL CLEANING**

- A. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
  - 1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:
    - a. Remove tools, construction equipment, machinery, and surplus material from Project site.
    - b. Clean exposed hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances.
    - c. Sweep concrete floors broom clean in unoccupied spaces.
    - d. Remove labels that are not permanent.
    - e. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
- C. Comply with safety standards for cleaning. Do not dump debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

END OF SECTION 017700

## SECTION 017823 - OPERATION AND MAINTENANCE DATA

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

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

## 1.2 SUMMARY

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

1. Operation manuals for systems, subsystems, and equipment.
2. Maintenance manuals for the care and maintenance of systems and equipment.

- B. Related Sections include the following:

1. Division 1 Section "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.
2. Division 1 Section "Closeout Procedures" for submitting operation and maintenance manuals.
3. Division 1 Section "Project Record Documents" for preparing Record Drawings for operation and maintenance manuals.
4. Divisions 2 through 8 Sections for specific operation and maintenance manual requirements for the Work in those Sections.

## 1.3 DEFINITIONS

- A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.
- B. Subsystem: A portion of a system with characteristics similar to a system.

## 1.4 SUBMITTALS

- A. Final Submittal: Submit one of each manual in final form at least 15 days before final inspection. Architect will return copy with comments within 15 days after final inspection.
  - 1. Correct or modify each manual to comply with Architect's comments. Submit 3 copies of each corrected manual within 15 days of receipt of Architect's comments.

## 1.5 COORDINATION

A. Where operation and maintenance documentation includes information on installations by more than one factory-authorized service representative, assemble and coordinate information furnished by representatives and prepare manuals.

## PART 2 - PRODUCTS

## 2.1 MANUALS, GENERAL

A. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:

1. Title page.
2. Table of contents.
3. Manual contents.

B. Title Page: Enclose title page in transparent plastic sleeve. Include the following information:

1. Subject matter included in manual.
2. Name and address of Project.
3. Name and address of Owner.
4. Date of submittal.
5. Name, address, and telephone number of Contractor.
6. Name and address of Architect.
7. Cross-reference to related systems in other operation and maintenance manuals.

C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.

1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.

D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.

1. Binders: Heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold **8-1/2-by-11-inch (215-by-280-mm)** paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.
  - a. If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system.

- b. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter of contents. Indicate volume number for multiple-volume sets.
2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software diskettes for computerized electronic equipment.
4. Supplementary Text: Prepared on **8-1/2-by-11-inch (215-by-280-mm)** white bond paper.
5. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.
  - a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
  - b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

## 2.2 OPERATION MANUALS

A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:

1. System, subsystem, and equipment descriptions.
2. Operating standards.
3. Operating procedures.
4. Operating logs.
5. Wiring diagrams.
6. Control diagrams.
7. Piped system diagrams.
8. Precautions against improper use.
9. License requirements including inspection and renewal dates.

B. Descriptions: Include the following:

1. Product name and model number.
2. Manufacturer's name.
3. Equipment identification with serial number of each component.
4. Equipment function.
5. Operating characteristics.
6. Limiting conditions.
7. Performance curves.
8. Engineering data and tests.
9. Complete nomenclature and number of replacement parts.

C. Operating Procedures: Include the following, as applicable:

1. Startup procedures.

2. Equipment or system break-in procedures.
3. Routine and normal operating instructions.
4. Regulation and control procedures.
5. Instructions on stopping.
6. Normal shutdown instructions.
7. Seasonal and weekend operating instructions.
8. Required sequences for electric or electronic systems.
9. Special operating instructions and procedures.

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

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

## 2.3 SYSTEMS AND EQUIPMENT MAINTENANCE MANUAL

A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.

B. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.

C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:

1. Standard printed maintenance instructions and bulletins.
2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
3. Identification and nomenclature of parts and components.
4. List of items recommended to be stocked as spare parts.

D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:

1. Test and inspection instructions.
2. Troubleshooting guide.
3. Precautions against improper maintenance.
4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
5. Aligning, adjusting, and checking instructions.
6. Demonstration and training videotape, if available.

E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.

1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.

F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.

G. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.

H. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.

### PART 3 - EXECUTION

#### 3.1 MANUAL PREPARATION

- A. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.
  1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
  2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.
- B. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.
  1. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.
- C. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in Record Drawings to ensure correct illustration of completed installation.
  1. Do not use original Project Record Documents as part of operation and maintenance manuals.
  2. Comply with requirements of newly prepared Record Drawings in Division 1 Section "Project Record Documents."

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Town of Trumbull

Middlebrook School

Window Replacement

State Project # TMP-144-CVSZ

D. Comply with Division 1 Section "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

END OF SECTION 017823

## **ASBESTOS ABATEMENT SPECIFICATION**

**Middlebrook Elementary School  
220 Middlebrook Avenue  
Trumbull, CT**

**PREPARED FOR:  
Trumbull Public Schools  
6254 Main Street  
Trumbull, CT 06611**



**PREPARED BY:  
AMC ENVIRONMENTAL, LLC  
P. O. BOX 423  
STRATFORD, CONNECTICUT 06615  
(203) 378-5020**

**January 17, 2014**

# Asbestos Abatement Specification

Middlebrook School  
Window Replacement Project  
State Project # TMP-144-CVSZ

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***GENERAL*****1.01 RELATED DOCUMENTS**

**Drawings** and general provisions of the contract, including **General** and **Supplementary Conditions** and **other Division Specifications** sections **apply to the work of this section.**

**Contractor shall be responsible to review all drawings and specifications.** Selective Removals and Cutting and Patching as required by other trade work may disturb asbestos containing materials. **All asbestos removal required shall be included in the base bid.** **Contractor shall coordinate the removal of asbestos containing materials with other trades as part of this specification and base bid work, no extra charges shall apply.**

**1.02 PRE-ABATEMENT MEETING**

The Architect/Design Consultant upon receipt, review and substantial approval of all pre-abatement submittals and upon verification that all material and equipment required for the project are available to the contractor will arrange for pre-abatement meeting between the abatement contractor, superintendent and foreman and the Owner Representative(s). The purpose of the meeting is to discuss any aspects of the submittals needing clarification or amplification and to discuss any aspects of the project execution and the sequence of operations. The abatement contractor and his employees shall be prepared to provide any supplemental evidence and information to the Owner's Representative pertaining to any aspects of the submittals or the materials and equipment. This meeting will be held no later than five (5) days prior to scheduled commencement. If the contractor fails to provide each and every submittal in a form acceptable to the Design Consultant **5 days prior** to this meeting, then the contractor will be responsible to pay the Design Consultant for review time at the rate of \$100.00 per hour, with a minimum charge of five (5) hours. Upon satisfactory resolution of any outstanding items or questions, the Owner's representative will issue a written order to proceed to the abatement contractor. **No abatement work shall be initiated prior to the written order to proceed.** The Contractor's failure to provide the submittals in accordance with the above shall not relieve the Contractor of his responsibility to complete the work in the time frame specified.

**1.03 PRE-ABATEMENT SUBMITTALS**

- A. Detailed site specific work plan for the entire project reflecting contract documents and the phasing and schedule requirements outlined.
- B. Provide evidence of a current State of Connecticut Asbestos Contractor License and an Insurance Certificate acceptable to the Town of Trumbull.
- C. Name, location and phone number of the landfill, documentation that the landfill is approved for ACM disposal and if a waste disposal sub-contractor will be used, provide name, address and phone number of sub-contractor.
- D. Provide written notification to local health, fire and safety authorities indicating the abatement work to be performed and any other notifications and arrangements required by the specifications.
- E. Submit to the Architect/Design Consultant and receive approval and/or acknowledgment, copies of the following:
  1. Notification of proposed abatement work to the Department of Public Health, Indoor Air Program, Environmental Health Section 410 Capitol Avenue, MS #51 Air, P.O. Box

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340308, Hartford, CT 06134. If waste is to be disposed of in Connecticut, then notify Solid Waste Management Unit, Department of Environmental Protection, not fewer than ten (10) work days before work commences on this project. This must be on the prescribed form, as may be required by the Division of Environmental Health.

2. A site specific plan for emergencies including fire, accident, power failure, pressure differential system failure, supplied air system failure, or any other event that may require modification or abridgement of decontamination or work area isolation procedures.
3. Documentation that the Contractor's employees, including foreman, supervisors and any other company personnel or agents who are responsible for any aspects of the abatement activities, have received adequate training for the dangers of asbestos. Evidence of the initial worker/supervisor USEPA training certification, EACH annual refresher training certification acceptable to the Design Consultant, and a copy of each abatement employee's State of Connecticut Asbestos Abatement License.
4. Documentation indicating that each employee has had instruction on the hazards of asbestos exposure, on use and fitting of respirators, on protective clothing, on use of showers, on entry and exit from work areas and on all aspects of work procedures and protective measures and understands this instruction, include a copy of the respirator program in compliance with 29 CFR Part 1926.1101.
5. When rental equipment is to be used in removal areas or to transport waste materials, a copy of the written notification provided to the rental company informing the nature of use of the rental equipment shall be submitted.
6. Documentation from a qualified Occupational Physician that all employees or agents who may be exposed to airborne asbestos in excess of background level have been provided with an opportunity to be medically monitored to determine whether they are physically capable of working while wearing the respirator required without suffering adverse health effects. In addition, document that personnel have received medical monitoring as required in OSHA 29 CFR Part 1910.1001 (l) or 29 CFR Part 1926.1101 (m). The Contractor must be aware of and provide information to the examining physician about unusual conditions in the work place environment (e.g., high temperatures, humidity, and chemical contaminants) that may impact on the employee's ability to perform work activities.
7. Documentation of respirator fit-testing for all Contractor employees and agents who must enter the work area. This fit-testing shall be in accordance with procedures as detailed in the OSHA Standard 29 CFR Part 1910.1001, Appendix C, and 29 CFR Part 1926.1101, Appendix C, Qualitative and Quantitative Fit Test Protocol. A copy of the contractor's Respiratory Protection Program demonstrating compliance with appropriate regulations.
8. Submit copies of all notices of violations or other citations issued concerning asbestos related work performed and any citation whatsoever for labor law violations for the period two (2) years prior to the date herein. Copies must clearly indicate the issuing agency or department, the date of issue and nature of the notice or citation. Attach a brief statement outlining the final disposition of each notice or citation.

### 1.04 **INSURANCE**

The Contractor and any subcontractors shall not commence work until all insurance required in the owner's contract has been obtained and such insurance has been reviewed and approved in writing by the owner. Insurance shall be provided by insurers satisfactory to the owner and authorized to do business in the State of Connecticut.

#### A. Limits:

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1. General Liability Insurance: \$1,000,000.00 per occurrence, \$ 2,000,000.00 aggregate.
2. Automobile Liability Insurance: \$1,000,000.00 per occurrence combined single limit (CSL).
3. Worker's Compensation: Statutory Limits within the State of Connecticut.
4. Excess Liability Insurance: \$ 3,000,000.00 aggregate

None required if cost of contract is under \$100,000.00

If cost of contract is \$100,00.00 to \$500,00.00

\$1,000,000.00 aggregate limit

If cost of contract exceeds \$500,00.00

\$3,000,000.00 aggregate limit

5. Professional Liability Insurance: \$1,000,000.00 aggregate limit (required for a professional services contract).
6. Contractors Pollution Liability Insurance: 1,000,000.00 aggregate limit

### 1.05 **WAGES & HOURLY RATES**

- A. The wages paid on an hourly basis to any mechanic, laborer or workman employed upon the work herein contracted to be done, and the amount of payment or contribution paid or payable on behalf of each such employee welfare fund as defined in the Connecticut General Statutes shall be at a rate equal to the rate customary or prevailing for the same work in the same trade or occupation in the Town in which such Public Works Project is being constructed.

Any Contractor who is not obligated by agreement to make payment or contribution of behalf of such employees to any such employee welfare fund shall pay to each employee as part of his wages the amount of payment or contribution for his classification on each payday.

- B. In accordance with Connecticut General Statutes 31-53 and 31-53a, all Contractors are required to complete and submit the enclosed forms:

1. “Contractors Wage Certifications Form”
2. “Contracting Agency Certification Form”
3. “Payroll Certification For Public Works Projects – Weekly Payroll”  
Form WWS-CP1 and WWS-CP2

- C. Contractors bidding on this project should be aware of the following “Connecticut Public and Special Acts” P.A. 02-69:

#### **Public Act No. 02-69**

#### **Substitute Senate Bill No. 63**

#### **AN ACT CONCERNING ANNUAL ADJUSTMENTS TO PREVAILING WAGES.**

Be it enacted by the State and House of Representatives in General Assembly convened:

Section 1. (NEW) (Effective October 1, 2002) Each contractor that is awarded a contract on or after October 1, 2002, for (1) the construction of a state highway or bridge that falls under the provisions of Section 31-54 of the general statutes, or (2) the construction, remodeling, refinishing, refurbishing, rehabilitation, alteration or repair of any public works project that falls under the provisions of Section 31-53 of the general statutes shall contact the Labor Commissioner on or before July first of each year, for the duration of such contract, to ascertain the prevailing rate of wages on an hourly basis and the amount of payment or contributions paid or payable on behalf of each mechanic , laborer or worker employed upon the work contracted to be done, and shall make any necessary adjustments to such

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prevailing rate of wages and such payment or contributions paid or payable on behalf of each such employee, effective each July first.

**D. MINIMUM WAGE RATES**

1. The current wage and benefit rates will be issued by Addendum.

**1.06 PRIOR TO COMMENCEMENT OF WORK**

Connecticut General Statute §4a-100 requires that any contractor (or subcontractor as of October 1, 2007) who wants to bid on a *state funded* contract or perform work pursuant to *a contract for the construction, reconstruction, alteration, remodeling, repair or demolition of any public building or any other public work by the state or a municipality except a public highway or bridge project or any other construction project administered by the Department of Transportation* which is estimated to cost **more than \$500,000** must be pre-qualified through the Department of Administrative Services. For this bid any **Contractor whose bid exceeds \$500,000.00** shall hold a current **"DAS Contractor Prequalification Certificate"** along with a current **"Update (Bid) Statement"**. Failure to submit these items with the bid will result in disqualification of the bidder per the Public Act. If you have any questions regarding these requirements, contact CTDAS at telephone number (860) 713-5280 or fax: (860) 622-2867 or visit their website at <http://www.das.state.ct.us>.

Prior to beginning work, the Owner's Representative, Architect/Design Consultant and Contractor shall make a visual inspection of each work area and list all pre-existing damage to building components. Contractor will submit a list, which shall include all damaged areas not included to be repaired under this contract. The Contractor may include a narrated video of all areas within the abatement project work area prior to the initiation of abatement activities. Any damage within the work area must be narrated during this inspection and a list of those areas must be supplied to the Owner's Representative along with the video. The Contractor and their subcontractors will be held responsible for any other damages incurred within the work area during the project. Failure to video these areas prior to project activities will automatically cause any item found damaged during the final inspection to be the responsibility of the Contractor to repair or replace. The Contractor will inform the Owner's Representative in advance as to when the inspection will take place. The video must be submitted to the Owner's Representative before any work activity will be permitted.

Post signs in and around the work area to comply with OSHA Standard 29 CFR Part 1910.1001 and 29 CFR Part 1926.1101. Post one (1) copy of each of the following documents at the work site:

Title 29, Code of Federal Regulations, Part 1910.1001 and 1926.1101. OSHA Asbestos Standard.

Title 40, Code of Federal Regulations, Part 61, Subparts A and M, National Emission Standards for Hazardous Air Pollutants.

Title 40, Code of Federal Regulations, Part 763, including Subparts E, F and G.

State of Connecticut, Department of Public Health; Asbestos Containing Materials in Schools Regulation (19a-333-1 to 19a-333-13).

State of Connecticut, Department of Public Health; Standards for Asbestos Abatement (19a-332a-1 through 19a-332a-16).

State of Connecticut Licensure and Training Requirements for Persons Engaged in Asbestos Abatement and Consultation Services Section 20-440-1 through 20-440-9.

Post the following in the clean room of the Worker Decontamination Enclosure and Contractor staging area: a copy of the Contractor's License and a list containing the names, addresses, and telephone numbers of the

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Contractor's Representative, Contractor's On-Site Supervisor, Owner, Owner's Representative, Architect/Design Consultant, Architect and any other personnel who may be required to assist during abatement activities, telephone numbers and locations of emergency services; including, but not limited to fire, ambulance, doctor, hospital, police, power company, telephone company, after hours phone numbers for the Contractor's Representative and Site Supervisor.

## 1.07 **SUBMITTALS DURING ABATEMENT**

Contractor to maintain a daily log at the job site documenting the dates and times of the following: Meetings, purpose, attendees and brief discussion; all persons entering/exiting work area; daily work activity; special or unusual events, such as barrier breaching, equipment failures, emergencies and any cause for stop of work; air monitoring tests and test results; submit complete daily log, which must include number of bags removed from containment each day and personal air monitoring results to Owner's Representative. Submit within 24 hours to the Owner's Representative copies of all of the above.

## 1.08 **CHANGE ORDERS**

For work performed by a *Trade* Contractor, the cost to the *Construction Manager* or *Owner* may include an Allowance for overhead and profit not to exceed ten (10) percent on the contractors own labor and equipment and ten (10) percent of materials, supplies, rental equipment and subcontractor work.

If the net value of a change results in a credit from the contractor, the credit shall be the net cost without overhead or profit.

## 1.09 **SUBMITTALS AT COMPLETION OF ABATEMENT**

Submit copies of all transport manifests, trip tickets and disposal receipts for all asbestos waste materials removed from the work area during the abatement process. The Contractor shall submit to the Owner's Representative any and all documentation requested. At which time, the Owner's Representative shall assemble a project report consisting of the daily field notes and the documentation of events during abatement including the waste shipment record signed by operator of licensed landfill. The project report shall include a certificate of completion, dated and signed by an authorized representative of the Contractor and shall be submitted to the Owner's Representative within 30 days of project completion.

## 2.01 **SCOPE OF WORK**

- A. The work specified herein includes all labor, materials, equipment, and appurtenances required to complete all demolition, clearing and prompt removal and disposal of all non-asbestos material and debris as required for gaining access to asbestos containing materials indicated on drawings, and/or herein called for in this specification.
- B. The Contractor shall be responsible for the following general requirements:
  1. Obtain and post all permits as required.
  2. Provide, erect, and maintain all planking, scaffolding, bracing, shoring, barricades and warning signs as requested to complete the scope of work for this project.
  3. Unless otherwise specified, all equipment, fixtures, piping and debris resulting from demolition and not scheduled to be reinstalled shall become the property of the Contractor and removed from the premises, and properly disposed.
  4. Material or equipment to be reset shall be removed with the utmost care to prevent damage of any kind. All material to be reused shall be stored in the existing building. Contractor shall coordinate with the Owner's Representative as to location within building.
  5. Materials shall be removed from the site and disposed of in accordance with any special requirements of the State of Connecticut.

- C. It shall be the responsibility of the Contractor to protect and preserve in operating condition all utilities traversing the building and site. Damage to any utility due to work under this contract shall be repaired to the satisfaction of the Owner at no cost to the Owner.
- D. The Owner will retain an Asbestos Abatement Project Monitor for his own interests. The Project Monitor shall be on site during asbestos abatement work as directed by the owner.
- E. Deviations from this Specification require the Owner's written approval.
- F. The Contractor shall supply all labor, materials, equipment, services, insurance (with specific coverage for work on asbestos), and incidentals which are necessary or required to perform the work in accordance with applicable governmental regulations and these specifications.
- G. The Contractor will provide, install and use a recording manometer for each worker decontamination enclosure. The contractor will provide and install fire extinguishers acceptable to the Owner's Representative at each worker decontamination enclosure and in each work area.
- H. During the progress of work, various areas of the building may be occupied by others. The Abatement Contractor will be responsible for verifying interior conditions prior to the commencement of any work, and documenting any damage or previous conditions that may affect new work. Any additional damage, which occurs during construction, will be the responsibility of the Contractor to be corrected at no charge to the Owner.
- I. Contractor is responsible for posting proper notification, barriers and signage that may be required to prevent access of unauthorized persons to areas undergoing asbestos abatement procedures.

## 2.02 **DESCRIPTION OF WORK**

**Base Bid Work** – The Contractor shall guarantee he will directly perform at least forty percent (40%) of the work with his own employees and shall submit a letter certifying and stating the portion of work that will be performed by his own employees. Base Bid asbestos abatement work shall include but not be limited to the following ACM. The quantities given below are provided to establish the order of magnitude of the abatement project. Actual quantities may vary. It is the sole responsibility of the Hazardous Materials Abatement Contractor (HMAC) to visit the site, review the Contract Documents and determine the quantities of ACM to be removed when developing their bid. Any discrepancies must be submitted in writing in RFI format to the Construction Manager for interpretation prior to submission of bid. There will be no exception to this requirement regardless of the magnitude of the change in quantity unless the HMAC submits their concerns in writing seven (7) days prior to the bid due date.

The HMAC must lock out/tag out all electrical power in all abatement areas, and all loose wires must be fastened securely in compliance with State and Local Building Codes. All electrical work must be accomplished by a tradesman who has a current and valid Connecticut State License for this work. The Contractor must provide written documentation that the building power sources used are capable and sufficient for the power demands generated by the work. Any additional power requirement shall be the responsibility of the Contractor. Coordinate with the Owner's Representative for work areas and scheduling. Each area of abatement activity is to be initiated by the Owner's Representative so as to coincide with other work. It is the sole responsibility of the HMAC to provide sufficient manpower to complete work as per the schedule.

### A. **Window Replacement**

**Extent of Work** - The asbestos abatement work required for this project consists of the removal and

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disposal of:

**Interior/Exterior Window Caulking – Approximately 10,000 linear feet**

**Type-2 Windows:** Principal Office\*, Nurse Office\*, Social Worker\*, Psychology Office\*, Rooms A-2\*, A-3\*, A-4\*, A-5\*, Cafeteria, Stage, Gymnasium and Rooms B-1, B-2, B-3, B-4, B-5, B-6, B-7, B-8 and B-14, C-1, C-2, C-3, C-4, C-5, C-6, C-7, C-8

**Type-1 Windows:** Rooms A-6\*, A-7\*, A-8\*, A-9\*, A-10\*, A-12\*, A-14\*, A-16\*, Computer Lab\*

**Type-3 Windows:** Cafeteria

**TLC Windows**

**Interior/Exterior Window Glazing Compound – Approximately 3,550 linear feet**

**Type-2 Windows:** Principal Office\*, Nurse Office\*, Social Worker Office\*, Psychology Office\*, Rooms A-2\*, A-3\*, A-4\*, A-5\*, Cafeteria, Stage, Gymnasium, TLC and Rooms B-1, B-2, B-3, B-4, B-5, B-6, B-7, B-8 and B-14, C-1, C-2, C-3, C-4, C-5, C-6, C-7, C-8

**Type-1 Windows:** Rooms A-6\*, A-7\*, A-8\*, A-9\*, A-10\*, A-12\*, A-14\*, A-16\*, Computer Lab\*

**Type-3 Windows:** Cafeteria

**TLC Windows**

Please see diagram PCB-04

**Note:** \*These materials also contain PCBs greater than 50 PPM.

**B. Phase of Removal**

**THE CONTRACTOR MUST COMPLETE THIS WORK IN ACCORDANCE WITH THE CONTRACT SCHEDULE INCLUDING ANY AND ALL FINAL CLEANING OF THE AREA AFTER CLEARANCE AIR SAMPLING HAS BEEN ACCEPTED.**

General Notes:

1. Pre-construction of all containments in each phase is advisable in an effort to save time.
2. Working in more than one area at a time is permissible, unless otherwise noted.

**C. Contractor's Responsibilities**

The Asbestos Abatement Contractor shall assume full responsibility and liability for the compliance with all applicable Federal, State, and local regulations pertaining to work practices, hauling and disposal of ACM and ACBM, and protection of workers, visitors to the site, and persons occupying

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areas adjacent to the site. Contractor is responsible for providing medical examinations and maintaining medical records of personnel as required by the applicable Federal, State and local requirements. Contractor shall hold the Design Consultant and Owner(s) Representative(s) harmless for failure to comply with any applicable work, hauling, disposal, safety, health, or other on the part of himself, his employees, or his subcontractors. Contractor incurs all sampling/analytical costs for sampling to comply with OSHA regulations. The Contractor is responsible for restoring all work areas and auxiliary areas utilized during abatement to conditions equal to or better than original. Any damage caused during the performance of abatement activities shall be repaired by the Contractor. The Contractor will post appropriate signage acceptable to the Owner's Representative to direct visitors to a sign-in location and will brief any such personnel on areas of abatement activity.

## 2.03 **UNIT PRICING**

The contractor further proposes and agrees that, should the amount of work required be increased or decreased, the following Unit Prices will be cost-in-place for computing extra cost or credits.

The amounts shown below are gross changes to the Contract Sum for additional work and include the Contractor's and Subcontractor's amounts for overhead and profit.

All work is to be accomplished in accordance with applicable sections of the specifications, and each Unit Price shall include all equipment tools, labor, permits, fees, etc., incidental to the completion of the work involved.

The following Unit Prices and provisions are to be included in and become part of this Contract to be used in evaluating additions to or deductions from the Work called for in the Specifications and/or Drawings. **BIDDERS ARE REQUIRED TO SUBMIT WITH THEIR BIDS, AMOUNTS FOR THE UNIT PRICE DESCRIPTIONS AS LISTED BELOW.**

**BELOW UNIT PRICES SHALL INCLUDE COST OF CONTAINMENT CONSTRAINTS AS MAY BE REQUIRED.**

Item	Item Description	Unit	Add/Deduct Cost
1	Removal of Asbestos Containing (non-PCBs) window caulking/glazing including set-up of Critical Barriers.	LF	

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## 3.01 **TERMINOLOGY**

Abatement - Procedures to control fiber release from asbestos containing materials. Includes removal and demolition activities.

Accredited or Accreditation - (when referring to a person or laboratory). A person or laboratory accredited in accordance with section 20 of Title II of the Toxic Substances Control Act (TSCA).

Agency - The authoritative force, usually at a state level, or their representative.

Adequately Wetted - Sufficiently mixed or coated with water, amended water or an aqueous solution; or the use of a removal encapsulant to prevent dust emissions.

Airlock - A system for permitting ingress and egress with minimum air movement between a contaminated area and an uncontaminated area, typically consisting of two contained doorways separated by a distance of at least six (6) feet such that one passes through one doorway into the airlock, allowing the doorway sheeting to overlap and close off the opening before proceeding through the second doorway, thereby preventing flow-through contamination.

Air Monitoring - The process of measuring the fiber content of a specific volume of air in a stated period of time.

Amended Water - Water to which a surfactant has been added to decrease the surface tension to 35 or less dynes.

ANSI - American National Standards Institute, 1430 Broadway, NY, NY 10018.

Approximate - Where used shall mean within  $10\% \pm$  the stated quantity.

Area Monitoring - Sampling of asbestos fiber concentrations within the asbestos control area and outside the asbestos control area which is representative of the airborne concentrations of asbestos fibers which may reach the breathing zone.

Asbestos - The term asbestos means the asbestiform varieties of actinolite, amosite, anthophyllite, chrysotile, crocidolite, and tremolite.

Asbestos Abatement - The removal, encapsulation, enclosure, renovation, repair, demolition or other disturbance of asbestos containing materials, but does not include activities which are related to (A) the removal or repair of asbestos cement pipe and are performed by employees of a water company as defined in Section 25-32a of the Connecticut General Statutes or (B) the removal of nonfriable asbestos-containing material found exterior to a building or structure other than material as regulated asbestos-containing material in 40 CFR 61, the National Emission Standards for Hazardous Air Pollutants, as amended from time to time.

Asbestos Abatement Project - Any asbestos abatement activity involving more than three (3) linear feet or three (3) square feet of asbestos containing material.

Asbestos Abatement Site Supervisor - Any asbestos abatement worker employed by an asbestos contractor who has been specifically trained as a supervisor in a training program approved by the department and who has been issued a certificate by the department.

Asbestos Abatement Worker - Any employee of a licensed asbestos contractor who engages in asbestos abatement, has completed a training program approved by the department and has been issued a certificate by the department.

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Asbestos Containing Material (ACM) - Any material composed of asbestos of any type and in an amount greater than one per cent by weight, either alone or mixed with other fibrous or nonfibrous material.

Asbestos Contractor - Any person or entity engaged in asbestos abatement whose employees actually perform the asbestos abatement work and who has been issued a license by the commissioner.

Asbestos Control Area - Any area where asbestos abatement operations are performed which is isolated by physical boundaries to prevent the spread of asbestos dust, fibers, or debris.

Asbestos Fiber - A particulate form of asbestos, (including chrysotile, amosite, crocidolite, tremolite, anthophyllite, actinolite or a combination of these materials) five (5) micrometers or longer, with a length-to-diameter ratio of at least 3 to 1.

Asbestos Fibers Permissible Exposure Limit - (PEL) Exposure to an airborne concentration of asbestos, (including chrysotile, amosite, crocidolite, tremolite, anthophyllite, actinolite, or a combination of these minerals) in excess of 0.10 fibers per cubic centimeter of air as an eight (8) hour time-weighted average (TWA), as determined by the method prescribed in OSHA Standard 29 CFR Part 1926.1101 Appendix A.

ASTM - American Society for Testing Materials, 1916 Race Street, Philadelphia, PA 19103.

Authorized Asbestos Disposal Facility - A location approved for handling and disposing of asbestos waste by the Connecticut Department of Environmental Protection or by an equivalent regulatory agency if the material is disposed of outside the State of Connecticut.

Authorized Person - Person authorized by the State or Contractor as required by work duties to be present in regulated areas.

Barrier Protection Enclosure - Barrier system for the contained work area shall be constructed on site with two layers of six (6) mil plastic forming walls and two layers of six mil plastic forming floors of area encompassing the renovation work. This enclosure will contain airlocked curtain doorways for ingress and egress.

Building Owner - The Owner or specifically authorized representative.

Certified Industrial Hygienist (CIH) - An industrial hygienist certified in Comprehensive Practice by the American Board of Industrial Hygiene.

CFR - Code of Federal Regulations.

Clean Room - An uncontaminated enclosed area or room, which is used by workers to enter and exit the enclosed work area via airlocks, and curtained doorways. The clean room (or change room) shall be equipped with suitable hooks, lockers, shelves, etc. for workers to store personal articles of clothing. The clean room shall be enclosed on four sides and have its own temporary ceiling separate from that of the work area. This area is used for storage of worker's street clothes and protective equipment.

Competent Person - Individual capable of identifying existing asbestos, tremolite, anthophyllite, or actinolite hazards and corrective measures to eliminate them, as specified in 29 CFR Part 1926.32(f). Individual shall have attended approved EPA sponsored asbestos abatement course for supervisors. The duties of the competent person include at least the following: establishing the negative pressure enclosure, ensuring its integrity, and controlling entry to and exit from the enclosure; supervising employee exposure monitoring required by 29 CFR

Part 1926.1101(f); ensuring that all employees working within such an enclosure wear the appropriate personal protective equipment, are trained in the use of appropriate methods of exposure control, and use the hygiene facilities and decontamination procedures specified; and ensuring that engineering controls in use are in proper operating condition and are functioning properly.

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Conn. OSHA - The Connecticut Department of Labor, Occupational Safety and Health Division.

Contractor - The individual and/or business licensed by the State of Connecticut as an Asbestos Abatement contractor with which the Owner arranges to perform the asbestos abatement project. The Contractor is responsible for the proper completion of project activities in accordance with the Contract Specifications. This includes all subcontractors that have been retained to perform any work.

Critical Barrier - Two sheets of six (6) mil polyethylene sheeting taped securely over windows, doorways, diffusers, grills and any other openings between the work area and uncontaminated areas outside of the work area including the outside of the building.

Curtained Doorway - A device to allow ingress or egress from one (1) room to another while permitting minimal air movement between the rooms, typically constructed by placing two (2) overlapping sheets of polyethylene over an existing or temporarily framed doorway, securing each along the top of the doorway, securing the vertical edge of one (1) sheet along one (1) vertical side of the doorway, and securing the vertical edge of the other sheet along the opposite vertical side of the doorway. Two (2) curtained doorways spaced a minimum of six (6) feet apart form an airlock.

Demolition - The wrecking or taking out of any part of a building including load-supporting structural member together with any related handling operations or the intentional burning of any facility and related razing, removing or stripping of asbestos products.

DEP - The Connecticut Department of Environmental Protection.

Design Consultant - The Design Consultant, representative of the Owner, is AMC Environmental, LLC, P.O. Box 423, Stratford, CT 06615 or their Authorized Representative, and is referred to in the Contract Documents as the Design Consultant/Project Monitor.

DPH - Department of Public Health, Indoor Air Program, Environmental Health Section, 410 Capitol Avenue, MS #51 Air, P.O. Box 340308, Hartford, CT 06134.

Encapsulant (sealant) - A liquid material which can be applied to asbestos containing material and which controls the possible release of asbestos fibers from the material either by creating a membrane over the surface (bridging encapsulant) or by penetrating into the material and binding its components together (penetrating encapsulant).

Enclosure - Procedures necessary to completely enclose asbestos containing material behind air-tight, impermeable, permanent barriers.

EPA - U.S. Environmental Protection Agency, 401 M Street, S.W., Washington, D.C. 20460. The Region I office USEPA, Region I, 1 Congress Street, Suite 1100, Boston, MA 02114.

Equipment Room - A contaminated room that is part of the Worker Decontamination Enclosure with provisions for storage of contaminated clothing and equipment.

Excursion Limit - The airborne concentration of asbestos averaged over a sampling period of thirty (30) minutes, as determined by the method prescribed in Appendix A of 29 CFR Part 1926.1101.

Facility - Means any private or public building/structure including but not limited to those used for institutional, residential (including single family), commercial or industrial purposes and vessels while ashore or in dry dock.

Facility Owner - Means the person or entity having title to the facility. For purposes of publicly owned property only, the Facility Owner shall be defined to be the chief executive officer of the federal, state or

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municipal agency which owns or controls the use of the facility.

Fixed Critical Barrier - Barrier constructed of 2 x 4 frame with Fire Retardant sheathing on work side and fire rated Sheetrock that has been smoke taped on the occupied side.

Fixed Object - A unit of equipment or furniture in the work area which cannot be removed from the work area.

HEPA Filter - High-Efficiency Particulate Air (HEPA) filter is capable of trapping and retaining at least 99.97 percent of all mono-dispersed particles of 0.3 micrometers in diameter or larger.

HEPA Vacuum Equipment - Vacuum equipment with a HEPA filter system for filtering the effluent air from the unit.

Holding Area - A chamber in the Waste Removal Decontamination Enclosure located between the washroom and an uncontaminated area. The holding area comprises an air lock.

HVAC - Heating, Ventilating and Air Conditioning.

Lockdown - The procedure of spraying polyethylene sheeting and building materials with an encapsulate type sealant to seal in non-visible asbestos containing residue.

Medical Records - Maintain complete and accurate records of employee's medical examinations for a period of at least 30 years after termination of employment as required by 29 CFR Part 1910 and 29 CFR Part 1926 and make records of the required medical examinations available for inspection and copying to the State of Connecticut's authorized representatives.

Movable Object - A unit (of equipment, furniture, etc.) in the work area, which can be removed from the work area.

Negative Air Pressure Equipment - A portable local exhaust system (Air Filtration Device) equipped with HEPA filtration used to create negative pressure in a contaminated area (negative with respect to adjacent uncontaminated areas) and capable of maintaining a constant, low velocity air flow into contaminated from adjacent uncontaminated areas.

Negative Initial Exposure Assessment - A demonstration by the competent person, which complies with the criteria in paragraph (f)(2)(iii) of 29 CFR Part 1926.1101, that employee exposure during an operation is expected to be consistently below the PELs.

Negative Pressure Enclosure (NPE) - A pressure differential and ventilation system where the work area is maintained at a negative pressure relative to air pressure outside the work area.

NESHAP - National Emission Standards for Hazardous Air Pollutants, including asbestos, administered by the EPA.

NIOSH - National Institute for Occupational Safety and Health.

OSHA - The Occupational Safety and Health Administration, 200 Constitution Avenue, Washington, D.C. 20210.

Outside Air - Ambient air outside buildings and structures.

PACM - Presumed asbestos containing material as defined by the OSHA Regulation 29 CFR Part 1926.1101.

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Personal Monitoring - Sampling of asbestos fiber concentrations within the breathing zone of an employee.  
Plasticize - To cover floors and walls with fire retardant polyethylene sheeting as herein specified.

Pre-Clean - The process of cleaning an area before asbestos abatement activities begin to ensure all dust and debris in the area considered to be asbestos containing are properly contained and disposed of. This increases the likelihood the area will pass aggressive air sampling clearance requirements after asbestos containing materials have been removed.

Presumed Asbestos Containing Material - Thermal system insulation, surfacing material, and resilient floor covering material found in building constructed no later than 1980 that is presumed to contain asbestos by the OSHA Regulation 29 CFR Part 1926.1101.

Project Designer – Jason Pringle, Project Designer License # 000252 is certified as the project designer. The certification authorizes a licensed asbestos consultant to apply knowledge of facility construction, design and development of abatement projects; abatement specifications; bidding documents; architectural drawings; and, schematic representations of material locations. Project designers may also determine how asbestos abatement should be conducted.

Project Monitor – Licensed as an asbestos abatement project monitor authorizes the asbestos consultant to function in the capacity of on-site representative of the facility owner or other persons, interpret project specifications or abatement management plans and monitor and evaluate contractor or employee compliance with applicable rules, regulations or specifications. Perform daily work area inspections, air monitoring, pre-abatement/post-abatement inspections and re-occupancy sampling, and ensure abatement projects are properly conducted, per Section 20-440-3(4) of the CT State Regulations.

Protection Factor - The ratio of the ambient concentration of an airborne substance to the concentration of the substance inside the respirator at the breathing zone of the wearer. The protection factor is a measure of the degree of protection provided by a respirator to the wearer.

Regulated Area - Area established by the employer to demarcate areas where Class I, II and III asbestos work is conducted, and any area where debris and waste from such asbestos work accumulate, and a work area within which airborne concentrations of asbestos, exceed or there is a reasonable possibility they may exceed the permissible exposure limit.

Regulated Asbestos Containing Material (RACM) - An EPA NESHAP's definition for (a) Friable asbestos material, (b) Category I nonfriable ACM that has become friable, (c) Category I nonfriable ACM that will be or has been subjected to sanding, grinding, cutting, or abrading or (d) Category II nonfriable ACM that has a high probability of becoming or has become crumbled, pulverized or reduced to powder by the forces expected to act on the material in the course of demolition or renovation operations regulated by this subpart.

Removal - All herein specified procedures necessary to remove asbestos containing materials from the designated areas and to dispose of these materials at an acceptable site.

Staging Area - The holding area or an area adjacent to the Waste Removal Decontamination Enclosure where containerized asbestos waste has been placed prior to removal from the work area. It is also an area where uncontaminated equipment and materials are stored.

Stripping - Taking of asbestos materials from any building element including structural members, pipes or HVAC equipment.

Structural Component - Any pipe, duct, boiler, tank, reactor, turbine, furnace or other component at or in a facility or any structural member of a facility.

Structural Member - Any load-supporting member of a facility such as beams and load-supporting walls or any

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non-load supporting member, such as ceilings and non-load supporting walls.

Surfacing Material - Material that is sprayed, troweled-on or otherwise applied to surfaces such as acoustical plaster on ceilings and fireproofing materials on structural members or other materials on surfaces for acoustical, fireproofing and other purposes.

Surfactant - A chemical wetting agent added to water to improve penetration.

Thermal System Insulation (TSI) - Insulation applied to pipes, fittings, boilers, breeching, tanks, ducts or other components to prevent heat loss or gain.

Time Weighted Average (TWA) - The average concentration of a contaminant in air during a specific time period as determined by the method prescribed in Appendix A of 29 CFR Part 1926.1101.

Visible Emissions - Any emissions containing particulate material that are visually detectable without the aid of instruments. This does not include condensed uncombined water vapor.

Visible Residue - Any debris or dust on surfaces in areas within the enclosed work area where asbestos abatement has taken place and which is visible to the unaided eye. All visible residue is assumed to contain asbestos.

Washroom - A room between the work area and the holding area in the Waste Removal Decontamination Enclosure with provisions for wet cleaning of exterior surfaces of disposal containers and contaminated equipment.

Waste Removal Decontamination Enclosure - Decontamination enclosure system designed for controlled transfer of bagged or containerized asbestos containing materials, materials and equipment typically consisting of a washroom and a holding area.

Waste Shipment Record - The shipping document required to be originated and signed by the waste generator, used to track and confirm the disposal of asbestos containing waste material and complies with EPA's NESHAP requirements.

Wet Cleaning - The process of eliminating asbestos contamination from building surfaces and objects by using cloths, mops, or other cleaning tools which have been dampened with water, and by afterwards disposing of these cleaning items as asbestos contaminated waste.

Work Area - Designated rooms, spaces, or areas of the project in which asbestos abatement actions are to be undertaken or which may become contaminated as a result of such abatement actions. A contained work area is an area that has been sealed, plasticized, and equipped with Worker and Waste Decontamination Enclosure Systems. A non-contained work area is an isolated or controlled access work area that has not been plasticized nor equipped with a Decontamination Enclosure System.

Work Area Enclosure - A contained work area with sealed critical barriers, and two layers of six (6) polyethylene sheeting covering walls and floor surfaces.

Workday - Work conducted within the building will be scheduled between the hours of 7:00 a.m. and 4:00 p.m. EST. All work hours to be scheduled and approved by the Owner's Representative. Contractor hours on Saturdays, Sundays and Holidays must secure permission from the Owner in writing.

Worker Decontamination System - Enclosed area adjacent and connected to the regulated area and consisting of an equipment room, shower area, and clean room each separated by airlocks such as will prevent the free passage of air or asbestos fibers and shall be accessible through doorways protected with two (2) overlapping 4 mil polyethylene sheets. The clean room (or change room) shall be equipped with suitable hooks, lockers, shelves, etc. for workers to store personal articles and clothing. The shower room shall be contiguous to the

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clean room and equipment room. All personnel entering or leaving the work area shall pass through the shower room. The number of showers provided shall satisfy the requirements of OSHA 29 CFR 1910.141 (d) (3) (ii). Warm water shall be supplied to the showers. The equipment room (dirty room) shall be situated between the shower room and the work area, and separated from both by means of suitable barriers or overlapping flaps such as will prevent the free passage of air or asbestos fibers.

## 4.01 **APPLICABLE DOCUMENTS**

- A. Except to the extent that more explicit or more stringent requirements are written directly into this specification, all applicable Federal, State and Local codes, regulations, and standards have the same force and effect and are incorporated by reference.
- B. The current issue of each document shall govern. When conflict among requirements or with this Specification exists, the more stringent requirements shall apply.
- C. Contractor shall comply with the following standards, regulations, codes and this Specification:
  - 1. EPA 560/5-85-024, June 1985, Guidance for Controlling Friable Asbestos Containing Materials in Buildings.
  - 2. NBS (National Bureau of Standards) 83-2688 Guidelines for Assessment and Abatement of Asbestos Containing Materials in Buildings.
  - 3. Title 29, Code of Federal Regulations, Parts 1910.1001 & 1926.1101 - covers asbestos. Part 1910.134 - covers respirator use. Occupational Safety and Health Administration (OSHA) U.S. Department of Labor.
  - 4. Title 40, Code of Federal Regulations, Part 61, Subparts A and M, National Emission Standards for Hazardous Air Pollutants.
  - 5. State of Connecticut, Department of Public Health; Standards for Asbestos Abatement (19a-332a-1 to 19a-332a-16) and Licensure and Training Requirements (20-440-1 through 20-440-9).
  - 6. Title 29, Code of Federal Regulations, Part 1910.132 Personal Protective Equipment for General Industry.
  - 7. Title 29, Code of Federal Regulations, Part 1926.59 Hazard Communication.
  - 8. Title 29, Code of Federal Regulations, Part 1910.146 Permit Required Confined Space.
  - 9. Title 49, Code of Federal Regulations, Part 171 and 172 Hazardous Substances, Part 173 Asbestos Waste Management Guide, Parts 171-180 Hazardous Materials Regulations (DOT - U.S. Department of Transportation).
  - 10. Title 40, Code of Federal Regulations Part 763, Subpart E & G and Appendix C & D (AHERA).
- D. Contractor shall provide the Owner's Representative with the following items and shall post this information at the decontamination chamber:
  - 1. A list of telephone numbers for local hospital and/or emergency squad, local fire department, the building owner (or representative) the most local city or regional Asbestos Control Program, and

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2. A copy of all Material Safety Data Sheets (MSDS) for hazardous chemicals used during the asbestos project.

E. Additional Related Documents:

1. The most recent edition as of the bid date and any published up-dates to all applicable State codes; including, but not limited to Connecticut Fire Safety Code, Connecticut Basic Building Code and NFPA (National Fire Protection Association) Standard 241.
2. National Codes and Standards
  - a. ASTM - American Society for Testing and Materials.
  - b. ANSI - American National Standards Institute ANSI Z9.2 - 1979 Fundamentals Governing the Design and Operation of Local Exhaust Systems.
  - c. ULI - Underwriters Laboratories, Inc.
3. All State, County, and City codes and ordinances as applicable.

### 5.01 ***PERSONNEL PROTECTION***

- A. Prior to commencing work, all workers shall be instructed in all aspects of personnel protection, work procedures, emergency evacuation procedures and use of equipment including procedures unique to this project.
- B. Respiratory protection shall meet the requirements of OSHA as presented in 29 CFR Part 1910.134 titled "Respiratory Protection" and 29 CFR Part 1926.1101 titled "Occupational Exposure to Asbestos in the Construction Industry".
- C. Contractor shall provide appropriate respiratory protection equipment for each worker and ensure usage during potential asbestos exposure, based on the Initial Exposure Assessment. THE MINIMUM RESPIRATORY PROTECTION FOR THIS PROJECT WILL BE FULL FACE POWERED AIR PURIFYING RESPIRATORS (PAPRs). Contractor may request a lower level of respiratory protection if information is presented documenting compliance with the Respiratory Protection 29 CFR Part 1910.134.
- D. Contractor shall provide all authorized persons entering contaminated areas with proper respirator and filters, and set of protective clothing.
- E. Contractor shall provide and require all workers to wear protective clothing in work areas where asbestos fiber concentrations exceed permissible limits established by OSHA. Protective clothing shall include impervious coveralls with elastic wrists and ankles, head covering, gloves and foot covering made from Tyvec or approved equivalent.

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## Respiratory Protection Table

Airborne concentration of asbestos, tremolite, anthophyllite, actinolite or a combination of these minerals	Required Respirator
Not in excess of 1 f/cc (10 x PEL)	Half-mask air-purifying respirator other than a disposable respirator, equipped with high efficiency filters.
Not in excess of 5 f/cc (50 x PEL)	Full facepiece air-purifying respirator equipped with high efficiency filters.
Not in excess of 10 f/cc (100 x PEL)	Any powered air-purifying respirator equipped with high efficiency filters or any supplied air respirator operated in continuous flow mode.
Not in excess of 100 f/cc (1000 x PEL)	Full facepiece supplied air respirator operated in pressure demand mode.
Greater than 100 f/cc (greater than 1,000 x PEL or unknown concentration)	Full facepiece supplied air respirator operated in pressure demand mode equipped with an auxiliary positive pressure self-contained breathing apparatus

Note: (a) Respirators assigned for higher environmental concentrations may be used at lower concentrations or when required respirator use is independent of concentration. (b) A high-efficiency filter means a filter that is at least 99.97 percent efficient against mono-dispersed particles of 0.3 micrometers in diameter or larger.

## 5.02 WORKER PROTECTION PROCEDURES

- A. Contractors shall ensure that all workers and authorized persons enter and leave contaminated area through the Worker Decontamination Enclosure.
- B. Entry procedures require removal of street clothes and dressing with required protective clothing and respiratory equipment in clean room.
- C. Exit procedures require HEPA vacuuming of gross contamination from protective clothing before leaving work area, proceed to equipment room for removal of protective clothing except respirator, wearing only respirator proceed to shower, after thorough washing including respirator, going to clean room for dressing in street clothes.
- D. Contractor shall ensure that entry and exit procedures are followed for each entry into contaminated areas.
- E. All contaminated protective clothing shall remain in equipment room for reuse or disposal as contaminated waste.
- F. Workers shall not eat, drink, smoke or chew gum or tobacco while in the Work Area.
- G. Workers shall be fully protected with respirators and protective clothing immediately prior to the first disturbance of asbestos containing or contaminated materials and until final clean-up is completed.

6.01 ***SEQUENCE OF WORK***

- A. The entire project is to proceed in accordance with the sequence of work as mutually agreed upon between the Contractor, Owner and Architect/Design Consultant. Work shall be divided into appropriate work areas, each of which is to be completed as a separate unit.
- B. The Contractor shall submit prior to commencement, in writing, a detailed removal schedule to the Owner and Architect/Design Consultant, with a copy to the Project Monitor. The schedule shall indicate the estimated duration of each activity during the asbestos removal and re-insulation phases, including mobilization, preparation, removal, clearance cleaning and testing, tear-down and demobilization. Included in the Schedule shall be the number of workers planned for each activity during each shift.

***MATERIALS AND EQUIPMENT***

7.01 ***MATERIALS***

- A. Fire retardant polyethylene sheet in roll size to minimize the frequency of joints shall be delivered to job site with factory label indicating six (6) mil.
- B. Polyethylene disposable bags shall be six (6) mil with pre-printed label.
- C. Tape used will be capable of sealing joints in adjacent polyethylene sheets and for attachment of polyethylene sheets to finished or unfinished surfaces of dissimilar materials and be capable of adhering under both wet and dry conditions, including the use of amended water.
- D. Surfactant (wetting agent) - shall consist of fifty (50) percent polyoxyethylene ether and fifty (50) percent polyoxyethylene ester, or equivalent, and shall be mixed with water to provide a concentration of one (1) ounce surfactant to five (5) gallons of water or as directed by manufacturer.
- E. Removal, Lockdown, Bridging and Penetrating encapsulants shall be non-flammable factory prepared type found acceptable by the Architect/Design Consultant. The Design Consultant may require the contractor to use white, colored or clear, based upon the requirements of the owner.

No encapsulant will be approved until the contractor demonstrates to the Architect/Design Consultant compatibility with replacement flooring.

1. Encapsulant shall meet the following requirements:

Fire Resistance:

ASTM E-84-84A Flame Spread Index 0 (Class A)  
ASTM E162 (Class A)

Smoke Generation:

Passes ASTM E-84-84A rated 5

Toxic Gas Release:

"Well below danger level" as tested by the U.S. Battelle Institute

Temperature Range:

Up to 1000 F after curing.

2. Usage shall be in accordance with manufacturer's printed technical data.

- F. Impermeable containers are to 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 Standard 29 CFR Part 1926.1101.) Containers must be both air and watertight.
- G. Labels and signs, as required by OSHA Standard 29 CFR Part 1910.1001 and Part 1926.1101, will be used.

**7.02 *TOOLS AND EQUIPMENT***

- A. Provide suitable tools for asbestos removal, encapsulation and enclosure.
- 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.
- C. Air filtering equipment shall meet HEPA requirements and be of sufficient capacity to cause at least **six (6) air changes per hour** within the work area when calculated **using a factor of .5 times the manufacturer capacity rating** (i.e. at 50% of rated capacity). Exhaust the filtered air so as to maintain a negative inside (work area) pressure of 0.02 inches of water and of sufficient flow through the Decontamination Enclosures so as to prevent escape of airborne fibers. Equipment shall incorporate automatic warning system to indicate improper pressure drop or unit failure and automatic recording system to indicate time of continuous operation. The contractor will provide, install and use recording manometers at each decontamination enclosure.
- D. Vacuum units, of suitable size and capacities for project, shall have HEPA filter capable of trapping and retaining at least 99.97 percent of all mono-dispersed particles of 0.3 micrometers in diameter or larger.
- E. The contractor shall have available power cables or source such as generator (where required).

**7.03 *EQUIPMENT REMOVAL PROCEDURES***

- A. Clean surfaces of contaminated containers and sponge or wipe before moving such items into the Waste Removal Decontamination Enclosure for final cleaning and removal to uncontaminated areas. Ensure that personnel do not leave Work Area through the Waste Removal Decontamination Enclosure.
- B. No equipment, supplies, or materials (except properly containerized waste material) shall be removed from an asbestos abatement project work area unless such equipment, supplies, or materials have been thoroughly decontaminated and cleaned free of asbestos debris. Where the configuration of the equipment, supplies or materials is such that decontamination and cleaning free of asbestos debris is neither possible nor feasible, then the object shall be thoroughly wrapped in a minimum of two (2) layers of six (6) mil polyethylene sheeting with all joints, seams and overlaps sealed with tape; or containerized in a metal drum with a locking lid. Examples include, but are not limited to, air filtration or HEPA filtered vacuuming equipment which may be wrapped in plastic rather than dismantling beyond the HEPA filters for cleaning purposes; sections of insulated pipe or other objects to be disposed of intact may be wrapped in plastic without prior removal of asbestos. Wood or other materials used to construct on-site decontamination or shower units may be wrapped in plastic for disposal or transport to another contaminated work site for re-use.
- C. HEPA-filtered vacuum cleaners shall be emptied of collected asbestos waste contents prior to removal of the equipment from the work area.

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- D. All pre-filters in the air filtration devices shall be removed prior to removal of the unit from an asbestos work site. The air filtration device shall be damp cleaned completely inside and out. The equipment shall be wrapped in plastic prior to removing it from the work area.

### 8.01 **PREPARATION OF WORK AREA ENCLOSURE SYSTEM**

- A. Post caution signs meeting the specifications of OSHA 29 CFR Parts 1910.1001 and 1926.1101 at any location and approaches to a location where airborne concentrations of asbestos may exceed ambient background levels. Signs shall be posted at a distance sufficiently far enough away from the work area to permit an employee to read and take necessary protective measures to avoid exposure. Additional signs may require posting following construction of workplace enclosure barriers.
- B. Lock out/tag out all electric power, including receptacles and light fixtures in the area of work activity. Any electrical fixtures that must be removed and replaced shall be done by an electrician who has a current and valid Connecticut State License for this work.
- C. HEPA filtered local exhaust ventilation shall be utilized during the installation of enclosures and supports where asbestos containing materials may be disturbed.
- D. The Contractor shall provide temporary lighting and ensure safe installation (including ground faulting) of temporary power sources and equipment in compliance with all applicable electrical code requirements and OSHA requirements for temporary electrical systems. Note the Contractor is responsible for proper connection and deployment of electrical supply lines.
- E. Shutdown and lockout all heating, cooling, and air conditioning system (HVAC) components that are in or pass through the work area. This work must be accomplished by a tradesman who has a current valid Connecticut State License for this work.
- F. Seal off all windows, doorways, corridor entrances, drains, ducts, grills, grates, diffusers, skylights, and other openings between the work area and uncontaminated areas outside of the work area (including the outside of the building, tunnels, crawl spaces) with six (6) mil polyethylene sheeting & tape.
- G. Method of attaching polyethylene sheeting to walls and equipment shall be agreed upon in advance by the Contractor, Architect/Design Consultant and Owner's Representative and selected to minimize damage to equipment and surfaces. Method of attachment may include any combination of duct tape or other waterproof tape, furring strips, spray glue, stick pins, staples, nails, screws or other effective procedures capable of sealing adjacent polyethylene sheets and capable of sealing polyethylene to dissimilar finished or unfinished surfaces under both wet and dry conditions (including the use of amended water). The repair of any damage to existing finishes occurring, as a result of such procedures will be the sole responsibility of the contractor.
- H. Pre-clean all fixed objects left in the contained work area using HEPA filtered vacuums and/or wet cleaning techniques as appropriate. Careful attention must be paid to machinery behind grills or gratings where access may difficult but contamination significant. Also pay particular attention to wall, floor, and ceiling penetrations behind fixed objects. After pre-cleaning, enclose fixed objects in six (6) mil polyethylene sheeting and seal securely in place with tape. Control panels, gauges, etc. in the work area may require Agency access during abatement. These shall be designated and enclosures constructed with access flaps sealed with waterproof tape.
- I. Pre-clean all surfaces in the work area using HEPA filtered vacuums and/or wet cleaning methods as appropriate. Do not use any methods that would raise dust such as dry sweeping or vacuuming with equipment not equipped with HEPA filters. Do not disturb asbestos containing materials during the

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pre-cleaning phase.

- J. Cover floors in the work area with polyethylene sheeting.
  - 1. Floors shall be covered with two (2) separate layers of six (6) mil (minimum) sheeting. Additional layers of sheeting may be utilized as drop cloths to aid in cleanup of bulk materials.
  - 2. Plastic shall be sized to minimize seams. If the floor area necessitates seams, those on successive layers of sheeting shall be staggered to reduce the potential for water to penetrate to the flooring material. A distance of at least 12 inches between seams is sufficient. Do not locate any seams at wall/floor joints.
  - 3. Floor sheeting shall extend at least 12 inches up the side walls of the work area.
  - 4. Sheetng shall be installed in a fashion so as to prevent slippage between successive layers of material. (Vinyl sheeting may be used for improved traction on floors.)
  - 5. At the start of each day's work, a loose layer of sheet plastic is recommended to be put down as a drop cloth. This drop cloth layer will be removed at the end of the day's work, collecting all the smears of debris that would otherwise be left on the floor layer of plastic. This will help prevent the debris from drying out overnight, elevating airborne fiber levels, and also help to make later cleanup easier.
- K. Cover walls in the work area with polyethylene sheeting. In addition, openings through these walls to uncontaminated areas of the building must be sealed.
  - 1. Walls shall be covered with two (2) separate layers of six (6) mil (minimum) polyethylene sheeting.
  - 2. Plastic shall be staggered and seams separated by a distance of at least twelve inches.
  - 3. Wall sheeting shall overlap floor sheeting by at least 12 inches beyond the wall/floor joint to provide a better seal against water damage and for negative pressure.
  - 4. Wall sheeting shall be secured adequately to prevent it from falling away from the walls. This will require additional support/attachment when negative pressure ventilation systems are operating.

### 8.02 WORKER DECONTAMINATION ENCLOSURE SYSTEM

- A. Worker Decontamination Enclosure Systems shall be provided at all locations where workers will enter and exit the work area. All decontamination units must be located external to the work area.
- B. The Worker Decontamination Enclosure System shall consist of at least a clean room, a shower room, and an equipment room; each separated from the other by curtained doors.
- C. Pathways into (from clean to contaminated) and out of (from contaminated to clean) the work area shall be clearly designated.
- D. Clean room shall be sized to adequately accommodate the work crew. A location for postings shall also be provided in this area. Whenever possible, a lockable door shall be used to permit access into the clean room from outside the work area. This space shall not be used for storage of tools, equipment, or materials (except as specifically designed) or as office space.

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- E. Shower room shall contain one or more showers as necessary to adequately accommodate workers. Each showerhead shall be supplied with hot and cold water. The shower enclosure shall be constructed to ensure against leakage of any kind. An adequate supply of soap, shampoo, and towels shall be supplied by the Contractor and be available at all times. Shower water shall be drained, collected, and filtered through a system with at least 5 micron particle size collection capability, or as required by Connecticut DEP, Water Management Bureau. All filtered wastewater shall then be disposed of into a nearby sanitary drain.
- F. The equipment room shall be used for storage of equipment and tools at the end of a shift after they have been decontaminated using a HEPA filtered vacuum and/or wet cleaning techniques as appropriate. Replacement filters (in sealed containers until used) for HEPA vacuums and negative pressure ventilation equipment, extra tools, containers of surfactant and other materials and equipment that may be required during the abatement may also be stored here as needed. A labeled six (6) mil polyethylene bag for collection of disposable clothing shall be located in the equipment room. Contaminated footwear (e.g., rubber boots, other reusable footwear) shall be stored in this area for reuse the following workday.
- G. In specific situations where the asbestos contractor determines that it is not feasible to establish a contiguous decontamination system at a work site, the asbestos contractor shall provide written notification and provide a copy to the facility owner of intent to utilize a remote decontamination system. Such systems must be operated in conformance with 29 CFR Part 1926.1101, Appendix F and must be approved by the Project Monitor.

### 8.03 **WASTE REMOVAL DECONTAMINATION ENCLOSURE**

- A. The Waste Removal Decontamination Enclosure shall be constructed at some location away from the Worker Decontamination Enclosure system. Wherever possible, this shall be located where there is direct access from the work area to the outside of the building.
- B. This enclosure system shall consist of a washroom, which will be an airlock, and a holding area. The doorways out of the work area, and from the holding area to the uncontaminated area will all be curtained.
- C. The Waste Removal Decontamination Enclosure shall be constructed in similar fashion to the Worker Decontamination Enclosure system using similar materials and airlock and curtain doorway designs.
- D. This enclosure systems shall not be used to enter or exit the work area.
- E. Emergency exits shall be established and clearly marked with duct tape arrows or other effective designations to permit easy location from anywhere within the work area. They shall be secured to prevent access from uncontaminated areas and still permit emergency exiting. These exits shall be properly sealed with polyethylene sheeting, which can be cut to permit egress if needed. These exits may be the Worker Decontamination Enclosure, the Waste Removal Decontamination Enclosure and/or other alternative exits satisfactory to fire officials.
- F. Equipment and Waste Removal Procedures:
  1. Asbestos contaminated waste that has been single bagged and equipment shall be transported out of the work area through the Waste Removal Decontamination Enclosure.
  2. Pass-out procedures shall utilize two teams of workers, an "inside" team and an "outside" team.
  3. The inside team wearing appropriate protective clothing and respirators for inside the work area shall clean the outside, including bottoms, of properly labeled containers (bags, drums,

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or unwrapped equipment) using HEPA vacuums and wet wiping techniques and transport them into the Waste Removal Decontamination enclosure. No worker from the inside team shall further exit the work area through this enclosure.

4. The outside team, wearing appropriate protective clothing and respirators, shall enter the enclosure from outside the work area, enclose the drums or bags in clean, labeled, six (6) mil polyethylene bags and remove them from the enclosure to the outside. No worker from the outside team shall further enter the work area through this enclosure.
4. The exit from this enclosure shall be secured to prevent unauthorized entry.

**8.04 SEPARATION OF WORK AREAS FROM OCCUPIED AREAS**

- A. Occupied areas and/or building space not within work areas shall be separated from asbestos abatement work areas by means of airtight Fixed Critical Barriers
- B. Separation of building areas shall not impair required building exits from any occupied building area.
- C. Critical Barrier - Two sheets of six (6) mil polyethylene sheeting taped securely over windows, doorways, diffusers, grills and any other openings between the work area and uncontaminated areas outside of the work area including the outside of the building.
- D. Fixed Critical Barrier - Barrier constructed of 2 x 4 frame with Fire Retardant sheathing on work side and fire rated Sheetrock that has been smoke taped on the occupied side.
- E. Contractor shall visually inspect barrier throughout work day to assure effective seal and repair defects immediately.
- F. Create pressure differential between work areas and occupied areas by the use of acceptable negative air pressure equipment.

**8.05 MAINTENANCE OF ENCLOSURE SYSTEMS**

- A. Ensure that barriers and plastic linings are effectively sealed and taped. Repair damaged barriers and remedy defects immediately upon discovery.
- B. Visually inspect enclosures at the beginning of each work period.
- C. Use chemical smoke test methods to test effectiveness of barriers daily and provide a log of the locations, dates and name of the person performing the testing.
- D. Create pressure differential between work areas and occupied areas by the use of negative air pressure equipment. Description: High efficiency particulate air (HEPA) filtration systems shall be equipped with filtration equipment in compliance with ANSI Z9.2-1979. The equipment shall be sized to provide at least six (6) air changes per hour in the work area when rated at 50% of manufacturers published capacity. An air change shall be defined as replacement of air inside the enclosed area with air from outside the enclosed area. Automatic shutdown of system and/or warning lights to indicate improper pressure drop across filters shall be incorporated into equipment to prevent operation of equipment if filters are overloaded or ruptured. At a minimum, one additional unit per 5,000 square feet of floor space shall be installed as a backup. Each such unit shall be equal in size to the largest primary unit in the work area.
- E. At any time during the abatement activities after barriers have been erected, if visible material is observed outside of the work area or if damage occurs to barriers, work shall immediately stop, repairs made to the barriers, and debris/residue cleaned up using appropriate HEPA vacuuming and wet mopping procedures.

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- F. If air samples collected outside of the work area during abatement activities indicate airborne fiber concentrations greater than 0.010 f/cc or preliminary background/ambient air levels which are higher than 0.010 f/cc, the Contractor will be directed to halt work immediately. The Contractor will begin emergency clean up procedures to include HEPA vacuuming and wet wiping (at a minimum) at no cost to the Owner. Upon completion, air samples shall be collected in the same areas. If these areas indicate airborne fiber concentration less than 0.010 f/cc then the Contractor may resume work. Alternately upon completion of the cleaning, the Project Monitor may perform TEM ambient air sampling. If these samples are  $\leq$  70 structures/mm<sup>2</sup>, the contractor may resume work. All TEM samples will be analyzed within 24 hours from receipt by the laboratory. Should these samples fail this criteria, the Contractor shall re-clean and the areas will be re-sampled.
- G. Contractor shall have standby temporary power available on site. This power shall be sufficient to operate all temporary lighting and not less than one half of the installed HEPA filtration units within 15 minutes from the failure of the building power source.

### 8.06 ASBESTOS REMOVAL

- A. Contractor shall have competent person on job at all times to ensure establishing proper enclosure system and proper work practices throughout project.
- B. Asbestos abatement work shall not commence until:
  - 1. Enclosure systems have been constructed, tested, and then approved by the Design Consultant.
  - 2. Negative pressure ventilation systems are functioning adequately and have been tested to minus 0.02 inches of water for 1 hour. A recording manometer strip chart will provide acceptable documentation.
  - 3. All pre-abatement submissions, notification, posting and permits have been provided and are satisfactory to the Owner and Design Consultant.
  - 4. All equipment for abatement, clean-up and disposal are available.
  - 5. All worker training (and certification) documentation is completed and approved by the Design Consultant.
  - 6. Contractor receives authorization from the Owner and Design Consultant.
- C. Spray asbestos materials with amended water using airless spray equipment capable of providing a "mist" application to reduce the release of fibers. The asbestos material shall be sprayed with water mist containing a wetting agent to enhance penetration. A fine spray of amended water shall be applied to reduce fiber release preceding the removal of the asbestos material.
- D. In order to maintain indoor asbestos concentrations at a minimum, the wet asbestos must be removed in manageable sections. Material drop shall not exceed eight (8) feet. For heights up to 15 feet provide inclined chutes or scaffolding to intercept drop. For heights exceeding 15 feet provide enclosed dust-proof chutes.
- E. All asbestos containing material removed in enclosed work areas will be bagged on a daily basis. No ACM will be allowed to remain on the floor overnight, allowing it to dry out. The contractor will report, in writing to the Project Monitor the number of containers bagged out daily.
- F. Seal filled containers. Place caution labels on containers in accordance with OSHA Standard 29 CFR

Part 1910.1001 and 29 CFR Part 1926.1101 if not already pre-printed on containers. Clean external surfaces of containers thoroughly by wet sponging in the designated area. Move containers to washroom, wet clean each container thoroughly and move to holding area by workers who have entered from uncontaminated areas dressed in clean coveralls. Ensure that workers do not enter uncontaminated areas into the washroom or the work area; ensure that contaminated workers do not exit the work area through the Waste Removal Decontamination Enclosure system.

- G. After completion of stripping work, all surfaces from which asbestos has 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 not permitted). During this work the surfaces being cleaned shall be kept wet.
- H. If at any time during asbestos removal, should the Owner's Project Monitor suspect contamination of areas outside the work area, he shall stop all abatement work until the Contractor takes steps to decontaminate these areas and eliminate causes of such contamination.

**8.07 NEGATIVE PRESSURE ENCLOSURE (NPE) SYSTEMS**

Glove bags are not allowed to be used unless the work conforms with 1926.1101(g)(5)(i) Negative Pressure Enclosure (NPE) Systems (OSHA). The State of Connecticut Regulations Section 19a-332a-11 requires an Alternative Work Practice (AWP) approval prior to implementation of any modification from the standard work practices identified in 19a-332a-1 to 19a-332a-16. As the owner's representative, AMC will prepare any and all AWPs if necessary. The fees associated with the AWPs including the state-processing fee will be the sole responsibility of the abatement contractor. There are no approved AWPs currently for this project.

**8.08 INSPECTION OF ASBESTOS ABATEMENT PROJECTS**

The Owner or Owner's Representative shall, after proper identification, have the right to enter into any facility, or onto any property where asbestos abatement is planned or is being performed or has been performed in order to determine whether such asbestos abatement is being performed in a manner consistent with good safe practices and in accordance with the regulations.

**8.09 ORDER TO CEASE ACTIVITY**

- A. Whenever the Owner or Owner's Representative has reason to believe on the basis of inspections or tests that asbestos abatement is being performed in violation of these regulations or specifications or, in the judgment of the Owner, is endangering the public's health, the Owner may issue a written or printed cease activity order to any person who performs, supervises or controls such asbestos abatement. Such order shall specifically describe the nature of the violation of the regulations or specifications or condition endangering the public's health.
- B. After receipt of a cease activity order, no person shall conduct asbestos abatement except in accordance with the provisions of the order.
- C. Compliance with the provisions of a cease activity order shall be determined by the Owner or Owner's Representative on the basis of re-inspection or additional tests as deemed necessary.
- D. Within five (5) business days of receipt of a written request of the person subject to a cease activity order, the Owner shall hold a hearing to provide the person subject to the order an opportunity to be heard and show that asbestos abatement is being performed in accordance with the regulations and/or without endangering the public health. The cease activity order shall remain in effect until five days after said hearing, within which time the Owner shall determine whether said order should continue in effect. The cease activity order shall be revoked at the end of said five day period if no decision is made by the Owner or if so ordered by the Owner.

**8.10 CLEAN-UP PROCEDURES**

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- A.
  - 1. Visual accumulations of loose asbestos containing waste material shall be cleaned up:
    - a. whenever sufficient asbestos containing waste material to fill a single leak-tight container of the type commensurate with the properties of asbestos containing waste material has been removed, or
    - b. at the end of each work shift, or
    - c. once each working day, whichever shall occur first. Visible material shall be maintained wet until cleaned up.
  - 2. Visible accumulations of asbestos containing waste material shall be containerized utilizing rubber dust pans and rubber squeegees or HEPA vacuums.
  - 3. Metal shovels shall not be used to pick up or move accumulated asbestos containing waste material or any other debris in the vicinity of isolation or surface barriers.
- B. Accumulations of dust shall be cleaned off at all surfaces of the work area on a daily basis, using HEPA vacuum or wet cleaning methods.
- C. The waste decontamination enclosure system shall be wet cleaned twice using wet cleaning methods upon completion of waste removal.
- D. The worker decontamination enclosure system shall be wet cleaned/HEPA vacuumed, as appropriate, after each shift change and meal break.
- E. Excessive water accumulation or flooding in the work area shall require work to stop until the water is collected and disposed of properly.
- F. Additional clean-up procedures shall be performed in the order set forth below prior to commencement of clearance air monitoring.
  - 1. After removal of visible accumulations of asbestos containing waste material, a HEPA vacuuming shall be performed on all surfaces. To pick up excess water and gross saturated debris, a wet-dry shop vacuum, dedicated to asbestos abatement, may be used. Any water collected must be put into appropriate leak tight containers, and removed and disposed of as ACM.
  - 2. All surfaces in the work area shall be wet cleaned (first cleaning).
  - 3. The cleaned layer of the surface barriers shall be removed from walls and floors. The isolation barriers shall remain in place throughout cleanup. Decontamination enclosure systems shall remain in place and be utilized.
  - 4. After the first cleaning, the work area shall be vacated for 12 hours to allow fibers to settle. Then, all objects and surfaces in the work area shall be HEPA-vacuumed and wet cleaned a second time. The Project Monitor may require the remaining plastic surface barriers to be removed, while the isolation barriers remain in position.
  - 5. After the second cleaning, the work area shall be vacated for 12 hours before wet cleaning and/or HEPA vacuuming all surfaces in the work area for a third cleaning.
  - 6. As a prerequisite to commencement of clearance air monitoring (see Paragraph 9.01 of this section), a thorough visual inspection by the Project Monitor shall verify the absence of asbestos containing waste material and the successful completion of the chosen abatement procedure. If visible accumulations of dust or bulk asbestos containing materials (ACM) are found in the Work Area, the Contractor shall repeat the cleaning at the Contractor's expense

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until there are no visible accumulations. The visual inspection will detect incomplete work, damage caused by the abatement activity, and inadequate cleanup of the work site. The visual inspection shall include the use of flashlights, rags (wet or dry), fingers, tools, or scraping devices to detect accumulations of dust or bulk ACM from any area. All surfaces covered with tape or polyethylene or uncovered shall be inspected. If required, polyethylene and tape shall be cut or removed to facilitate the inspection and then repaired or replaced.

7. All containerized waste shall be removed from the work area and the holding area.
8. All tools and equipment shall be removed from the work area and decontaminated in the waste decontamination enclosure system.
9. After successful clearance air monitoring, the isolation barriers shall be removed in conjunction with the use of a HEPA vacuum.

***AIR MONITORING***

***9.01 CONSULTANTS' AIR SAMPLING RESPONSIBILITIES***

- A. Air sampling shall be conducted by the Consultant/Project Monitor to ascertain the integrity of controls that protect the building from asbestos contamination. Independently, the Contractor shall monitor air quality within the work area to ascertain the protection of employees and to comply with OSHA regulations.
- B. Consultant's Project Monitor shall collect and analyze air samples during the following time periods:
  - 1. Pre-Abatement Period: The consultant's project monitor may collect samples prior to abatement work to establish baseline readings. These samples will be collected in and around the proposed work area.
  - 2. Abatement Period: The Consultants project monitor will collect samples on a daily basis during the work period. A sufficient number of area samples shall be taken outside of the work area, at the exhaust of the negative pressure system, and outside of the building to judge the degree of cleanliness or contamination of the building during removal. Additional samples may be taken inside the work area and decontamination enclosure system, at the discretion of the APM.
  - 3. Post-Abatement Period: As required by the regulation, the Consultant's project monitor shall conduct air sampling following the final cleanup phase of the project, once the "no visible residue" criterion, as established by the project monitor, has been met. Five (5) samples shall be collected inside the work area utilizing aggressive methods to comply with the State of Connecticut Department of Public Health Standards for Asbestos Abatement, sections 19a-332a-12, and 19a-332a-13 and the United States Environmental Protection Agency (USEPA) Asbestos-Containing Materials in Schools regulation 40 CFR Part 763. Analysis of the samples to determine airborne concentrations of asbestos shall be conducted by Transmission Electron Microscopy (TEM) method with an upper limit of 70.0 structures per square millimeter ( $s/mm^2$ ) as an average concentration of airborne fibers in five (5) samples in accordance with the above regulations.
- C. The Consultant's project monitor shall provide continual evaluation of the air quality of the building during removal, using her/her best professional judgments in respect of the State of Connecticut Department of Public Health guideline of 0.010 fibers/cc and the background air quality established during the pre-abatement period.
- D. If the project monitor determines that the building air quality has become contaminated from the project, he/she shall immediately inform the Contractor to cease all removal operations and implement a work stoppage clean up procedure.

The Contractor shall conduct a thorough cleanup of the areas of the building designated by the Consultant. No further removal work can take place until the project monitor has assessed that the building air has been decontaminated.

- E. Pre-abatement and during abatement air samples shall be collected as required to obtain a volume of 1,200 liters. Samples shall be analyzed by Phase Contrast Microscopy (PCM) methodology using the NIOSH 7400 protocol.

**9.02 CONSULTANTS INSPECTION RESPONSIBILITIES**

- A. Inspections shall be conducted by the Consultant/Project Monitor throughout the progress of the abatement project. Inspections shall be conducted in order to document the progress of the abatement work as well as the procedures and practices employed by the abatement Contractor.
- B. The Consultant/Project Monitor shall perform the following inspections during the course of abatement activities:
  1. **Pre-commencement Inspection:** Pre-commencement inspections shall be performed at the time requested by the abatement Contractor. The Consultant/Project Monitor shall be informed sufficiently in advance of the time the inspection is needed. During the course of the pre-commencement inspection, the Consultant/Project Monitor shall inspect the containment and surrounding work areas. This shall include, but not be limited to, inspection of barrier integrity, worker decontamination facility, utilization of power sources, and location and capacity of negative air filtration devices. If, during the course of the pre-commencement inspection, deficiencies are found, the Contractor shall perform the necessary adjustments in order to obtain compliance.
  2. **Work Area Inspections:** Work area inspections may be conducted on a daily basis at the discretion of the Owner/Consultant/Project Monitor. During the course of the work inspections, the Consultant/Project Monitor shall observe the Contractor's removal procedures, verify barrier integrity, monitor negative air filtration devices, assess project progress, and inform the abatement Contractor of specific remedial activities if deficiencies are noted.
  3. **Pre-sealant Final Visual Inspection:** A pre-sealant inspection for each work area shall be conducted by the Consultant/Project Monitor upon the request of the abatement Contractor. 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, during the course of the pre-sealant inspection, the Consultant/Project Monitor identifies residual dust or debris, the Contractor shall comply with the request of the Consultant/Project Monitor in order to render the area "dust free."

**9.03 INITIAL CLEARANCE TESTING**

- A. After the visual inspection is completed and all surfaces in the abatement area have dried, a procedure of lockdown using a coat of a satisfactory encapsulating agent, refer to Section 02100, Paragraph 7.01, shall be applied to all surfaces in the work area including structural members, building components and plastic sheeting on walls, floors and coverings of non-removable items, to seal in non-visible residue. All barriers, with the exception of the primary barriers, are to be removed. Air monitoring clearance sampling and analysis shall be undertaken after visual inspection and once the encapsulant has dried. Selection of location and number of samples shall be the responsibility of the Project Monitor. Air monitoring volumes shall be sufficient to provide a detection limit of 0.010 fibers/cc using NIOSH-approved method. Maximum acceptable levels for air samples shall be 0.010 fibers/cc or less. Alternately, the clearance air testing shall utilize the procedures outlined in 40 CFR, Part 763, Appendix A to Subpart E Interim Transmission Electron Microscopy (this procedure may be mandatory) per Federal and State regulations.
- B. Areas which do not comply with the Standard for Cleaning for Initial Clearance shall continue to be cleaned by and at the Contractor's expense until the specified Standard of Cleaning is achieved as evidenced by results of air testing as previously specified. If the area should initially fail to pass the clearance testing criteria, the Contractor shall pay any additional charges for all subsequent air

clearance testing for that area.

C. Upon successful compliance with the Standard of Cleaning for Initial Clearance, mandatory respiratory protection for workers engaged in re-spray or finishing work in the Work Area may be waived at the discretion of the Contractor.

**9.04 POST-ABATEMENT CLEARANCE REQUIREMENTS**

A. Sampling shall not begin until at least 12 hours after wet cleaning has been completed and no visible pools of water or condensation remain.

B. Samplers shall be placed at random around work area. If the work area contains floor area, a sampler shall be placed in each room. When the number of rooms is greater than the required number of samples, a representative sample of rooms shall be selected.

C. The following aggressive sampling procedures shall be used within the work area during all clearance air monitoring:

1. Before starting the sampling pumps, use forced air equipment (such as a one horse-power leaf blower) to direct exhaust air against all surfaces, including, but not limited to: walls, ceilings, floors, ledges and other surfaces in the work area. This pre-sampling procedure shall take at least 5 minutes per 1,000 sq. ft. of floor area; then at other intervals during sampling period to keep mixing air.
2. Start the sampling pumps and sample for the required time or volume.
3. Turn off the pump and then the fan(s) when sampling is completed.

D. Each homogeneous work area, which does not meet the clearance criteria, shall be thoroughly recleaned using wet methods, with the negative pressure ventilation system in operation. New samples shall be collected in the work area as described above. The process shall be repeated until the work site passes the test with the cost of re-sampling borne entirely by the Contractor.

E. For an asbestos project with more than one homogeneous work area, the release criterion shall be applied independently to each work area.

**9.05 ANALYSIS AND REPORTING RESULTS**

Laboratory analyses shall be considered evidence of compliance with these regulations only if they conform to the following requirements:

A. During abatement activities, turnaround time for analytical results by PCM of air samples shall be 24 hours or less.

B. Preparation and analysis of area samples by PCM shall be by NIOSH Method 7400, using "A Rules".

C. PCM analysis results shall be reported as a fiber concentration (f/cc) for each sample.

**9.06 ACTION CRITERIA**

A. Criteria during Abatement Activities

If air samples collected outside of the work area during abatement activities indicate airborne fiber concentrations greater than original background levels or greater than the 0.010 f/cc as determined by Phase Contrast Microscopy, whichever is larger, work shall stop for inspection, and the integrity of

## Asbestos Abatement Specification

Middlebrook School  
Window Replacement Project  
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barriers shall be restored. Clean-up of surfaces outside the work area using HEPA vacuums or wet cleaning techniques shall be done prior to resuming abatement activities.

- B. Clearance and/or Re-occupancy Criteria
  - 1. The clearance criteria shall be applied to each homogeneous work area independently.
  - 2. For PCM analysis, the clearance air monitoring shall be considered satisfactory when every sample is less than or equal to 0.010 fiber/cubic centimeter (f/cc).
  - 3. For TEM analysis, the clearance criteria shall comply with 40 CFR Part 763 (October 30, 1987).
  - 5. The turnaround time for all Clearance Air Results will be 24 hours from time of receipt by the laboratory. If the contractor elects a shorter period, he may do so upon payment in advance of any additional cost.

### **10.01 REINSTALLATION OF DISPLACED EQUIPMENT**

When clean-up is complete:

- 1. Relocate objects moved to temporary locations in the course of the work to their proper positions.
- 2. Re-secure mounted objects removed in the course of the work in their former positions.
- 3. Re-establish HVAC, mechanical and electrical systems in proper working order. Install new filters and dispose of used filters as asbestos contaminated waste.

### **10.02 DISPOSAL OF ASBESTOS CONTAINING MATERIALS AND ASBESTOS CONTAMINATED WASTE**

- A. Any disposal of asbestos materials and asbestos waste within Connecticut must be authorized by the Office of Solid Waste Management pursuant to Section 22a-209-8(i) of the administrative regulations of the Department of Environmental Protection, State of Connecticut. Contractor will place on site a disposal container(s) of sufficient capacity for the asbestos waste generated. All applicable NESHAP - 40 CFR Part 61 requirements must be followed.

#### **B. GENERATOR AND/OR HAULER REQUIREMENTS**

- 1. The asbestos materials shall be packaged in leak tight containers (i.e., six (6) mil plastic bags) and the container and/or truck used to transport the material shall be lined with six (6) mil polyethylene sheeting or equivalent.
- 2. All containers must be labeled in large legible letters in accordance with OSHA Regulation 29 Part CFR 1910.1001 and Part 1926.1101 49, CFR Parts 171 and 172, and 40 CFR Part 61.
- 3. The landfill accepting the wastes must be notified before shipping for scheduling to insure that adequate personnel and apparatus are available at the time of disposal.
- 4. The asbestos must be delivered in separate shipments. It must not be transported with any other materials.

### **10.03 ADDITIONAL REQUIREMENTS**

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- A. All applicable rules and regulations as required by the department of Labor's Occupational Safety and Health Standards, the United States Environmental Protection Agency's regulations on National Emission Standards for Hazardous Air Pollutants and the Department of Transportation regulations for the transportation of asbestos containing material, shall be followed. After full compliance with the above requirements is established the Contractor will be released from the project.

### 11.01 **AIR MONITORING AND ANALYSIS - Contractor Responsibility**

- A. Air sampling shall be conducted by the Contractor, as necessary, to assure that workers are using appropriate respiratory protection in accordance with OSHA Standard 29 CFR Part 1910.1001 and Part 1926.1101.
- B. DOCUMENTATION OF AIR SAMPLING RESULTS MUST BE RECORDED AT THE WORK SITE WITHIN TWENTY-FOUR (24) HOURS AND BE AVAILABLE FOR REVIEW BY THE PROJECT MONITOR EMPLOYED BY THE OWNER, UNTIL THE JOB IS COMPLETE. UPON COMPLETION OF THE JOB, THESE ARE TO BE FORWARDED TO THE OWNER.
  - 1. Samples shall be analyzed in accordance with Appendix A to Section 1926.1101-OSHA Reference Method.
- C. OSHA air monitoring schemes and inspections shall be conducted by a person qualified to perform these duties. This professional must be knowledgeable and responsible for evaluation of worker protection equipment and procedures.
- D. PCM Air sampling analysis must be performed by individuals trained in the National Institute for Occupational Safety and Health (NIOSH) 582 (Method 7400) Equivalent course on Asbestos Air Sampling and Analysis and be a proficient participant in the Asbestos Analytic Registry Program for Asbestos. Documentation of individual air sample analysis qualifications must be provided to the Owner or their designated agent.
- E. All samples must be analyzed by a State of Connecticut, Department of Public Health Approved Environmental Laboratory.
- F. The contractor shall have TWA and excursion air results on site within 24 hours of sampling. The contractor, at a minimum, must comply with the chart below. All individuals involved in Class I work must use PAPR respirator protection at a minimum. Half face respirators are not acceptable when performing Class I work.

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<b>Stop Work Level (f/cc)</b>	<b>Required Respirator</b>	<b>Minimum Protection Factor</b>
.1	Half Face	10
.5	PAPR	50
1.0	Tyvec Pressure Demand	100

**PRE-RENOVATION HAZARDOUS MATERIALS INSPECTION  
For Window Replacement Project**

**PERFORMED AT:**

**Middlebrook Elementary School  
220 Middlebrooks Avenue  
Trumbull, CT**

**PREPARED FOR:**

**Mr. Steve Kennedy  
Trumbull Public Schools  
6254 Main Street  
Trumbull, CT 06611**

**PREPARED BY:**



**ENVIRONMENTAL, LLC**

**AMC ENVIRONMENTAL, LLC  
P. O. BOX 423  
STRATFORD, CONNECTICUT 06615  
(203) 378-5020**

**Inspection Date: April 9, July 17 & 19, 2012  
Report Date: July 2012**

## **1.0 INTRODUCTION**

On April 9, July 17 and July 19, 2012, AMC Environmental, LLC conducted a pre-renovation hazardous materials inspection at Middlebrook Elementary School, located at 220 Middlebrooks Avenue in Trumbull, CT. The purpose of the Inspection was to identify potential hazardous building materials that may be associated with the various types of window systems present throughout the building. The inspection included all window systems scheduled to be replaced during this project. The scope of this inspection is limited to the materials described below.

### **Asbestos Containing Materials (ACM)**

The asbestos inspection was conducted in accordance with the Asbestos Hazard Emergency Response Act (AHERA), a provision of the Toxic Substances Control Act, which became law in 1986. Connecticut Regulations for Asbestos Work in Schools section 19a-333a states that schools must inspect any suspect material prior to disturbing it.

Asbestos inspection performed by: Richard Onofrio

State of Connecticut Licensed Asbestos Inspector  
License # 000715

Justin Proto

State of Connecticut Licensed Asbestos Inspector  
License # 000697

### **Lead Based Paint**

The lead-based paint screen was performed to satisfy the requirements set by the State of Connecticut Department of Environmental Protection (DEP), Bureau of Waste Management "Guidance for the Management and Disposal of Lead-Contaminated Materials Generated in the Lead Abatement, Renovation, and Demolition Industries".

Additionally, OSHA regulates lead dust exposure to workers in the construction industry under 29 CFR 1926.62 Lead in Construction.

The lead based paint screen was performed by Richard Onofrio; a State of Connecticut Licensed Lead inspector/Risk Assessor (License # 002217).

### **Polychlorinated Biphenyls (PCBs)**

The PCB inspection was performed to satisfy the Toxic Substances Control Act (TSCA) of 1976. This authorized U.S. EPA to control substances that were determined to cause unreasonable risk to public health or the environment. In 1979 the U.S. EPA banned the manufacture of new products containing PCBs and developed regulatory requirements for

the storage, labeling, use, and disposal of materials containing PCBs at levels above the regulatory thresholds. As a result, caulking materials with concentrations above 50-ppm must be managed as PCB wastes and removed following special procedures. PCB concentrations below this threshold of 50 ppm are overseen on the state level and regulated by the State of Connecticut Department of Energy and Environmental Protection (DEEP).

## **2.0 BUILDING DESCRIPTION**

Middlebrook Elementary School is a two story building located at 220 Middlebrooks Avenue in Trumbull, Connecticut. AMC sampled and assessed the window systems and their components throughout the school prior to the start of a proposed window replacement project. Testing was conducted wing by wing and windows were categorized by window type.

All windows assessed were of metal clad construction with either a stone, concrete, or wood sill. All windows were installed within painted concrete block or brick construction. Typically, all windows contained interior and exterior window glazing compound and window frame caulk. The majority of the window frame caulk identified throughout the building was present on the exterior of the windows; however caulk on the interior did exist (see **Appendix D** for diagrams).

## **3.0 ASBESTOS CONTAINING MATERIALS**

### **Inspection**

This asbestos-containing materials inspection included interior and exterior caulking, window wrap, and glazing associated with several different window systems within Middlebrook School in Trumbull, CT. Semi-destructive testing techniques are utilized during the inspection process. Suspect building materials that are inaccessible for inspection and sampling are assumed to be ACM for the purpose of this report. Suspect materials for a project of this nature are generally located under windowsills, behind window panels or covers, behind window jambs, or in otherwise concealed areas of the window system.

During the inspection, the Inspector documents the location, quantity, class, and friability of each suspect material. Friability is an industry term that measures a materials resilience. Material that can be easily crumbled, pulverized, or reduced to powder (by hand) when dried is defined as being friable. Estimated quantities of identified ACM's are provided for positive material only. Each material is either quantified in square or linear footage, depending on the type of material. For a full list of ACM and Materials needing to be re-tested or assumed **see table 1**. For a full list of all non-asbestos containing materials tested **see table 2**.

### **Bulk Sampling**

The United States Environmental Protection Agency (USEPA) has separated ACM into three categories. These categories are: Thermal System Insulation (TSI), Surfacing Materials, and Miscellaneous materials. TSI includes all materials that are used to prevent heat loss or gain, or water condensation on mechanical systems. Examples of TSI are pipe covering, boiler insulation, duct wrap, and mudded fitting cement. Surfacing includes any material that sprayed, towed, or otherwise to an existing surface. Surfacing applications are commonly used in fireproofing and acoustical applications. All other material fall into the miscellaneous category such as vinyl floor tiles, ceiling tiles and drywall. All sampling methods and sampling quantities are collected at AMC's discretion and meet or exceed requirements set by the USEPA.

### **Bulk Sample Analysis**

Samples of suspect materials are transmitted directly to an independent, State of Connecticut Department of Public Health (DPH), laboratory for analysis by Polarized Light Microscopy (PLM). PLM is the acceptable method of analysis in accordance with the Environmental Protection Agency (EPA) "Interim Method for the Determination of Asbestos in Bulk Insulation", 40 CFR 763, Subpart F, Appendix A EPA 600/M4-82-020. The Inspector collected "sets" of samples for each homogenous material sampled. Each sample is analyzed in the set until one sample is determined to contain asbestos (more than 1%). Sample analyses are reported in percentage of asbestos. The USEPA defines ACM as any material that contains more than 1 % asbestos, by way of PLM. "NAD", refers to "No asbestos Detected", and "DNA" refers to "Did Not Analyze" due to stop at first positive. The State of Connecticut Department of Public Health, the USEPA, as well as the United States Department of Labor regulate any material determined to contain greater than 1% of asbestos.

### **Friable ACM**

Other analytical methods are recommended for certain friable material samples. The Point Count Method can further analyze friable materials shown to contain less than 10% asbestos by PLM analysis. Recommended, by the United States Environmental Protection Agency, the Point Count Method is accepted as providing accurate analytical results when determining the percent content of bulk samples with very low asbestos concentrations. Friable material containing less than 1 % asbestos must be analyzed by the (PLM) Point Count Method.

### **Non-Friable ACM**

Non-friable asbestos samples showing percentages containing less than 1%, NAD, or "TRACE", should be confirmed by the "NOB TEM ELAP 198.4 Method". This procedure is recommended by the USEPA. If the results from this analysis determine asbestos content to still be less than 1 %, the sample is considered not to be asbestos containing.

#### **4.0 Conclusion**

During the course of the building inspection, a total of sixty-eight (68) samples of suspect ACM were collected, all of which were analyzed by PLM "stop on first positive".

From the sixty-eight (68) samples, six (6) ACM samples were identified. The materials identified include brown adhesive associated with wood window sills in the C-wing, window glazing compound associated with several different window types, exterior window frame caulk on type 1 windows, exterior window frame caulk on type 2 windows – top and bottom layers and exterior window frame caulk on wood windows. Samples obtained are representative and may not fully represent all materials present within each window type. This inspection is a preliminary assessment and additional sampling will be needed fully grasp the extent of asbestos containing materials within the school (see **Table 1** for a complete list of ACM and their locations).

Additionally there were two samples of window-glazing compound that documented <1% asbestos. AMC recommends these samples be re-tested using a stronger analysis known as the TEM NOB method, to confirm the concentration of asbestos in these materials. Generally, when samples documenting trace amount of asbestos (<1%) are analyzed under further magnification (TEM), asbestos is typically detected significantly higher then shown by PLM analysis. There was also one sample that documented no asbestos detected, however the lab recommended further testing using TEM NOB method. Although the State of Connecticut Department of Public Health does not regulate materials containing less than 1 %, OHSA standards and regulations still apply with any detectable amount of asbestos (see **Appendix A** for Analytical Results).

**All regulated friable and non-friable asbestos containing material must be removed prior to demolition or renovations in which these materials will be disturbed. A State of Connecticut Licensed Abatement Contractor must be used to perform the removal work. A visual inspection must be performed by a Licensed Project Monitor at the completion of the abatement for each work area. Re-occupancy air clearance is required prior to any person re-entering the area.**

**The Abatement Contractor must submit a 10 day notice for asbestos abatement exceeding 10 linear feet or 25 square feet, to the State of Connecticut Department of Public Health. This notification can be hand delivered or postmarked 10 days prior to the start of asbestos abatement. For abatement jobs involving less than these threshold quantities, only a demolition notification is required.**

## **5.0 RECOMMENDATIONS CONCERNING ASBESTOS**

Laws govern all asbestos activities undertaken in the State of Connecticut. AMC Environmental, LLC suggests the following to ensure compliance with state, federal, or local asbestos regulations and to reduce possible liabilities.

- State of Connecticut, Department of Public Health; Standards for Asbestos Abatement (19a-332-1a through 19a-332a-16).
- State of Connecticut Licensure and Training Requirements for Persons Engaged in Asbestos Abatement and Consultation Services Section 20-440-1 through 20-440-9.
- The Federal Regulation governing asbestos is Title 40 of the Code of Federal Regulations (40 CFR), Part 61, Subpart M, Demolition and/or Renovation of Facilities with Asbestos-Containing Materials.

The following recommendations pertain to asbestos removal projects.

- A Licensed Asbestos Project Designer should develop a plan or specification to ensure asbestos is removed in a safe and proper manner. At a minimum, these specifications should include an effective asbestos removal plan, a thorough health and safety plan, reference to applicable legal standards, necessary regulatory notification, adequate insurance requirements and proper bidding procedures.
- A Licensed Project Monitor should monitor the asbestos removal. At a minimum, monitoring activities should include air sampling (before, during and after), inspection of contractor work practices and maintaining a daily monitoring log to thoroughly document removal activities.
- A Licensed Contractor must perform the asbestos removal.

### **Inaccessible Areas**

The windows were inspected before removal. Additional materials may be present behind casings, sills, or jambs that were not accessible at the time of the inspection. Additionally, testing was representative in nature and all materials may not have been identified in this preliminary assessment.

### **Disclaimer**

Any work performed by AMC Environmental, LLC was done using the degree of care and skill ordinarily exercised under similar circumstances by members of the profession practicing in the same or similar capacity. The standard of care shall exclusively be judged as of the date of services rendered and not according to later standards. The

conclusions and recommendations contained in this report are based on limited environmental sampling and visual observations, and were arrived at in accordance with generally accepted standards of industrial hygiene practice. No other warranty, expressed or implied, is made.

**TABLE 1**  
**ASBESTOS CONTAINING MATERIALS SUMMARY**

**TABLE 1**  
**ASBESTOS CONTAINING MATERIALS**  
**SUMMARY TABLE**

Middlebrook School  
 Trumbull, CT

AMC Tracking # ASB071228		Laboratory: EMSL Analytical, Inc.		Laboratory Order # 031223814			
LOCATION(S)	MATERIAL TYPE	SAMPLE #	CLASS	BULK SAMPLE ANALYSIS RESULTS		QUANTITY*	F/NF
				PLM	PC	TEM NOB	ACM
C-1, C-2, C-3, C-7	Brown adhesive associated w/ wood window sill	0717/JP-07 0717/JP-08	MISC	15% Chrys 20% Chrys		YES	TBD
Façade A, D (Type 1)	Window glazing compound on metal sash	0719/JP-17 0719/JP-18 0719/JP-19	MISC	2% Chrys		YES	TBD
Façade A, D (Type 1)	Window frame caulk on brick, bottom layer	0719/JP-23 0719/JP-24 0719/JP-25	MISC	2% Chrys		YES	TBD
Façade A, B, courtyard (Type 2)	Window frame caulk on brick, top layer	0719/JP-29 0719/JP-30 0719/JP-31	MISC	3% Chrys		YES	TBD
Façade A, B, courtyard (Type 2)	Window frame caulk on brick, bottom layer	0719/JP-32 0719/JP-33 0719/JP-34	MISC	2% Chrys		YES	TBD
Façade A	Wood window frame caulk	0719/JP-37 0719/JP-38	MISC	3% Chrys 4% Chrys		YES	TBD
<b>Estimated Quantity:</b>		<b>ANALYTICAL METHODS:</b>					
<b>KEY:</b>		SF - Square Feet LF - Linear Feet Chrys - Chrysotile Amos - Amosite Anth - Anthophyllite Trem - Tremolite Croc - Crocidolite					
NA - Not Analyzed NAD - No Asbestos Detected F - Friable NF - Non-Friable TSI - Thermal Systems Insulation SURF - Type of Surfacing Material MISC - Miscellaneous Material		PLM PC - EPA 600/R-93/116 Quantitation 400 Point Count TEM NOB - New York ELAP 198.4 Method PLM - EPA 600-R-93/116 Method PS - Previously Samples ACM - Asbestos Containing Material ASSD - Assumed Asbestos Containing Material					

\* Please Note: Quantities are estimates. Determination of exact quantities for bidding purposes is the sole responsibility of the contractor

**Samples Analyzed By EPA Method 600/R-93/116 (PLM)  
IN ACCORDANCE WITH STATE OF CONNECTICUT REGULATIONS Section 19a:333-5**

**NOTE**

Polarized Light Microscopy may not consistently detect asbestos in samples of roofing, flashing, floor tile, mastic and similar non-organically bound materials. Transmission Electron Microscopy is currently the only method that can definitely determine if this material contains asbestos > 0.1% by weight. However, the State of Connecticut Regulations state that bulk samples shall not be composited for analysis and shall be analyzed for asbestos content by polarized light microscopy (PLM), using the "Interim Method for the Determination of Asbestos in Bulk Insulation Samples" found at Appendix A to subpart F in 40 CFR Part 763 as amended, or the current EPA method for the analysis of asbestos in building materials by polarized light microscopy.

**TABLE 2**  
**NON-ASBESTOS CONTAINING MATERIALS**

**TABLE 2**  
**NON-ASBESTOS CONTAINING MATERIALS**  
**SUMMARY TABLE**

Middlebrook School  
Trumbull, CT

AMC Tracking # ASB071228	Lab: EMSL Analytical, Inc.	Lab # 031223814
Sample #	Sample Location	Sample Description
0409/RO-01	Room A-6	Interior metal window glazing compound
0409/RO-02	Room A-10	Interior metal window glazing compound
0409/RO-03	Room A-6	Cream colored tile board over radiator
0409/RO-04	Room A-10	Cream colored tile board over radiator
0409/RO-05	Room A-10	Silicone replacement window glazing compound over original
0409/RO-06	Room A-10	Silicone replacement window glazing compound over original
0409/RO-07	Room A-12	Gray ceramic tile grout at window sill
0409/RO-08	Hallway to TLC	Stone window sill
0409/RO-09	Hallway to TLC	White metal window frame caulk
0409/RO-10	Hallway to TLC	White metal window frame caulk
0409/RO-11	Hallway to TLC	Brown metal window glazing compound
0409/RO-12	Hallway to TLC	Brown metal window glazing compound
0409/RO-13	TLC Room	White metal window frame caulk
0409/RO-14	TLC Room	White metal window frame caulk
0409/RO-15	TLC Room	Black window glazing compound
0409/RO-16	TLC Room	Black window glazing compound
<b>0409/RO-17</b>	<b>Room B-7</b>	<b>Metal window glazing compound</b>
<b>0409/RO-18</b>	<b>Room B-7</b>	<b>Metal window glazing compound</b>
0717/JP-01	C-Wing	Ceramic tile thinset
0717/JP-02	C-Wing	Ceramic tile thinset
0717/JP-03	C-1	Sheetrock
0717/JP-04	C-7	Sheetrock
0717/JP-05	C-1	Window glazing compound on metal sashes
0717/JP-06	C-7	Window glazing compound on metal sashes
0717/JP-09	D-6	Grey metal window glazing compound
0717/JP-10	D-3	Grey metal window glazing compound
0717/JP-11	D-3	Grey window frame caulk on 1 opening
0717/JP-12	D-3	Grey window frame caulk on 1 opening
0717/JP-13	Café	White wood window glazing compound
0717/JP-14	Café	White wood window glazing compound
0717/JP-15	Media Center	Grey metal window glazing compound
0717/JP-16	Media Center	Grey metal window glazing compound
0719/JP-20	Façade A	Type 1 window frame caulk on brick top layer
0719/JP-21	Façade D	Type 1 window frame caulk on brick top layer
0719/JP-22	Façade D	Type 1 window frame caulk on brick top layer
0719/JP-26	Façade A	Type 2 window glazing compound on metal sash
0719/JP-27	Façade B	Type 2 window glazing compound on metal sash
0719/JP-28	Courtyard	Type 2 window glazing compound on metal sash

**TABLE 2**  
**NON-ASBESTOS CONTAINING MATERIALS**  
**SUMMARY TABLE**

Middlebrook School  
Trumbull, CT

Sample #	Sample Location	Sample Description
0719/JP-35	Façade A	Wood window glazing compound
0719/JP-36	Façade A	Wood window glazing compound
0719/JP-39	Façade A	Wood window frame caulk bottom layer on brick
0719/JP-40	Façade A	Wood window frame caulk bottom layer on brick
0719/JP-41	Façade A – LL	Grey window frame caulk on brick assoc. w/ Type 4
0719/JP-42	Façade A – LL	Grey window frame caulk on brick assoc. w/ Type 4
0719/JP-43	Façade A – LL	Black window glazing compound on metal sash assoc. w/ Type 4
0719/JP-44	Façade A – LL	Black window glazing compound on metal sash assoc. w/ Type 4
0719/JP-45	Façade B	Grey window sill caulk top layer
0719/JP-46	Façade B	Grey window sill caulk at brick window frame
0719/JP-47	Façade C	Grey window frame caulk on Type 5
0719/JP-48	Façade D	Grey window frame caulk on Type 5
0719/JP-49	Façade D	Bottom layer dark grey window frame caulk
0719/JP-50	Façade D	Bottom layer dark grey window frame caulk

***\*Samples in italic and bold documented <1% asbestos. Further testing using TEM NOB method is recommended, if not further analyzed samples can be considered non-asbestos containing and can be discarded as construction debris. However OSHA work practices and regulations apply.***

## 6.0 LEAD-BASED PAINT

### X-Ray Fluorescence Screen

The lead-based paint screening was performed using an X-Ray Fluorescence (XRF) Radiation Monitoring Device (RMD) Lead Paint Analyzer (LPA 1), serial number 1326. The screen includes accessible surfaces and building materials within the inspection area. The lead screen tests limited components and surfaces throughout the building. It is not intended to test all painted surfaces, but to achieve a representation of painted components for the purpose of characterizing the waste stream.

The X-ray Fluorescence Analyzer (XRF) is the most common and accepted means of field-testing for lead in paint. The XRF detects lead through gamma ray technology. It is designed to measure the total weight of lead in a measured area. The results are reported in milligrams per centimeter squared ( $mg/cm^2$ ). Most states have set a legal limit for lead in paint; Connecticut uses the  $1.0mg/cm^2$  threshold. The lead screen provides the data necessary to accurately identify the waste streams that will be generated as a result of the renovation activities. These waste streams can then be evaluated by the Toxicity Characteristic Leachate Procedure (TCLP) test to determine if the waste will need to be discarded as hazardous lead waste or non-hazardous solid waste.

The computer generated lead-based paint inspection report is provided in Appendix A. The report consists of three (3) sections: a coversheet, summary report, and detailed report. Surfaces with results greater than  $1.0 mg/cm^2$  can be found in the summary report. All surfaces tested can be found in the detailed section of the report. The condition of the paint is also noted for each surface or component tested by either an "I" for Intact or a "P" for Poor. The Location of surfaces tested is illustrated by letters. "A" refers to street side, followed by B, C, and D, in a clockwise pattern.

### Worker Protection

Toxic level lead-based paint as defined by the State of Connecticut Regulations means a level of lead which when present in a dried paint, plaster or other accessible surface in a residential dwelling contains more than 0.50 percent lead by dry weight as measured by atomic absorption spectrophotometry (AAS), or 1.0 milligrams lead per square centimeter of surface as measured on site by an X-ray fluorescence analyzer or other equipment deemed sufficiently accurate and reliable by the commissioner. OSHA regulates lead dust exposure to workers under 29 CFR 1926.62 and considers any detectable level of lead in paint (above or below Connecticut's level) to be a concern. Therefore OSHA requires exposure assessments be conducted for each task where painted surfaces or components are disturbed.

### Lead Waste Characterization

The State of Connecticut Department of Environmental Protection regulates the disposal of hazardous waste. Lead containing waste is analyzed by a procedure known as a TCLP or Toxicity Leachate Procedure (Regulation of State DEP 22a-449C-101). This analytical test determines a buildings material waste classification.

The TCLP test requires a 100-gram sample of waste material, which is then analyzed and assessed for its ability to leach out lead into the environment. The waste is classified as AMC Environmental, LLC  
Stratford, CT

hazardous waste if the sample results are greater than 5.0 mg/l of lead. The wastes are classified as non-hazardous if the TCLP sample result is less than this threshold. All materials and components containing equal to or greater than 1.0mg/cm<sup>2</sup> of lead by XRF requires waste classification analysis.

## **Results**

### **XRF Testing Results**

Eighteen (18) XRF readings were collected during the lead-based paint screen of the building windows and surrounding walls. The lead-based paint screen identified no actionable levels of lead paint over the threshold of 1.0mg/cm<sup>2</sup>. Surfaces tested were representative throughout the school. Only surfaces that will be potentially disturbed during the window replacement project were tested. The windows throughout the school are of metal construction and with a factory milled finish. If additional surfaces are anticipated to be disturbed during the renovation project that are not listed in this report, further sampling will be required. No other environmental sampling such as dust wipes or soil samples were collected during this assessment.

A complete inventory of tested building materials is illustrated in Detailed Reports and can be found in **Appendix B**.

## **Conclusion**

No (0) surfaces tested document the presence of toxic lead-based paint. No further action is necessary at this time. However, AMC recommends obtaining baseline lead in dust and soil concentrations prior to any renovation activities. This will assist in identifying all potential hazards associated with lead-paint and ensure the environmental conditions both prior to and following the replacement project. Initial exposure assessments must be performed on employees who engage in activities that disturb building materials with any detectable levels of lead in paint. Personal protective equipment must be provided to employees during such activities. Lead safe work practices and protocols must be followed. If the scope of work changes and includes surfaces not included in this report, additional sampling must be performed prior to the commencement of work.

## 7.0 (PCB's) POLYCHLORINATED BIPHENYLS

### Inspection

PCB's can be found in a variety of items including transformers, capacitors, fluorescent light ballast, and other oil-containing equipment. Certain building materials such as flooring, caulking, roofing and insulation can also contain these materials. This PCB inspection focused on the caulking and window glazing associated with the various window systems found within the school. PCB's were extensively used between 1950 through 1977 in caulking material.

Potential PCB-containing caulking can exist in buildings constructed or renovated between 1950 and 1980. PCB caulking and glazing compounds can be found around windows frames and sills, door frames, masonry columns and other masonry building materials on interior and exterior surfaces, as well as in expansion joints. PCB containing items must be managed and disposed of properly in accordance with special requirements. Representative samples of caulking and window glazing material from the building's window systems were tested prior to the start of the window replacement project. Samples were obtained from both interior and exterior window components. If the results of the samples prove to be contaminated with PCB's, the surrounding soils and substrates also need to be surveyed to assess the potential for residual PCB contamination. PCB-containing caulking may leach PCBs into adjacent surfaces such as brick, block or soils.

PCB concentrations in original caulking can vary from less than 50 parts per million (ppm) up to and exceeding 200,000 ppm. In locations where the original caulking has been replaced, PCBs may have leached into the surrounding substrate. In those locations where new caulking has replaced the original PCB caulking, PCBs may have also leached back into the new caulking at concentrations above the 50-ppm regulatory threshold.

Currently, the USEPA regulates the disposal of this material under the Toxic Substance Control Act (40 CFR761.62. The Toxic Substances Control Act (TSCA) of 1976 authorized U.S. EPA to control substances that were determined to cause unreasonable risk to public health or the environment. In 1979 the U.S. EPA banned the manufacture of new products containing PCBs and developed regulatory requirements for the storage, labeling, use, and disposal of materials containing PCBs at levels above the regulatory thresholds. In addition, the regulations under TSCA specify allowed or authorized uses of PCBs in certain situations. If a material or item is not specifically listed it is considered unauthorized. The U.S. EPA considers building materials containing PCBs, including caulking with PCB concentrations exceeding 50-ppm to be an unauthorized use. As a result, caulking materials with concentrations above 50-ppm must be managed as PCB wastes and removed following special procedures. PCB concentrations below this threshold of 50 ppm are overseen on the state level and regulated by the State of Connecticut Department of Environmental Protection (DEP). Safe work practices are still necessary when workers are exposed or renovations disturb concentrations below this limit, and the waste generated is required to be properly disposed of properly.

## Results

A total of eight (8) interior and fifteen (15) exterior bulk samples of window frame caulking and glazing were tested from the building. Of the twenty-three (23) samples, two (2) interior samples and two (2) exterior samples identified the presence of PCB's greater than the threshold level of 50 parts per million (ppm). However, EPA states that slightly elevated PCB concentrations that are under the 50 ppm may still need to be categorized under TSCA. The reasoning is that the caulk may have been at one time above the 50 ppm threshold or that new caulk was applied over the original PCB containing caulk and the PCB's leached into the new caulk. Therefore, based on the data, additional samples require further testing and evaluation before the samples can be considered a non-TSCA regulated material. This inspection is only a preliminary assessment and additional materials must be collected to confirm or deny the presence of PCBS within the caulking and glazing as well as the location of these materials (see **Appendix C** for analytical results).

**1 PPM (parts per million) = 1 mg/Kg**

Sample Number	Component	Window Type	Location	Result in mg/Kg
0409PCB-01	Window glazing compound (composite)	1	Room A-6 – Interior	3,000
0409PCB-02	Window glazing compound	5	Hallway to TLC – Interior	82
0409PCB-03	Window glazing compound	2	Room B-7 – Interior	9.1
0717PCB-01	Window frame caulk	5	TLC Room – Interior	3.4
0717PCB-02	Window glazing compound	5	TLC Room – Interior	4.4
0717PCB-03	Window glazing compound	2	Room C-7 – Interior	16
0717PCB-04	Window glazing compound	2	Room D-6 – Interior	12
0717PCB-05	Window frame caulk	2/4	Room D-3 – Interior	ND
0719PCB-01	Window frame caulk	1	Facade A – Exterior	ND
0719PCB-02	Window frame caulk	2	Facade A – Exterior	ND
0719PCB-03	Window glazing compound	1	Facade A – Exterior	1.3
<b>0719PCB-04</b>	<b>Window glazing compound</b>	<b>2</b>	<b>Facade A – Exterior</b>	<b>50</b>
0719PCB-05	Window frame caulk	3	Facade A – Exterior	1.1
0719PCB-06	Window glazing compound	3	Facade A – Exterior	ND
0719PCB-07	Window frame caulk	3	Facade A – Exterior	5.9
0719PCB-08	Window frame caulk	4	Facade A – Exterior (LL)	ND
0719PCB-09	Window glazing compound	4	Facade A – Exterior (LL)	ND
0719PCB-10	Window sill caulk		Facade B – Exterior	2.2
0719PCB-11	Window glazing compound	2	Facade B – Exterior	ND
0719PCB-12	Window frame caulk	5	Facade C – Exterior	5.2
<b>0719PCB-13</b>	<b>Window frame caulk</b>	<b>5</b>	<b>Facade D – Exterior</b>	<b>17,100</b>

Sample Number	Component	Window Type	Location	Result in mg/Kg
0719PCB-14	Window frame caulk (composite)	1	Courtyard	3.9
0719PCB-15	Window frame caulk (composite)	2	Courtyard	16

**Samples listed in bold exceed the 50 ppm threshold set by the USEPA.**

***Samples with concentrations >1 ppm exceed the State of CT DEEP threshold.***

### Conclusion

Initial composite and isolated samples of caulking and glazing compound were obtained from the interior and exterior of the school window systems. Both the interior and exterior samples identified elevated levels of PCB's in the window frame caulk and window glazing. Both TSCA and non-TSCA concentrations were found. Sampling was representative based on window type and building material description. Other factors that were considered are building construction dates. Additional testing is needed to properly characterize and isolate PCB and non-PCB containing materials. In some cases, caulking and or glazing that contained PCB's also were identified as being an asbestos containing material. Materials that contain PCB's >50 ppm with asbestos that is >1% are considered a mixed waste and must be disposed of as such. For materials that contain <50ppm of PCB's and >1% asbestos, the asbestos supersedes the PCB's.

Due to the high levels of some of the sample results, notification to the EPA is required and removal of the contaminated caulk and glazing is mandatory. Once a comprehensive inspection is conducted, soil and substrate testing at and around the windows where PCB's were identified is needed in order to accurately identify the extent of the PCB contamination and migration path. Once all additional testing is complete, a PCB Remediation plan must be developed and submitted for approval to the United States Environmental Protection Agency Region 1 office.

Report Written by:



Richard Onofrio  
Environmental Consultant

Report Reviewed by:



Jason Pringle  
Principal

Pre-Renovation Hazardous Materials Report  
Middlebrook Elementary School, Trumbull, CT  
Window Replacement  
July 2012  
Page 14

## **APPENDIX A**

### **LABORATORY RESULTS – ASBESTOS**



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Received: 07/27/12 10:59 AM  
Analysis Date: 7/28/2012  
Collected: 7/27/2012

Project: ASB071228/ MIDDLEBROOK SCHOOL TRUMBULL

### Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 and/or EPA 600/M4-82-020 Method(s) using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos		Asbestos			
			%	Fibrous	%	Non-Fibrous	%	Type
0409/RO 01 031223814-0001	ROOM A-6/ INTERIOR METAL WINDOW GLAZING COMPOUND	Gray Non-Fibrous Heterogeneous			60%	Non-fibrous (other)		None Detected
					40%	Ca Carbonate		
0409/RO 02 031223814-0002	ROOM A-10/ INTERIOR METAL WINDOW GLAZING COMPOUND	Gray Non-Fibrous Heterogeneous			55%	Non-fibrous (other)		None Detected
					45%	Ca Carbonate		
0409/RO 03 031223814-0003	ROOM A-6/ CREAM COLORED TILE BOARD OVER RADIATOR	Brown/Cream Fibrous Heterogeneous	80%	Cellulose	20%	Non-fibrous (other)		None Detected
0409/RO 04 031223814-0004	ROOM A- 10/CREAM COLORED TILE BOARD OVER RADIATOR	Brown Fibrous Heterogeneous	95%	Cellulose	5%	Non-fibrous (other)		None Detected
0409/RO 05 031223814-0005	ROOM A-10/ SILICONE REPLACEMENT WINDOW GLAZING - COMPOUND OVER ORIGINAL	Clear Non-Fibrous Heterogeneous			100%	Non-fibrous (other)		None Detected

Analyst(s)

Henry Akintunde (31)

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James Hall, Laboratory Manager  
or other approved signatory

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Samples analyzed by EMSL Analytical, Inc. New York, NY AIHA-LAP, LLC-IHLAP Lab 102581, NVLAP Lab Code 101048-9, NYS ELAP 11506, NJ NY022, CT PH-0170, MA AA000170

Initial report from 07/28/2012 11:38:13

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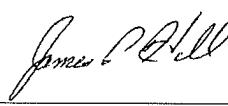
**Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 and/or EPA 600/M4-82-020 Method(s) using Polarized Light Microscopy**

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
0409/RO 06 031223814-0006	ROOM A-10/ SILICONE REPLACEMENT WINDOW GLAZING - COMPOUND OVER ORIGINAL	Clear Non-Fibrous Heterogeneous		100% Non-fibrous (other)	None Detected
0409/RO 07 031223814-0007	ROOM A- 12/GRAY CERAMIC TILE GROUT AT WINDOW SILL	Gray Non-Fibrous Heterogeneous		30% Non-fibrous (other) 40% Quartz 30% Ca Carbonate	None Detected
0409/RO 08 031223814-0008	HALLWAY TO TLC / STONE WINDOW SILL	Black Non-Fibrous Heterogeneous		65% Non-fibrous (other) 15% Ca Carbonate 20% Quartz	None Detected
0409/RO 09 031223814-0009	HALLWAY TO TLC / WHITE METAL WINDOW FRAME CAULK	White Non-Fibrous Heterogeneous		100% Non-fibrous (other)	None Detected
0409/RO 10 031223814-0010	HALLWAY TO TLC / WHITE METAL WINDOW FRAME CAULK	White Non-Fibrous Heterogeneous		100% Non-fibrous (other)	None Detected

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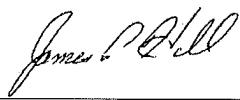
**Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 and/or EPA 600/M4-82-020 Method(s) using Polarized Light Microscopy**

Sample	Description	Appearance	Non-Asbestos		Asbestos	
			% Fibrous	% Non-Fibrous	%	Type
0409/RO 11 031223814-0011	HALLWAY TO TLC / BROWN METAL WINDOW GLAZING - COMPOUND	Gray/Green Non-Fibrous Heterogeneous		60% Non-fibrous (other) 40% Ca Carbonate		None Detected
TEM Recommended						
0409/RO 12 031223814-0012	HALLWAY TO TLC / BROWN METAL WINDOW GLAZING - COMPOUND	White Non-Fibrous Heterogeneous		70% Non-fibrous (other) 30% Ca Carbonate		None Detected
0409/RO 13 031223814-0013	TLC ROOM/ WHITE METAL WINDOW FRAME CUAULK	Gray Non-Fibrous Homogeneous		100% Non-fibrous (other)		None Detected
0409/RO 14 031223814-0014	TLC ROOM/ WHITE METAL WINDOW FRAME CUAULK	Gray/White Non-Fibrous Heterogeneous		100% Non-fibrous (other)		None Detected
0409/RO 15 031223814-0015	TLC ROOM / BLACK WINDOW GLAZING COMPOUND	Black Non-Fibrous Homogeneous		100% Non-fibrous (other)		None Detected
0409/RO 16 031223814-0016	TLC ROOM / BLACK WINDOW GLAZING COMPOUND	Black Non-Fibrous Heterogeneous		100% Non-fibrous (other)		None Detected

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Project: ASB071228/ MIDDLEBROOK SCHOOL TRUMBULL

**Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 and/or EPA 600/M4-82-020 Method(s) using Polarized Light Microscopy**

Sample	Description	Appearance	Non-Asbestos		Asbestos	
			% Fibrous	% Non-Fibrous	%	Type
0409/RO 17 031223814-0017	ROOM B-7/ METAL WINDOW GLAZING COMPOUND	Gray/White Non-Fibrous Heterogeneous		60% Non-fibrous (other) 40% Ca Carbonate	<1%	<b>Chrysotile</b>
0409/RO 18 031223814-0018	ROOM B-7/ METAL WINDOW GLAZING COMPOUND	Gray Non-Fibrous Heterogeneous		100% Non-fibrous (other)	<1%	<b>Chrysotile</b>
0717/JP01 031223814-0019	C-WING / CERAMIC TILE THINSET	Gray/White Non-Fibrous Heterogeneous		40% Non-fibrous (other) 40% Ca Carbonate 20% Quartz		<b>None Detected</b>
0717/JP02 031223814-0020	C-WING / CERAMIC TILE THINSET	Gray Non-Fibrous Heterogeneous		55% Non-fibrous (other) 30% Ca Carbonate 15% Quartz		<b>None Detected</b>
0717/JP03 031223814-0021	C-1/ SHEETROCK	White Non-Fibrous Heterogeneous		40% Non-fibrous (other) 60% Gypsum		<b>None Detected</b>
0717/JP04 031223814-0022	C-7/ SHEETROCK	Gray/White Non-Fibrous Heterogeneous		20% Non-fibrous (other) 35% Ca Carbonate 45% Gypsum		<b>None Detected</b>

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**Stratford, CT 06615**

Project: **ASB071228/ MIDDLEBROOK SCHOOL TRUMBULL**

**Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 and/or EPA 600/M4-82-020 Method(s) using Polarized Light Microscopy**

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
0717/JP05 031223814-0023	C-1/ WINDOW GLAZING COMPOUND ON METAL SASHES	Tan Non-Fibrous Heterogeneous	1% Fibrous (other)	44% Non-fibrous (other) 40% Ca Carbonate 15% Quartz	None Detected
TEM Recommended					
0717/JP06 031223814-0024	C-7/ WINDOW GLAZING COMPOUND ON METAL SASHES	Gray Non-Fibrous Heterogeneous	<1% Fibrous (other)	70% Non-fibrous (other) 30% Ca Carbonate	None Detected
TEM RECOMMENDED					
0717/JP07 031223814-0025	C-1// BROWN ADHESIVE ASSOC W/ WOOD WINDOW SILL	Brown Non-Fibrous Heterogeneous		85% Non-fibrous (other)	15% Chrysotile
0717/JP08 031223814-0026	C-7/ BROWN ADHESIVE ASSOC W/ WOOD WINDOW SILL	Black Fibrous Heterogeneous		80% Non-fibrous (other)	20% Chrysotile
0717/JP09 031223814-0027	D-6/ GREY METAL WINDOW GLAZING COMPOUND	Gray Non-Fibrous Heterogeneous	5% Fibrous (other)	55% Non-fibrous (other) 40% Ca Carbonate	None Detected
0717/JP10 031223814-0028	D-3/ GREY METAL WINDOW GLAZING COMPOUND	Gray Non-Fibrous Heterogeneous	2% Fibrous (other) 2% Cellulose	61% Non-fibrous (other) 35% Ca Carbonate	None Detected

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EMSL Order: 031223814  
 CustomerID: AMCT50  
 CustomerPO:  
 ProjectID:

Attn: **Jason Pringle**  
**AMC Environmental, LLC**  
**PO Box 423**  
**Stratford, CT 06615**

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 Fax: (203) 375-7344  
 Received: 07/27/12 10:59 AM  
 Analysis Date: 7/28/2012  
 Collected: 7/27/2012

Project: ASB071228/ MIDDLEBROOK SCHOOL TRUMBULL

**Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 and/or EPA 600/M4-82-020 Method(s) using Polarized Light Microscopy**

Sample	Description	Appearance	Non-Asbestos		Asbestos	
			% Fibrous	% Non-Fibrous	%	Type
0717/JP11 031223814-0029	D-3/ GREY WINDOW FRAME CAULK ON 1 OPENING	Gray Non-Fibrous Heterogeneous		60% Non-fibrous (other) 40% Ca Carbonate		None Detected
0717/JP12 031223814-0030	D-3/ GREY WINDOW FRAME CAULK ON 1 OPENING	Gray Non-Fibrous Heterogeneous		85% Non-fibrous (other) 15% Ca Carbonate		None Detected
0717/JP13 031223814-0031	CAFE / WHITE WOOD WINDOW GLAZING COMPOUND	Tan Non-Fibrous Heterogeneous		60% Non-fibrous (other) 40% Ca Carbonate		None Detected
0717/JP14 031223814-0032	CAFE / WHITE WOOD WINDOW GLAZING COMPOUND	Gray Non-Fibrous Heterogeneous		70% Non-fibrous (other) 30% Ca Carbonate		None Detected
0717/JP15 031223814-0033	MEDIA CENTER / GREY METAL WINDOW GLAZING COMPOUND	Gray/Green Non-Fibrous Heterogeneous	5% Cellulose	55% Non-fibrous (other) 40% Ca Carbonate		None Detected
0717/JP16 031223814-0034	MEDIA CENTER / GREY METAL WINDOW GLAZING COMPOUND	Gray Non-Fibrous Heterogeneous		80% Non-fibrous (other) 20% Ca Carbonate		None Detected

Analyst(s)

Henry Akintunde (31)

Jessica Cox (37)

James Hall, Laboratory Manager  
or other approved signatory

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**Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 and/or EPA 600/M4-82-020 Method(s) using Polarized Light Microscopy**

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
0719/JP17 031223814-0035	FACADE A/ TYPE 1 WINDOW GLAZING COMPOUND ON METAL - SASH	Gray Non-Fibrous Heterogeneous	1% Fibrous (other)	59% Non-fibrous (other) 40% Ca Carbonate	None Detected
0719/JP18 031223814-0036	FACADE D/ TYPE 1 WINDOW GLAZING COMPOUND ON METAL - SASH	Gray/Tan Non-Fibrous Heterogeneous		58% Non-fibrous (other) 40% Ca Carbonate	2% Chrysotile
0719/JP19 031223814-0037	FACADE D/ TYPE 1 WINDOW FRAME CAULK ON BRICK TOP - LAYER	Gray Non-Fibrous Heterogeneous		73% Non-fibrous (other) 25% Ca Carbonate	2% Chrysotile
0719/JP20 031223814-0038	FACADE A/ TYPE 1 WINDOW FRAME CAULK ON BRICK TOP - LAYER	White Non-Fibrous Heterogeneous		60% Non-fibrous (other) 40% Ca Carbonate	None Detected
0719/JP21 031223814-0039	FACADE D/ TYPE 1 WINDOW FRAME CAULK ON BRICK TOP - LAYER	White Non-Fibrous Heterogeneous		60% Non-fibrous (other) 40% Ca Carbonate	None Detected

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**Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 and/or EPA 600/M4-82-020 Method(s) using Polarized Light Microscopy**

Sample	Description	Appearance	Non-Asbestos		Asbestos	
			% Fibrous	% Non-Fibrous	%	Type
0719/JP22 031223814-0040	FACADE D/ TYPE 1 WINDOW FRAME CAULK ON BRICK TOP - LAYER	Gray Non-Fibrous Heterogeneous		70% Non-fibrous (other) 30% Ca Carbonate		None Detected
0719/JP23 031223814-0041	FACADE A/ TYPE 1 WINDOW FRAME CAULK ON BRICK - BOTTOM LAYER	Gray/Tan Non-Fibrous Heterogeneous		58% Non-fibrous (other) 40% Ca Carbonate	2%	Chrysotile
0719/JP24 031223814-0042	FACADE D/ TYPE 1 WINDOW FRAME CAULK ON BRICK - BOTTOM LAYER	Gray/Tan Non-Fibrous Heterogeneous		58% Non-fibrous (other) 40% Ca Carbonate	2%	Chrysotile
0719/JP25 031223814-0043	FACADE D/ TYPE 1 WINDOW FRAME CAULK ON BRICK	Gray Non-Fibrous Heterogeneous		78% Non-fibrous (other) 20% Ca Carbonate	2%	Chrysotile
0719/JP26 031223814-0044	FACADE A/ TYPE 2 WINDOW GLAZING COMPOUND ON METAL - SASH	Gray Non-Fibrous Heterogeneous		60% Non-fibrous (other) 40% Ca Carbonate		None Detected
0719/JP27 031223814-0045	FACADE B/ TYPE 2 WINDOW GLAZING COMPOUND ON METAL - SASH	White Non-Fibrous Heterogeneous		60% Non-fibrous (other) 40% Ca Carbonate		None Detected

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**Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 and/or EPA 600/M4-82-020 Method(s) using Polarized Light Microscopy**

Sample	Description	Appearance	Non-Asbestos		Asbestos	
			% Fibrous	% Non-Fibrous	%	Type
0719/JP28 031223814-0046	COURTYARD / TYPE 2 WINDOW FRAME CAULK ON BRICK TOP - LAYER	White Non-Fibrous Heterogeneous		65% Non-fibrous (other) 35% Ca Carbonate		None Detected
0719/JP29 031223814-0047	FAÇADE A/ TYPE 2 WINDOW FRAME CAULK ON BRICK TOP - LAYER	White Non-Fibrous Heterogeneous		60% Non-fibrous (other) 40% Ca Carbonate		None Detected
0719/JP30 031223814-0048	FAÇADE A/ TYPE 2 WINDOW FRAME CAULK ON BRICK TOP - LAYER	Gray/White Non-Fibrous Heterogeneous		57% Non-fibrous (other) 40% Ca Carbonate	3%	Chrysotile
0719/JP31 031223814-0049	COURTYARD / TAPE 2 WINDOW FRAME CAULK ON BRICK - BOTTOM LAYER	Gray Non-Fibrous Heterogeneous	2% Fibrous (other)	68% Non-fibrous (other) 30% Ca Carbonate		None Detected
TEM RECOMMENDED						
0719/JP32 031223814-0050	FAÇADE A / TYPE 2 WINDOW FRAME CAULK ON BRICK - BOTTOM LAYER	White Non-Fibrous Heterogeneous		58% Non-fibrous (other) 40% Ca Carbonate	2%	Chrysotile

Analyst(s)

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**Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 and/or EPA 600/M4-82-020 Method(s) using Polarized Light Microscopy**

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
0719/JP33 031223814-0051	FACADE B / TYPE 2 WINDOW FRAME CAULK ON BRICK - BOTTOM LAYER	Gray/Tan Non-Fibrous Heterogeneous		55% Non-fibrous (other) 40% Ca Carbonate	5% Chrysotile
0719/JP34 031223814-0052	COURTYARD / TYPE 2 WINOW FRAME CAULK ON BRICK - BOTTOM LAYER	Tan/White Non-Fibrous Heterogeneous		65% Non-fibrous (other) 30% Ca Carbonate	5% Chrysotile
0719/JP35 031223814-0053	FACADE A/ WOOD WINDOW GLAZING COMPOUND	White Non-Fibrous Heterogeneous		60% Non-fibrous (other) 40% Ca Carbonate	None Detected
0719/JP36 031223814-0054	FACADE A/ WOOD WINDOW GLAZING COMPOUND	Gray/White Non-Fibrous Heterogeneous		50% Non-fibrous (other) 50% Ca Carbonate	None Detected
0719/JP37 031223814-0055	FACADE A/ WOOD WINDOW FRAME CAULK	Gray Non-Fibrous Heterogeneous		57% Non-fibrous (other) 40% Ca Carbonate	3% Chrysotile
0719/JP38 031223814-0056	FACADE A/ WOOD WINDOW FRAME CAULK	Brown/Gray Non-Fibrous Heterogeneous		76% Non-fibrous (other) 20% Ca Carbonate	4% Chrysotile

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Sample	Description	Appearance	Non-Asbestos		Asbestos	
			% Fibrous	% Non-Fibrous	%	Type
0719/JP39	FACADE A/ WOOD WINDOW	White		60% Non-fibrous (other)		None Detected
031223814-0057	FRAME CAULK BOTTOM LAYER ON - BRICK	Non-Fibrous Heterogeneous		40% Ca Carbonate		
0719/JP40	FACADE A/ WOOD WINDOW	Gray/White		60% Non-fibrous (other)		None Detected
031223814-0058	FRAME CAULK BOTTOM LAYER ON - BRICK	Non-Fibrous Heterogeneous		40% Ca Carbonate		
0719/JP41	FACADE A -LL/ GREY WINDOW	Gray		60% Non-fibrous (other)		None Detected
031223814-0059	FRAME CUALK IN BRICK - ASSOC W/ TAPE 4	Non-Fibrous Heterogeneous		40% Ca Carbonate		
0719/JP42	FACADE A -LL/ GREY WINDOW	Gray		70% Non-fibrous (other)		None Detected
031223814-0060	FRAME CUALK IN BRICK - ASSOC W/ TAPE 4	Non-Fibrous Heterogeneous		30% Ca Carbonate		
0719/JP43	FACADE A -LL/ BLACK WINDOW GLAZING COMPOUND ON - METAL SASH ASSOC W/ TYPE 4	Black		80% Non-fibrous (other)		None Detected
		Non-Fibrous Heterogeneous		20% Ca Carbonate		

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Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
0719/JP44 031223814-0062	FACADE A -LL/ BLACK WINDOW GLAZING COMPOUND ON - METAL SASH ASSOC W/ TYPE 4	Black Non-Fibrous Heterogeneous		100% Non-fibrous (other)	None Detected
0719/JP45 031223814-0063	FACADE B- GREY WINDOW SILL CAULK TOP LAYER	Gray/White Non-Fibrous Heterogeneous		60% Non-fibrous (other) 40% Ca Carbonate	None Detected
0719/JP46 031223814-0064	FACADE B/ GREY WINDOW SILL CAULK AT BRICK WINDOW - FRAME	Gray Non-Fibrous Heterogeneous		80% Non-fibrous (other) 20% Ca Carbonate	None Detected
0719/JP47 031223814-0065	FACADE C / GREY WINDOW FRAME CAULK ON TYPE 5	Gray/White Non-Fibrous Heterogeneous		60% Non-fibrous (other) 40% Ca Carbonate	None Detected
0719/JP48 031223814-0066	FACADE C / GREY WINDOW FRAME CAULK ON TYPE 5	Gray Non-Fibrous Heterogeneous		75% Non-fibrous (other) 25% Ca Carbonate	None Detected

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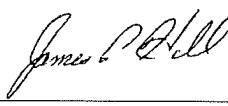
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Sample	Description	Appearance	Non-Asbestos		Asbestos	
			% Fibrous	% Non-Fibrous	%	Type
0719/JP49	FACACE D/ BOTTOM LAYER	Gray		60% Non-fibrous (other)		None Detected
031223814-0067	DARK GREY WINDOW FRAME - CAULK	Non-Fibrous Heterogeneous		40% Ca Carbonate		
0719/JP50	FACACE D/ BOTTOM LAYER	Gray		85% Non-fibrous (other)		None Detected
031223814-0068	DARK GREY WINDOW FRAME - CAULK	Non-Fibrous Heterogeneous		15% Ca Carbonate		

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**APPENDIX B**

**XRF REPORT**

# LEAD PAINT INSPECTION REPORT

REPORT NUMBER: S#01326 - 07/19/12 11:25

INSPECTION FOR: Middlebrook School

PERFORMED AT:

INSPECTION DATE: 07/19/12

INSTRUMENT TYPE: R M D  
MODEL LPA-1  
XRF TYPE ANALYZER  
Serial Number: 01326

ACTION LEVEL: 1.0 mg/cm<sup>2</sup>

OPERATOR LICENSE: \_\_\_\_\_

SIGNED: *Richard Onofrio*

Date: 7/19/12

Lead Inspector/Risk Assessor  
Certificate # 002217

**SUMMARY REPORT OF LEAD PAINT INSPECTION FOR: Middlebrook School**

Inspection Date: 07/19/12  
Report Date: 8/1/2012  
Abatement Level: 1.0  
Report No. S#01326 - 07/19/12 11:02  
Total Readings: 18 Actionable: 0  
Job Started: 07/19/12 11:02  
Job Finished: 07/19/12 11:23

Reading No.	Wall	Structure	Location	Member	Paint Cond	Substrate	Color	Lead (mg/cm <sup>2</sup> )	Mode
<b>Calibration Readings</b>									
<b>----- End of Readings -----</b>									

**DETAILED REPORT OF LEAD PAINT INSPECTION FOR: Middlebrook School**

Inspection Date: 07/19/12  
 Report Date: 8/1/2012  
 Abatement Level: 1.0  
 Report No. S#01326 - 07/19/12 11:02  
 Total Readings: 18  
 Job Started: 07/19/12 11:02  
 Job Finished: 07/19/12 11:23

Reading No.	Wall	Structure	Location	Member	Paint Cond	Substrate	Color	Lead (mg/cm <sup>2</sup> )	Mode
<b>Interior Room 001 C wing</b>									
013	C	wall	Lft		I	Plaster	white	-0.1	QM
014	C	Window	Lft	Sash	I	Plaster	white	-0.5	QM
<b>Interior Room 003 B Wing</b>									
007	C	wall	Lft		I	Plaster	white	0.2	QM
008	C	Window	Lft	Sash	I	metal	N/A	-0.5	QM
009	C	Window	Lft	Sill	I	ceramic	yellow	-0.1	QM
<b>Interior Room 004 B Wing</b>									
004	A	Window	Lft	Sash	I	metal	N/A	-0.3	QM
005	A	Window	Lft	Sill	I	ceramic	yellow	-0.1	QM
006	C	wall	Lft		I	Plaster	white	0.1	QM
<b>Interior Room 005 C wing</b>									
017	C	wall	Lft		I	Plaster	white	-0.2	QM
018	C	Window	Lft	Sash	I	metal	N/A	-0.2	QM
<b>Interior Room 006 C wing</b>									
016	C	wall	Lft		I	Plaster	white	-0.1	QM
015	C	Window	Lft	Sash	I	metal	N/A	-0.1	QM
<b>Interior Room 012 B Wing</b>									
012	C	wall	Lft		I	Plaster	white	0.0	QM
011	C	Window	Lft	Sash	I	metal	N/A	-0.1	QM
010	C	Window	Lft	Sill	I	ceramic	yellow	-0.6	QM
<b>Calibration Readings</b>									
001								0.9	TC
002								1.0	TC
003								1.0	TC

----- End of Readings -----

**APPENDIX C**

**PCB LABORATORY RESULTS**

August 6, 2012

Sandy Owen  
AMC Environmental, LLC  
PO Box 423  
Stratford, CT 06615

Project Location: Middlebrook School, Trumbull

Client Job Number:

Project Number: [none]

Laboratory Work Order Number: 12G0912

Enclosed are results of analyses for samples received by the laboratory on July 27, 2012. If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Lisa A. Worthington  
Project Manager

39 Spruce Street \* East Longmeadow, MA 01028 \* FAX 413/525-6405 \* TEL. 413/525-2332

AMC Environmental, LLC  
PO Box 423  
Stratford, CT 06615  
ATTN: Sandy Owen

REPORT DATE: 8/6/2012

PURCHASE ORDER NUMBER:

PROJECT NUMBER: [none]

#### ANALYTICAL SUMMARY

WORK ORDER NUMBER: 12G0912

The results of analyses performed on the following samples submitted to the CON-TEST Analytical Laboratory are found in this report.

PROJECT LOCATION: Middlebrook School, Trumbull

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
0409PCB-01	12G0912-01	Caulk	WGC Composite (Room A-6)	SW-846 8082A	
0409PCB-02	12G0912-02	Caulk	WGC (Hallway To TLC)	SW-846 8082A	
0409PCB-03	12G0912-03	Caulk	WGC (Room B-7)	SW-846 8082A	
0717PCB-01	12G0912-04	Caulk	WFC (TLC Room)	SW-846 8082A	
0717PCB-02	12G0912-05	Caulk	WGC (TLC Room)	SW-846 8082A	
0717PCB-03	12G0912-06	Caulk	WGC (Room C-7)	SW-846 8082A	
0717PCB-04	12G0912-07	Caulk	WGC (Room D-6)	SW-846 8082A	
0717PCB-05	12G0912-08	Caulk	WFC (Room D-3)	SW-846 8082A	
0719PCB-01	12G0912-09	Caulk	WFC-Type 1 (Fac A)	SW-846 8082A	
0719PCB-02	12G0912-10	Caulk	WFC-Type 2 (Fac A)	SW-846 8082A	
0719PCB-03	12G0912-11	Caulk	WGC-Type 1 (Fac A)	SW-846 8082A	
0719PCB-04	12G0912-12	Caulk	WGC-Type 2 (Fac A)	SW-846 8082A	
0719PCB-05	12G0912-13	Caulk	WFC-Type 3 (Fac A)	SW-846 8082A	
0719PCB-06	12G0912-14	Caulk	WGC-Type 3 (Fac A)	SW-846 8082A	
0719PCB-07	12G0912-15	Caulk	WFC-Type 3 (Fac A)	SW-846 8082A	
0719PCB-08	12G0912-16	Caulk	WFC-Type 4 (Fac A-LL)	SW-846 8082A	
0719PCB-09	12G0912-17	Caulk	WGC-Type 4 (Fac A-LL)	SW-846 8082A	
0719PCB-10	12G0912-18	Caulk	Window Sill Caulk (Fac B)	SW-846 8082A	
0719PCB-11	12G0912-19	Caulk	WGC-Type 2 (Fac B)	SW-846 8082A	
0719PCB-12	12G0912-20	Caulk	WFC-Type 5 (Fac C)	SW-846 8082A	
0719PCB-13	12G0912-21	Caulk	WFC-Type 5 (Fac D)	SW-846 8082A	
0719PCB-14	12G0912-22	Caulk	WFC-Type 1 (Courtyard) Composite	SW-846 8082A	
0719PCB-15	12G0912-23	Caulk	WFC-Type 2 (Courtyard) Composite	SW-846 8082A	

**CASE NARRATIVE SUMMARY**

All reported results are within defined laboratory quality control objectives unless listed below or otherwise qualified in this report.

**SW-846 8082A**

**Qualifications:**

Sample received after recommended holding time was exceeded.

**Analyte & Samples(s) Qualified:**

12G0912-01[0409PCB-01], 12G0912-02[0409PCB-02], 12G0912-03[0409PCB-03]

Sample contains two incompletely resolved aroclors. Aroclor with the closest matching pattern is reported.

**Analyte & Samples(s) Qualified:**

**Aroclor-1254**

12G0912-23[0719PCB-15]

Sample fingerprint does not match standard exactly. Sample was quantitated against the closest matching standard.

**Analyte & Samples(s) Qualified:**

**Aroclor-1248 [2C]**

12G0912-22[0719PCB-14]

Result was confirmed using a dissimilar column. Relative percent difference between the two results was >40%. The higher result was reported.

**Analyte & Samples(s) Qualified:**

**Aroclor-1254 [2C]**

12G0912-11[0719PCB-03]

The surrogate recovery for this sample is not available due to sample dilution below the surrogate reporting limit required from high analyte concentration and/or matrix interferences.

**Analyte & Samples(s) Qualified:**

**Decachlorobiphenyl, Decachlorobiphenyl [2C], Tetrachloro-m-xylene, Tetrachloro-m-xylene [2C]**

12G0912-01[0409PCB-01], 12G0912-12[0719PCB-04], 12G0912-21[0719PCB-13]

The results of analyses reported only relate to samples submitted to the Con-Test Analytical Laboratory for testing.

I certify that the analyses listed above, unless specifically listed as subcontracted, if any, were performed under my direction according to the approved methodologies listed in this document, and that based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.



Daren J. Damboragian  
Laboratory Manager

39 Spruce Street \* East Longmeadow, MA 01028 \* FAX 413/525-6405 \* TEL. 413/525-2332

Project Location: Middlebrook School, Trumbull

Sample Description: WGC Composite (Room A-6)

Work Order: 12G0912

Date Received: 7/27/2012

Field Sample #: 0409PCB-01

Sampled: 4/9/2012 00:00

Sample ID: 12G0912-01

Sample Matrix: Caulk

Sample Flags: H-03

**Polychlorinated Biphenyls with 3540 Soxhlet Extraction**

Analyte	Results	RL	Units	Dilution	Flag	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	350	mg/Kg	2000		SW-846 8082A	7/27/12	8/2/12 9:28	MJC
Aroclor-1221 [1]	ND	350	mg/Kg	2000		SW-846 8082A	7/27/12	8/2/12 9:28	MJC
Aroclor-1232 [1]	ND	350	mg/Kg	2000		SW-846 8082A	7/27/12	8/2/12 9:28	MJC
Aroclor-1242 [1]	ND	350	mg/Kg	2000		SW-846 8082A	7/27/12	8/2/12 9:28	MJC
Aroclor-1248 [1]	ND	350	mg/Kg	2000		SW-846 8082A	7/27/12	8/2/12 9:28	MJC
Aroclor-1254 [1]	3000	350	mg/Kg	2000		SW-846 8082A	7/27/12	8/2/12 9:28	MJC
Aroclor-1260 [1]	ND	350	mg/Kg	2000		SW-846 8082A	7/27/12	8/2/12 9:28	MJC
Aroclor-1262 [1]	ND	350	mg/Kg	2000		SW-846 8082A	7/27/12	8/2/12 9:28	MJC
Aroclor-1268 [1]	ND	350	mg/Kg	2000		SW-846 8082A	7/27/12	8/2/12 9:28	MJC
<b>Surrogates</b>		<b>% Recovery</b>	<b>Recovery Limits</b>		<b>Flag</b>				
Decachlorobiphenyl [1]	*	30-150			S-01			8/2/12 9:28	
Decachlorobiphenyl [2]	*	30-150			S-01			8/2/12 9:28	
Tetrachloro-m-xylene [1]	*	30-150			S-01			8/2/12 9:28	
Tetrachloro-m-xylene [2]	*	30-150			S-01			8/2/12 9:28	

39 Spruce Street \* East Longmeadow, MA 01028 \* FAX 413/525-6405 \* TEL. 413/525-2332

Project Location: Middlebrook School, Trumbull      Sample Description:      WGC (Hallway To TLC)

Work Order: 12G0912

Date Received: 7/27/2012

Field Sample #: 0409PCB-02

Sampled: 4/9/2012 00:00

Sample ID: 12G0912-02

Sample Matrix: Caulk

Sample Flags: H-03

**Polychlorinated Biphenyls with 3540 Soxhlet Extraction**

Analyte	Results	RL	Units	Dilution	Flag	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	9.0	mg/Kg	50		SW-846 8082A	7/27/12	8/1/12 22:01	MJC
Aroclor-1221 [1]	ND	9.0	mg/Kg	50		SW-846 8082A	7/27/12	8/1/12 22:01	MJC
Aroclor-1232 [1]	ND	9.0	mg/Kg	50		SW-846 8082A	7/27/12	8/1/12 22:01	MJC
Aroclor-1242 [1]	ND	9.0	mg/Kg	50		SW-846 8082A	7/27/12	8/1/12 22:01	MJC
Aroclor-1248 [1]	ND	9.0	mg/Kg	50		SW-846 8082A	7/27/12	8/1/12 22:01	MJC
Aroclor-1254 [1]	82	9.0	mg/Kg	50		SW-846 8082A	7/27/12	8/1/12 22:01	MJC
Aroclor-1260 [1]	ND	9.0	mg/Kg	50		SW-846 8082A	7/27/12	8/1/12 22:01	MJC
Aroclor-1262 [1]	ND	9.0	mg/Kg	50		SW-846 8082A	7/27/12	8/1/12 22:01	MJC
Aroclor-1268 [1]	ND	9.0	mg/Kg	50		SW-846 8082A	7/27/12	8/1/12 22:01	MJC
<b>Surrogates</b>		<b>% Recovery</b>	<b>Recovery Limits</b>		<b>Flag</b>				
Decachlorobiphenyl [1]		*	30-150					8/1/12 22:01	
Decachlorobiphenyl [2]		*	30-150					8/1/12 22:01	
Tetrachloro-m-xylene [1]		*	30-150					8/1/12 22:01	
Tetrachloro-m-xylene [2]		*	30-150					8/1/12 22:01	

39 Spruce Street \* East Longmeadow, MA 01028 \* FAX 413/525-6405 \* TEL. 413/525-2332

Project Location: Middlebrook School, Trumbull      Sample Description:      WGC (Room B-7)

Work Order: 12G0912

Date Received: 7/27/2012

Field Sample #: 0409PCB-03

Sampled: 4/9/2012 00:00

Sample ID: 12G0912-03

Sample Matrix: Caulk

Sample Flags: H-03

**Polychlorinated Biphenyls with 3540 Soxhlet Extraction**

Analyte	Results	RL	Units	Dilution	Flag	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.89	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 8:49	MJC
Aroclor-1221 [1]	ND	0.89	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 8:49	MJC
Aroclor-1232 [1]	ND	0.89	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 8:49	MJC
Aroclor-1242 [1]	ND	0.89	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 8:49	MJC
Aroclor-1248 [1]	ND	0.89	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 8:49	MJC
Aroclor-1254 [1]	9.1	0.89	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 8:49	MJC
Aroclor-1260 [1]	ND	0.89	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 8:49	MJC
Aroclor-1262 [1]	ND	0.89	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 8:49	MJC
Aroclor-1268 [1]	ND	0.89	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 8:49	MJC
<b>Surrogates</b>		<b>% Recovery</b>	<b>Recovery Limits</b>	<b>Flag</b>					
Decachlorobiphenyl [1]		63.8	30-150					8/2/12 8:49	
Decachlorobiphenyl [2]		63.2	30-150					8/2/12 8:49	
Tetrachloro-m-xylene [1]		63.9	30-150					8/2/12 8:49	
Tetrachloro-m-xylene [2]		65.0	30-150					8/2/12 8:49	

39 Spruce Street \* East Longmeadow, MA 01028 \* FAX 413/525-6405 \* TEL. 413/525-2332

Project Location: Middlebrook School, Trumbull      Sample Description: WFC (TLC Room)

Work Order: I2G0912

Date Received: 7/27/2012

Field Sample #: 0717PCB-01

Sampled: 7/17/2012 00:00

Sample ID: 12G0912-04

Sample Matrix: Caulk

**Polychlorinated Biphenyls with 3540 Soxhlet Extraction**

Analyte	Results	RL	Units	Dilution	Flag	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.90	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 12:16	MJC
Aroclor-1221 [1]	ND	0.90	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 12:16	MJC
Aroclor-1232 [1]	ND	0.90	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 12:16	MJC
Aroclor-1242 [1]	ND	0.90	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 12:16	MJC
Aroclor-1248 [1]	ND	0.90	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 12:16	MJC
Aroclor-1254 [1]	3.4	0.90	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 12:16	MJC
Aroclor-1260 [1]	ND	0.90	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 12:16	MJC
Aroclor-1262 [1]	ND	0.90	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 12:16	MJC
Aroclor-1268 [1]	ND	0.90	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 12:16	MJC
<b>Surrogates</b>		<b>% Recovery</b>	<b>Recovery Limits</b>	<b>Flag</b>					
Decachlorobiphenyl [1]	89.0	30-150						8/2/12 12:16	
Decachlorobiphenyl [2]	87.0	30-150						8/2/12 12:16	
Tetrachloro-m-xylene [1]	80.9	30-150						8/2/12 12:16	
Tetrachloro-m-xylene [2]	82.3	30-150						8/2/12 12:16	

39 Spruce Street \* East Longmeadow, MA 01028 \* FAX 413/525-6405 \* TEL. 413/525-2332

Project Location: Middlebrook School, Trumbull

Sample Description: WGC (TLC Room)

Work Order: 12G0912

Date Received: 7/27/2012

Field Sample #: 0717PCB-02

Sampled: 7/17/2012 00:00

Sample ID: 12G0912-05

Sample Matrix: Caulk

**Polychlorinated Biphenyls with 3540 Soxhlet Extraction**

Analyte	Results	RL	Units	Dilution	Flag	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.84	mg/Kg	5		SW-846 8082A	7/27/12	8/1/12 22:40	MJC
Aroclor-1221 [1]	ND	0.84	mg/Kg	5		SW-846 8082A	7/27/12	8/1/12 22:40	MJC
Aroclor-1232 [1]	ND	0.84	mg/Kg	5		SW-846 8082A	7/27/12	8/1/12 22:40	MJC
Aroclor-1242 [1]	ND	0.84	mg/Kg	5		SW-846 8082A	7/27/12	8/1/12 22:40	MJC
Aroclor-1248 [1]	ND	0.84	mg/Kg	5		SW-846 8082A	7/27/12	8/1/12 22:40	MJC
Aroclor-1254 [1]	4.4	0.84	mg/Kg	5		SW-846 8082A	7/27/12	8/1/12 22:40	MJC
Aroclor-1260 [1]	ND	0.84	mg/Kg	5		SW-846 8082A	7/27/12	8/1/12 22:40	MJC
Aroclor-1262 [1]	ND	0.84	mg/Kg	5		SW-846 8082A	7/27/12	8/1/12 22:40	MJC
Aroclor-1268 [1]	ND	0.84	mg/Kg	5		SW-846 8082A	7/27/12	8/1/12 22:40	MJC
Surrogates		% Recovery	Recovery Limits		Flag				
Decachlorobiphenyl [1]		107	30-150					8/1/12 22:40	
Decachlorobiphenyl [2]		108	30-150					8/1/12 22:40	
Tetrachloro-m-xylene [1]		113	30-150					8/1/12 22:40	
Tetrachloro-m-xylene [2]		114	30-150					8/1/12 22:40	

39 Spruce Street \* East Longmeadow, MA 01028 \* FAX 413/525-6405 \* TEL. 413/525-2332

Project Location: Middlebrook School, Trumbull      Sample Description:      WGC (Room C-7)

Work Order: 12G0912

Date Received: 7/27/2012

Field Sample #: 0717PCB-03

Sampled: 7/17/2012 00:00

Sample ID: 12G0912-06

Sample Matrix: Caulk

**Polychlorinated Biphenyls with 3540 Soxhlet Extraction**

Analyte	Results	RL	Units	Dilution	Flag	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	3.9	mg/Kg	20		SW-846 8082A	7/27/12	8/1/12 22:52	MJC
Aroclor-1221 [1]	ND	3.9	mg/Kg	20		SW-846 8082A	7/27/12	8/1/12 22:52	MJC
Aroclor-1232 [1]	ND	3.9	mg/Kg	20		SW-846 8082A	7/27/12	8/1/12 22:52	MJC
Aroclor-1242 [1]	ND	3.9	mg/Kg	20		SW-846 8082A	7/27/12	8/1/12 22:52	MJC
Aroclor-1248 [1]	ND	3.9	mg/Kg	20		SW-846 8082A	7/27/12	8/1/12 22:52	MJC
Aroclor-1254 [2]	16	3.9	mg/Kg	20		SW-846 8082A	7/27/12	8/1/12 22:52	MJC
Aroclor-1260 [1]	ND	3.9	mg/Kg	20		SW-846 8082A	7/27/12	8/1/12 22:52	MJC
Aroclor-1262 [1]	ND	3.9	mg/Kg	20		SW-846 8082A	7/27/12	8/1/12 22:52	MJC
Aroclor-1268 [1]	ND	3.9	mg/Kg	20		SW-846 8082A	7/27/12	8/1/12 22:52	MJC
<b>Surrogates</b>		<b>% Recovery</b>	<b>Recovery Limits</b>	<b>Flag</b>					
Decachlorobiphenyl [1]		110	30-150						
Decachlorobiphenyl [2]		111	30-150						
Tetrachloro-m-xylene [1]		102	30-150						
Tetrachloro-m-xylene [2]		109	30-150						

39 Spruce Street \* East Longmeadow, MA 01028 \* FAX 413/525-6405 \* TEL. 413/525-2332

Project Location: Middlebrook School, Trumbull

Sample Description: WGC (Room D-6)

Work Order: 12G0912

Date Received: 7/27/2012

Field Sample #: 0717PCB-04

Sampled: 7/17/2012 00:00

Sample ID: 12G0912-07

Sample Matrix: Caulk

**Polychlorinated Biphenyls with J540 Soxhlet Extraction**

Analyte	Results	RL	Units	Dilution	Flag	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	1.9	mg/Kg	10		SW-846 8082A	7/27/12	8/1/12 23:05	MJC
Aroclor-1221 [1]	ND	1.9	mg/Kg	10		SW-846 8082A	7/27/12	8/1/12 23:05	MJC
Aroclor-1232 [1]	ND	1.9	mg/Kg	10		SW-846 8082A	7/27/12	8/1/12 23:05	MJC
Aroclor-1242 [1]	ND	1.9	mg/Kg	10		SW-846 8082A	7/27/12	8/1/12 23:05	MJC
Aroclor-1248 [1]	ND	1.9	mg/Kg	10		SW-846 8082A	7/27/12	8/1/12 23:05	MJC
Aroclor-1254 [2]	12	1.9	mg/Kg	10		SW-846 8082A	7/27/12	8/1/12 23:05	MJC
Aroclor-1260 [1]	ND	1.9	mg/Kg	10		SW-846 8082A	7/27/12	8/1/12 23:05	MJC
Aroclor-1262 [1]	ND	1.9	mg/Kg	10		SW-846 8082A	7/27/12	8/1/12 23:05	MJC
Aroclor-1268 [1]	ND	1.9	mg/Kg	10		SW-846 8082A	7/27/12	8/1/12 23:05	MJC
Surrogates		% Recovery	Recovery Limits		Flag				
Decachlorobiphenyl [1]		109	30-150					8/1/12 23:05	
Decachlorobiphenyl [2]		108	30-150					8/1/12 23:05	
Tetrachloro-m-xylene [1]		110	30-150					8/1/12 23:05	
Tetrachloro-m-xylene [2]		115	30-150					8/1/12 23:05	

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Project Location: Middlebrook School, Trumbull      Sample Description: WFC (Room D-3)

Work Order: 12G0912

Date Received: 7/27/2012

Field Sample #: 0717PCB-05

Sampled: 7/17/2012 00:00

Sample ID: 12G0912-08

Sample Matrix: Caulk

**Polychlorinated Biphenyls with 3540 Soxhlet Extraction**

Analyte	Results	RL	Units	Dilution	Flag	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.99	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 12:29	MJC
Aroclor-1221 [1]	ND	0.99	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 12:29	MJC
Aroclor-1232 [1]	ND	0.99	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 12:29	MJC
Aroclor-1242 [1]	ND	0.99	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 12:29	MJC
Aroclor-1248 [1]	ND	0.99	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 12:29	MJC
Aroclor-1254 [1]	ND	0.99	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 12:29	MJC
Aroclor-1260 [1]	ND	0.99	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 12:29	MJC
Aroclor-1262 [1]	ND	0.99	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 12:29	MJC
Aroclor-1268 [1]	ND	0.99	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 12:29	MJC
Surrogates	% Recovery	Recovery Limits	Flag						
Decachlorobiphenyl [1]	92.4	30-150						8/2/12 12:29	
Decachlorobiphenyl [2]	91.7	30-150						8/2/12 12:29	
Tetrachloro-m-xylene [1]	82.5	30-150						8/2/12 12:29	
Tetrachloro-m-xylene [2]	85.2	30-150						8/2/12 12:29	

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Project Location: Middlebrook School, Trumbull

Sample Description: WFC-Type 1 (Fac A)

Work Order: 12G0912

Date Received: 7/27/2012

Field Sample #: 0719PCB-01

Sampled: 7/19/2012 00:00

Sample ID: 12G0912-09

Sample Matrix: Caulk

**Polychlorinated Biphenyls with 3540 Soxhlet Extraction**

Analyte	Results	RL	Units	Dilution	Flag	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.87	mg/Kg	5		SW-846 8082A	7/27/12	8/1/12 23:31	MJC
Aroclor-1221 [1]	ND	0.87	mg/Kg	5		SW-846 8082A	7/27/12	8/1/12 23:31	MJC
Aroclor-1232 [1]	ND	0.87	mg/Kg	5		SW-846 8082A	7/27/12	8/1/12 23:31	MJC
Aroclor-1242 [1]	ND	0.87	mg/Kg	5		SW-846 8082A	7/27/12	8/1/12 23:31	MJC
Aroclor-1248 [1]	ND	0.87	mg/Kg	5		SW-846 8082A	7/27/12	8/1/12 23:31	MJC
Aroclor-1254 [1]	ND	0.87	mg/Kg	5		SW-846 8082A	7/27/12	8/1/12 23:31	MJC
Aroclor-1260 [1]	ND	0.87	mg/Kg	5		SW-846 8082A	7/27/12	8/1/12 23:31	MJC
Aroclor-1262 [1]	ND	0.87	mg/Kg	5		SW-846 8082A	7/27/12	8/1/12 23:31	MJC
Aroclor-1268 [1]	ND	0.87	mg/Kg	5		SW-846 8082A	7/27/12	8/1/12 23:31	MJC
Surrogates	% Recovery		Recovery Limits		Flag				
Decachlorobiphenyl [1]	123		30-150					8/1/12 23:31	
Decachlorobiphenyl [2]	114		30-150					8/1/12 23:31	
Tetrachloro-m-xylene [1]	111		30-150					8/1/12 23:31	
Tetrachloro-m-xylene [2]	110		30-150					8/1/12 23:31	

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Project Location: Middlebrook School, Trumbull

Sample Description: WFC-Type 2 (Fac A)

Work Order: 12G0912

Date Received: 7/27/2012

Field Sample #: 0719PCB-02

Sampled: 7/19/2012 00:00

Sample ID: 12G0912-10

Sample Matrix: Caulk

**Polychlorinated Biphenyls with 3540 Soxhlet Extraction**

Analyte	Results	RL	Units	Dilution	Flag	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.87	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 9:41	MJC
Aroclor-1221 [1]	ND	0.87	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 9:41	MJC
Aroclor-1232 [1]	ND	0.87	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 9:41	MJC
Aroclor-1242 [1]	ND	0.87	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 9:41	MJC
Aroclor-1248 [1]	ND	0.87	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 9:41	MJC
Aroclor-1254 [1]	ND	0.87	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 9:41	MJC
Aroclor-1260 [1]	ND	0.87	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 9:41	MJC
Aroclor-1262 [1]	ND	0.87	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 9:41	MJC
Aroclor-1268 [1]	ND	0.87	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 9:41	MJC
Surrogates		% Recovery	Recovery Limits		Flag				
Decachlorobiphenyl [1]		108	30-150					8/2/12 9:41	
Decachlorobiphenyl [2]		105	30-150					8/2/12 9:41	
Tetrachloro-m-xylene [1]		110	30-150					8/2/12 9:41	
Tetrachloro-m-xylene [2]		113	30-150					8/2/12 9:41	

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Project Location: Middlebrook School, Trumbull

Sample Description: WGC-Type 1 (Fac A)

Work Order: 12G0912

Date Received: 7/27/2012

Field Sample #: 0719PCB-03

Sampled: 7/19/2012 00:00

Sample ID: 12G0912-11

Sample Matrix: Caulk

**Polychlorinated Biphenyls with 3540 Soxhlet Extraction**

Analyte	Results	RL	Units	Dilution	Flag	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.97	mg/Kg	5		SW-846 8082A	7/27/12	8/1/12 23:57	MJC
Aroclor-1221 [1]	ND	0.97	mg/Kg	5		SW-846 8082A	7/27/12	8/1/12 23:57	MJC
Aroclor-1232 [1]	ND	0.97	mg/Kg	5		SW-846 8082A	7/27/12	8/1/12 23:57	MJC
Aroclor-1242 [1]	ND	0.97	mg/Kg	5		SW-846 8082A	7/27/12	8/1/12 23:57	MJC
Aroclor-1248 [1]	ND	0.97	mg/Kg	5		SW-846 8082A	7/27/12	8/1/12 23:57	MJC
Aroclor-1254 [2]	1.3	0.97	mg/Kg	5	P-01	SW-846 8082A	7/27/12	8/1/12 23:57	MJC
Aroclor-1260 [1]	ND	0.97	mg/Kg	5		SW-846 8082A	7/27/12	8/1/12 23:57	MJC
Aroclor-1262 [1]	ND	0.97	mg/Kg	5		SW-846 8082A	7/27/12	8/1/12 23:57	MJC
Aroclor-1268 [1]	ND	0.97	mg/Kg	5		SW-846 8082A	7/27/12	8/1/12 23:57	MJC
Surrogates		% Recovery	Recovery Limits		Flag				
Decachlorobiphenyl [1]		105	30-150					8/1/12 23:57	
Decachlorobiphenyl [2]		104	30-150					8/1/12 23:57	
Tetrachloro-m-xylene [1]		103	30-150					8/1/12 23:57	
Tetrachloro-m-xylene [2]		107	30-150					8/1/12 23:57	

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Project Location: Middlebrook School, Trumbull

Sample Description: WGC-Type 2 (Fac A)

Work Order: 12G0912

Date Received: 7/27/2012

Field Sample #: 0719PCB-04

Sampled: 7/19/2012 00:00

Sample ID: 12G0912-12

Sample Matrix: Caulk

**Polychlorinated Biphenyls with 3540 Soxhlet Extraction**

Analyte	Results	RL	Units	Dilution	Flag	Method	Date Preparcd	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	9.5	mg/Kg	50		SW-846 8082A	7/27/12	8/2/12 0:10	MJC
Aroclor-1221 [1]	ND	9.5	mg/Kg	50		SW-846 8082A	7/27/12	8/2/12 0:10	MJC
Aroclor-1232 [1]	ND	9.5	mg/Kg	50		SW-846 8082A	7/27/12	8/2/12 0:10	MJC
Aroclor-1242 [1]	ND	9.5	mg/Kg	50		SW-846 8082A	7/27/12	8/2/12 0:10	MJC
Aroclor-1248 [1]	ND	9.5	mg/Kg	50		SW-846 8082A	7/27/12	8/2/12 0:10	MJC
Aroclor-1254 [1]	50	9.5	mg/Kg	50		SW-846 8082A	7/27/12	8/2/12 0:10	MJC
Aroclor-1260 [1]	ND	9.5	mg/Kg	50		SW-846 8082A	7/27/12	8/2/12 0:10	MJC
Aroclor-1262 [1]	ND	9.5	mg/Kg	50		SW-846 8082A	7/27/12	8/2/12 0:10	MJC
Aroclor-1268 [1]	ND	9.5	mg/Kg	50		SW-846 8082A	7/27/12	8/2/12 0:10	MJC
Surrogates	% Recovery		Recovery Limits		Flag				
Decachlorobiphenyl [1]	*		30-150			S-01			8/2/12 0:10
Decachlorobiphenyl [2]	*		30-150			S-01			8/2/12 0:10
Tetrachloro-m-xylene [1]	*		30-150			S-01			8/2/12 0:10
Tetrachloro-m-xylene [2]	*		30-150			S-01			8/2/12 0:10

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Project Location: Middlebrook School, Trumbull

Sample Description: WFC-Type 3 (Fac A)

Work Order: 12G0912

Date Received: 7/27/2012

Field Sample #: 0719PCB-05

Sampled: 7/19/2012 00:00

Sample ID: 12G0912-13

Sample Matrix: Caulk

**Polychlorinated Biphenyls with 3540 Soxhlet Extraction**

Analyte	Results	RL	Units	Dilution	Flag	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.98	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 1:15	MJC
Aroclor-1221 [1]	ND	0.98	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 1:15	MJC
Aroclor-1232 [1]	ND	0.98	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 1:15	MJC
Aroclor-1242 [1]	ND	0.98	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 1:15	MJC
Aroclor-1248 [1]	ND	0.98	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 1:15	MJC
Aroclor-1254 [2]	1.1	0.98	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 1:15	MJC
Aroclor-1260 [1]	ND	0.98	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 1:15	MJC
Aroclor-1262 [1]	ND	0.98	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 1:15	MJC
Aroclor-1268 [1]	ND	0.98	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 1:15	MJC
<b>Surrogates</b>		<b>% Recovery</b>	<b>Recovery Limits</b>	<b>Flag</b>					
Decachlorobiphenyl [1]		116	30-150					8/2/12 1:15	
Decachlorobiphenyl [2]		112	30-150					8/2/12 1:15	
Tetrachloro-m-xylene [1]		116	30-150					8/2/12 1:15	
Tetrachloro-m-xylene [2]		112	30-150					8/2/12 1:15	

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Project Location: Middlebrook School, Trumbull

Sample Description: WGC-Type 3 (Fac A)

Work Order: 12G0912

Date Received: 7/27/2012

Field Sample #: 0719PCB-06

Sampled: 7/19/2012 00:00

Sample ID: 12G0912-14

Sample Matrix: Caulk

**Polychlorinated Biphenyls with 3540 Soxhlet Extraction**

Analyte	Results	RL	Units	Dilution	Flag	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.97	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 1:27	MJC
Aroclor-1221 [1]	ND	0.97	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 1:27	MJC
Aroclor-1232 [1]	ND	0.97	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 1:27	MJC
Aroclor-1242 [1]	ND	0.97	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 1:27	MJC
Aroclor-1248 [1]	ND	0.97	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 1:27	MJC
Aroclor-1254 [1]	ND	0.97	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 1:27	MJC
Aroclor-1260 [1]	ND	0.97	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 1:27	MJC
Aroclor-1262 [1]	ND	0.97	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 1:27	MJC
Aroclor-1268 [1]	ND	0.97	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 1:27	MJC
<b>Surrogates</b>		<b>% Recovery</b>	<b>Recovery Limits</b>	<b>Flag</b>					
Decachlorobiphenyl [1]		119	30-150						
Decachlorobiphenyl [2]		119	30-150						
Tetrachloro-m-xylene [1]		116	30-150						
Tetrachloro-m-xylene [2]		118	30-150						

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Project Location: Middlebrook School, Trumbull

Sample Description: WFC-Type 3 (Fac A)

Work Order: 12G0912

Date Received: 7/27/2012

Field Sample #: 0719PCB-07

Sampled: 7/19/2012 00:00

Sample ID: 12G0912-15

Sample Matrix: Caulk

**Polychlorinated Biphenyls with 3540 Soxhlet Extraction**

Analyte	Results	RL	Units	Dilution	Flag	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.84	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 9:54	MJC
Aroclor-1221 [1]	ND	0.84	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 9:54	MJC
Aroclor-1232 [1]	ND	0.84	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 9:54	MJC
Aroclor-1242 [1]	ND	0.84	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 9:54	MJC
Aroclor-1248 [1]	ND	0.84	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 9:54	MJC
Aroclor-1254 [2]	5.9	0.84	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 9:54	MJC
Aroclor-1260 [1]	ND	0.84	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 9:54	MJC
Aroclor-1262 [1]	ND	0.84	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 9:54	MJC
Aroclor-1268 [1]	ND	0.84	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 9:54	MJC
<b>Surrogates</b>		<b>% Recovery</b>	<b>Recovery Limits</b>		<b>Flag</b>				
Decachlorobiphenyl [1]		118	30-150					8/2/12 9:54	
Decachlorobiphenyl [2]		116	30-150					8/2/12 9:54	
Tetrachloro-m-xylene [1]		114	30-150					8/2/12 9:54	
Tetrachloro-m-xylene [2]		116	30-150					8/2/12 9:54	

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Project Location: Middlebrook School, Trumbull

Sample Description: WFC-Type 4 (Fac A-LL)

Work Order: 12G0912

Date Received: 7/27/2012

Field Sample #: 0719PCB-08

Sampled: 7/19/2012 00:00

Sample ID: 12G0912-16

Sample Matrix: Caulk

**Polychlorinated Biphenyls with 3540 Soxhlet Extraction**

Analyte	Results	RL	Units	Dilution	Flag	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.83	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 12:42	MJC
Aroclor-1221 [1]	ND	0.83	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 12:42	MJC
Aroclor-1232 [1]	ND	0.83	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 12:42	MJC
Aroclor-1242 [1]	ND	0.83	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 12:42	MJC
Aroclor-1248 [1]	ND	0.83	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 12:42	MJC
Aroclor-1254 [1]	ND	0.83	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 12:42	MJC
Aroclor-1260 [1]	ND	0.83	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 12:42	MJC
Aroclor-1262 [1]	ND	0.83	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 12:42	MJC
Aroclor-1268 [1]	ND	0.83	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 12:42	MJC
Surrogates	% Recovery	Recovery Limits	Flag						
Decachlorobiphenyl [1]	85.9	30-150							8/2/12 12:42
Decachlorobiphenyl [2]	84.4	30-150							8/2/12 12:42
Tetrachloro-m-xylene [1]	79.7	30-150							8/2/12 12:42
Tetrachloro-m-xylene [2]	79.4	30-150							8/2/12 12:42

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Project Location: Middlebrook School, Trumbull      Sample Description:      WGC-Type 4 (Fac A-LL)

Work Order: 12G0912

Date Received: 7/27/2012

Field Sample #: 0719PCB-09

Sampled: 7/19/2012 00:00

Sample ID: 12G0912-17

Sample Matrix: Caulk

**Polychlorinated Biphenyls with 3540 Soxhlet Extraction**

Analyte	Results	RL	Units	Dilution	Flag	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.85	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 2:06	MJC
Aroclor-1221 [1]	ND	0.85	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 2:06	MJC
Aroclor-1232 [1]	ND	0.85	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 2:06	MJC
Aroclor-1242 [1]	ND	0.85	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 2:06	MJC
Aroclor-1248 [1]	ND	0.85	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 2:06	MJC
Aroclor-1254 [1]	ND	0.85	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 2:06	MJC
Aroclor-1260 [1]	ND	0.85	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 2:06	MJC
Aroclor-1262 [1]	ND	0.85	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 2:06	MJC
Aroclor-1268 [1]	ND	0.85	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 2:06	MJC
<b>Surrogates</b>		<b>% Recovery</b>	<b>Recovery Limits</b>	<b>Flag</b>					
Decachlorobiphenyl [1]		121	30-150						8/2/12 2:06
Decachlorobiphenyl [2]		117	30-150						8/2/12 2:06
Tetrachloro-m-xylene [1]		109	30-150						8/2/12 2:06
Tetrachloro-m-xylene [2]		112	30-150						8/2/12 2:06

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Project Location: Middlebrook School, Trumbull

Sample Description: Window Sill Caulk (Fac B)

Work Order: 12G0912

Date Received: 7/27/2012

Field Sample #: 0719PCB-10

Sampled: 7/19/2012 00:00

Sample ID: 12G0912-18

Sample Matrix: Caulk

**Polychlorinated Biphenyls with 3540 Soxhlet Extraction**

Analyte	Results	RL	Units	Dilution	Flag	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.84	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 10:07	MJC
Aroclor-1221 [1]	ND	0.84	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 10:07	MJC
Aroclor-1232 [1]	ND	0.84	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 10:07	MJC
Aroclor-1242 [1]	ND	0.84	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 10:07	MJC
Aroclor-1248 [1]	ND	0.84	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 10:07	MJC
Aroclor-1254 [2]	2.2	0.84	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 10:07	MJC
Aroclor-1260 [1]	ND	0.84	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 10:07	MJC
Aroclor-1262 [1]	ND	0.84	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 10:07	MJC
Aroclor-1268 [1]	ND	0.84	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 10:07	MJC
<b>Surrogates</b>		<b>% Recovery</b>	<b>Recovery Limits</b>	<b>Flag</b>					
Decachlorobiphenyl [1]		117	30-150						
Decachlorobiphenyl [2]		114	30-150						
Tetrachloro-m-xylene [1]		113	30-150						
Tetrachloro-m-xylene [2]		117	30-150						

39 Spruce Street \* East Longmeadow, MA 01028 \* FAX 413/525-6405 \* TEL. 413/525-2332

Project Location: Middlebrook School, Trumbull

Sample Description: WGC-Type 2 (Fac B)

Work Order: 12G0912

Date Received: 7/27/2012

Field Sample #: 0719PCB-11

Sampled: 7/19/2012 00:00

Sample ID: 12G0912-19

Sample Matrix: Caulk

**Polychlorinated Biphenyls with 3540 Soxhlet Extraction**

Analyte	Results	RL	Units	Dilution	Flag	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.92	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 2:32	MJC
Aroclor-1221 [1]	ND	0.92	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 2:32	MJC
Aroclor-1232 [1]	ND	0.92	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 2:32	MJC
Aroclor-1242 [1]	ND	0.92	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 2:32	MJC
Aroclor-1248 [1]	ND	0.92	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 2:32	MJC
Aroclor-1254 [1]	ND	0.92	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 2:32	MJC
Aroclor-1260 [1]	ND	0.92	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 2:32	MJC
Aroclor-1262 [1]	ND	0.92	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 2:32	MJC
Aroclor-1268 [1]	ND	0.92	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 2:32	MJC
Surrogates		% Recovery	Recovery Limits		Flag				
Decachlorobiphenyl [1]		135	30-150					8/2/12 2:32	
Decachlorobiphenyl [2]		132	30-150					8/2/12 2:32	
Tetrachloro-m-xylene [1]		130	30-150					8/2/12 2:32	
Tetrachloro-m-xylene [2]		132	30-150					8/2/12 2:32	

39 Spruce Street \* East Longmeadow, MA 01028 \* FAX 413/525-6405 \* TEL. 413/525-2332

Project Location: Middlebrook School, Trumbull

Sample Description: WFC-Type 5 (Fac C)

Work Order: 12G0912

Date Received: 7/27/2012

Field Sample #: 0719PCB-12

Sampled: 7/19/2012 00:00

Sample ID: 12G0912-20

Sample Matrix: Caulk

**Polychlorinated Biphenyls with 3540 Soxhlet Extraction**

Analyte	Results	RL	Units	Dilution	Flag	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.89	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 2:45	MJC
Aroclor-1221 [1]	ND	0.89	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 2:45	MJC
Aroclor-1232 [1]	ND	0.89	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 2:45	MJC
Aroclor-1242 [1]	ND	0.89	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 2:45	MJC
Aroclor-1248 [1]	ND	0.89	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 2:45	MJC
Aroclor-1254 [2]	5.2	0.89	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 2:45	MJC
Aroclor-1260 [1]	ND	0.89	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 2:45	MJC
Aroclor-1262 [1]	ND	0.89	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 2:45	MJC
Aroclor-1268 [1]	ND	0.89	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 2:45	MJC
<b>Surrogates</b>		<b>% Recovery</b>	<b>Recovery Limits</b>	<b>Flag</b>					
Decachlorobiphenyl [1]		121	30-150						8/2/12 2:45
Decachlorobiphenyl [2]		117	30-150						8/2/12 2:45
Tetrachloro-m-xylene [1]		115	30-150						8/2/12 2:45
Tetrachloro-m-xylene [2]		117	30-150						8/2/12 2:45

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Project Location: Middlebrook School, Trumbull

Sample Description: WFC-Type 5 (Fac D)

Work Order: 12G0912

Date Received: 7/27/2012

Field Sample #: 0719PCB-13

Sampled: 7/19/2012 00:00

Sample ID: 12G0912-21

Sample Matrix: Caulk

**Polychlorinated Biphenyls with 3540 Soxhlet Extraction**

Analyte	Results	RL	Units	Dilution	Flag	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	500	mg/Kg	2500		SW-846 8082A	7/27/12	8/2/12 10:20	MJC
Aroclor-1221 [1]	ND	500	mg/Kg	2500		SW-846 8082A	7/27/12	8/2/12 10:20	MJC
Aroclor-1232 [1]	ND	500	mg/Kg	2500		SW-846 8082A	7/27/12	8/2/12 10:20	MJC
Aroclor-1242 [1]	ND	500	mg/Kg	2500		SW-846 8082A	7/27/12	8/2/12 10:20	MJC
Aroclor-1248 [2]	8000	500	mg/Kg	2500		SW-846 8082A	7/27/12	8/2/12 10:20	MJC
Aroclor-1254 [1]	9100	500	mg/Kg	2500		SW-846 8082A	7/27/12	8/2/12 10:20	MJC
Aroclor-1260 [1]	ND	500	mg/Kg	2500		SW-846 8082A	7/27/12	8/2/12 10:20	MJC
Aroclor-1262 [1]	ND	500	mg/Kg	2500		SW-846 8082A	7/27/12	8/2/12 10:20	MJC
Aroclor-1268 [1]	ND	500	mg/Kg	2500		SW-846 8082A	7/27/12	8/2/12 10:20	MJC
<b>Surrogates</b>		<b>% Recovery</b>	<b>Recovery Limits</b>		<b>Flag</b>				
Decachlorobiphenyl [1]	*		30-150			S-01		8/2/12 10:20	
Decachlorobiphenyl [2]	*		30-150			S-01		8/2/12 10:20	
Tetrachloro-m-xylene [1]	*		30-150			S-01		8/2/12 10:20	
Tetrachloro-m-xylene [2]	*		30-150			S-01		8/2/12 10:20	

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Project Location: Middlebrook School, Trumbull      Sample Description: WFC-Type I (Courtyard) Composite      Work Order: 12G0912  
 Date Received: 7/27/2012  
 Field Sample #: 0719PCB-14      Sampled: 7/19/2012 00:00  
 Sample ID: 12G0912-22  
 Sample Matrix: Caulk

**Polychlorinated Biphenyls with 3540 Soxhlet Extraction**

Analyte	Results	RL	Units	Dilution	Flag	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.91	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 9:02	MJC
Aroclor-1221 [1]	ND	0.91	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 9:02	MJC
Aroclor-1232 [1]	ND	0.91	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 9:02	MJC
Aroclor-1242 [1]	ND	0.91	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 9:02	MJC
Aroclor-1248 [2]	1.9	0.91	mg/Kg	5	O-04	SW-846 8082A	7/27/12	8/2/12 9:02	MJC
Aroclor-1254 [2]	2.0	0.91	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 9:02	MJC
Aroclor-1260 [1]	ND	0.91	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 9:02	MJC
Aroclor-1262 [1]	ND	0.91	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 9:02	MJC
Aroclor-1268 [1]	ND	0.91	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 9:02	MJC
Surrogates	% Recovery		Recovery Limits		Flag				
Decachlorobiphenyl [1]	121		30-150					8/2/12 9:02	
Decachlorobiphenyl [2]	116		30-150					8/2/12 9:02	
Tetrachloro-m-xylene [1]	119		30-150					8/2/12 9:02	
Tetrachloro-m-xylene [2]	120		30-150					8/2/12 9:02	

39 Spruce Street \* East Longmeadow, MA 01028 \* FAX 413/525-6405 \* TEL. 413/525-2332

Project Location: Middlebrook School, Trumbull

Sample Description: WFC-Type 2 (Courtyard) Composite

Work Order: 12G0912

Date Received: 7/27/2012

Field Sample #: 0719PCB-15

Sampled: 7/19/2012 00:00

Sample ID: 12G0912-23

Sample Matrix: Caulk

**Polychlorinated Biphenyls with 3540 Soxhlet Extraction**

Analyte	Results	RL	Units	Dilution	Flag	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.86	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 10:33	MJC
Aroclor-1221 [1]	ND	0.86	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 10:33	MJC
Aroclor-1232 [1]	ND	0.86	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 10:33	MJC
Aroclor-1242 [1]	ND	0.86	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 10:33	MJC
Aroclor-1248 [1]	ND	0.86	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 10:33	MJC
Aroclor-1254 [1]	16	0.86	mg/Kg	5	O-03	SW-846 8082A	7/27/12	8/2/12 10:33	MJC
Aroclor-1260 [1]	ND	0.86	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 10:33	MJC
Aroclor-1262 [1]	ND	0.86	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 10:33	MJC
Aroclor-1268 [1]	ND	0.86	mg/Kg	5		SW-846 8082A	7/27/12	8/2/12 10:33	MJC
Surrogates		% Recovery	Recovery Limits		Flag				
Decachlorobiphenyl [1]		118	30-150					8/2/12 10:33	
Decachlorobiphenyl [2]		116	30-150					8/2/12 10:33	
Tetrachloro-m-xylene [1]		119	30-150					8/2/12 10:33	
Tetrachloro-m-xylene [2]		122	30-150					8/2/12 10:33	

## Sample Extraction Data

Prep Method: SW-846 3540C-SW-846 8082A

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
12G0912-01 [0409PCB-01]	B055965	0.572	10.0	07/27/12
12G0912-02 [0409PCB-02]	B055965	0.556	10.0	07/27/12
12G0912-03 [0409PCB-03]	B055965	0.562	10.0	07/27/12
12G0912-04 [0717PCB-01]	B055965	0.554	10.0	07/27/12
12G0912-05 [0717PCB-02]	B055965	0.592	10.0	07/27/12
12G0912-06 [0717PCB-03]	B055965	0.508	10.0	07/27/12
12G0912-07 [0717PCB-04]	B055965	0.540	10.0	07/27/12
12G0912-08 [0717PCB-05]	B055965	0.503	10.0	07/27/12
12G0912-09 [0719PCB-01]	B055965	0.573	10.0	07/27/12
12G0912-10 [0719PCB-02]	B055965	0.574	10.0	07/27/12
12G0912-11 [0719PCB-03]	B055965	0.515	10.0	07/27/12
12G0912-12 [0719PCB-04]	B055965	0.524	10.0	07/27/12
12G0912-13 [0719PCB-05]	B055965	0.510	10.0	07/27/12
12G0912-14 [0719PCB-06]	B055965	0.518	10.0	07/27/12
12G0912-15 [0719PCB-07]	B055965	0.595	10.0	07/27/12
12G0912-16 [0719PCB-08]	B055965	0.599	10.0	07/27/12
12G0912-17 [0719PCB-09]	B055965	0.591	10.0	07/27/12
12G0912-18 [0719PCB-10]	B055965	0.597	10.0	07/27/12
12G0912-19 [0719PCB-11]	B055965	0.545	10.0	07/27/12
12G0912-20 [0719PCB-12]	B055965	0.562	10.0	07/27/12

Prep Method: SW-846 3540C-SW-846 8082A

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
12G0912-21 [0719PCB-13]	B055966	0.500	10.0	07/27/12
12G0912-22 [0719PCB-14]	B055966	0.549	10.0	07/27/12
12G0912-23 [0719PCB-15]	B055966	0.584	10.0	07/27/12

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**QUALITY CONTROL**

**Polychlorinated Biphenyls with 3540 Soxhlet Extraction - Quality Control**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD RPD	RPD Limit	Notes
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Batch B055965 - SW-846 3540C

Blank (B055965-BLK1)		Prepared: 07/27/12 Analyzed: 08/01/12							
Aroclor-1016	ND	0.20	mg/Kg						
Aroclor-1016 [2C]	ND	0.20	mg/Kg						
Aroclor-1221	ND	0.20	mg/Kg						
Aroclor-1221 [2C]	ND	0.20	mg/Kg						
Aroclor-1232	ND	0.20	mg/Kg						
Aroclor-1232 [2C]	ND	0.20	mg/Kg						
Aroclor-1242	ND	0.20	mg/Kg						
Aroclor-1242 [2C]	ND	0.20	mg/Kg						
Aroclor-1248	ND	0.20	mg/Kg						
Aroclor-1248 [2C]	ND	0.20	mg/Kg						
Aroclor-1254	ND	0.20	mg/Kg						
Aroclor-1254 [2C]	ND	0.20	mg/Kg						
Aroclor-1260	ND	0.20	mg/Kg						
Aroclor-1260 [2C]	ND	0.20	mg/Kg						
Aroclor-1262	ND	0.20	mg/Kg						
Aroclor-1262 [2C]	ND	0.20	mg/Kg						
Aroclor-1268	ND	0.20	mg/Kg						
Aroclor-1268 [2C]	ND	0.20	mg/Kg						
Surrogate: Decachlorobiphenyl	3.91		mg/Kg	4.00		97.8	30-150		
Surrogate: Decachlorobiphenyl [2C]	3.81		mg/Kg	4.00		95.2	30-150		
Surrogate: Tetrachloro-m-xylene	4.32		mg/Kg	4.00		108	30-150		
Surrogate: Tetrachloro-m-xylene [2C]	4.29		mg/Kg	4.00		107	30-150		

LCS (B055965-BS1)		Prepared: 07/27/12 Analyzed: 08/01/12					
Aroclor-1016	3.4	0.20	mg/Kg	4.00		85.3	40-140
Aroclor-1016 [2C]	3.4	0.20	mg/Kg	4.00		86.0	40-140
Aroclor-1260	3.6	0.20	mg/Kg	4.00		90.8	40-140
Aroclor-1260 [2C]	3.5	0.20	mg/Kg	4.00		87.6	40-140
Surrogate: Decachlorobiphenyl	3.77		mg/Kg	4.00		94.3	30-150
Surrogate: Decachlorobiphenyl [2C]	3.70		mg/Kg	4.00		92.6	30-150
Surrogate: Tetrachloro-m-xylene	3.88		mg/Kg	4.00		97.0	30-150
Surrogate: Tetrachloro-m-xylene [2C]	3.82		mg/Kg	4.00		95.6	30-150

LCS Dup (B055965-BSD1)		Prepared: 07/27/12 Analyzed: 08/01/12					
Aroclor-1016	3.8	0.20	mg/Kg	4.00		94.2	40-140
Aroclor-1016 [2C]	3.8	0.20	mg/Kg	4.00		94.1	40-140
Aroclor-1260	4.0	0.20	mg/Kg	4.00		101	40-140
Aroclor-1260 [2C]	3.8	0.20	mg/Kg	4.00		95.7	40-140
Surrogate: Decachlorobiphenyl	4.06		mg/Kg	4.00		102	30-150
Surrogate: Decachlorobiphenyl [2C]	3.99		mg/Kg	4.00		99.8	30-150
Surrogate: Tetrachloro-m-xylene	4.13		mg/Kg	4.00		103	30-150
Surrogate: Tetrachloro-m-xylene [2C]	4.08		mg/Kg	4.00		102	30-150

## QUALITY CONTROL

## Polychlorinated Biphenyls with 3540 Soxhlet Extraction - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD RPD	RPD Limit	Notes
<b>Batch B055966 - SW-846 3540C</b>										
<b>Blank (B055966-BLK1)</b>										
Prepared: 07/27/12 Analyzed: 08/01/12										
Aroclor-1016	ND	0.20	mg/Kg							
Aroclor-1016 [2C]	ND	0.20	mg/Kg							
Aroclor-1221	ND	0.20	mg/Kg							
Aroclor-1221 [2C]	ND	0.20	mg/Kg							
Aroclor-1232	ND	0.20	mg/Kg							
Aroclor-1232 [2C]	ND	0.20	mg/Kg							
Aroclor-1242	ND	0.20	mg/Kg							
Aroclor-1242 [2C]	ND	0.20	mg/Kg							
Aroclor-1248	ND	0.20	mg/Kg							
Aroclor-1248 [2C]	ND	0.20	mg/Kg							
Aroclor-1254	ND	0.20	mg/Kg							
Aroclor-1254 [2C]	ND	0.20	mg/Kg							
Aroclor-1260	ND	0.20	mg/Kg							
Aroclor-1260 [2C]	ND	0.20	mg/Kg							
Aroclor-1262	ND	0.20	mg/Kg							
Aroclor-1262 [2C]	ND	0.20	mg/Kg							
Aroclor-1268	ND	0.20	mg/Kg							
Aroclor-1268 [2C]	ND	0.20	mg/Kg							
Surrogate: Decachlorobiphenyl	4.19		mg/Kg	4.00		105		30-150		
Surrogate: Decachlorobiphenyl [2C]	4.09		mg/Kg	4.00		102		30-150		
Surrogate: Tetrachloro-m-xylene	4.35		mg/Kg	4.00		109		30-150		
Surrogate: Tetrachloro-m-xylene [2C]	4.32		mg/Kg	4.00		108		30-150		
<b>LCS (B055966-BS1)</b>										
Prepared: 07/27/12 Analyzed: 08/01/12										
Aroclor-1016	3.9	0.20	mg/Kg	4.00		97.9		40-140		
Aroclor-1016 [2C]	4.0	0.20	mg/Kg	4.00		99.9		40-140		
Aroclor-1260	4.1	0.20	mg/Kg	4.00		102		40-140		
Aroclor-1260 [2C]	3.9	0.20	mg/Kg	4.00		97.5		40-140		
Surrogate: Decachlorobiphenyl	4.12		mg/Kg	4.00		103		30-150		
Surrogate: Decachlorobiphenyl [2C]	4.05		mg/Kg	4.00		101		30-150		
Surrogate: Tetrachloro-m-xylene	4.12		mg/Kg	4.00		103		30-150		
Surrogate: Tetrachloro-m-xylene [2C]	4.06		mg/Kg	4.00		102		30-150		
<b>LCS Dup (B055966-BSD1)</b>										
Prepared: 07/27/12 Analyzed: 08/01/12										
Aroclor-1016	4.0	0.20	mg/Kg	4.00		100	40-140	2.41	30	
Aroclor-1016 [2C]	4.0	0.20	mg/Kg	4.00		101	40-140	1.23	30	
Aroclor-1260	4.1	0.20	mg/Kg	4.00		104	40-140	1.42	30	
Aroclor-1260 [2C]	3.9	0.20	mg/Kg	4.00		98.6	40-140	1.05	30	
Surrogate: Decachlorobiphenyl	4.18		mg/Kg	4.00		104		30-150		
Surrogate: Decachlorobiphenyl [2C]	4.10		mg/Kg	4.00		103		30-150		
Surrogate: Tetrachloro-m-xylene	4.35		mg/Kg	4.00		109		30-150		
Surrogate: Tetrachloro-m-xylene [2C]	4.29		mg/Kg	4.00		107		30-150		

---

39 Spruce Street \* East Longmeadow, MA 01028 \* FAX 413/525-6405 \* TEL. 413/525-2332

**FLAG/QUALIFIER SUMMARY**

- \* QC result is outside of established limits.
- † Wide recovery limits established for difficult compound.
- ‡ Wide RPD limits established for difficult compound.
- # Data exceeded client recommended or regulatory level

Percent recoveries and relative percent differences (RPDs) are determined by the software using values in the calculation which have not been rounded.

- H-03 Sample received after recommended holding time was exceeded.
- O-03 Sample contains two incompletely resolved aroclors. Aroclor with the closest matching pattern is reported.
- O-04 Sample fingerprint does not match standard exactly. Sample was quantitated against the closest matching standard.
- P-01 Result was confirmed using a dissimilar column. Relative percent difference between the two results was >40%. The higher result was reported.
- S-01 The surrogate recovery for this sample is not available due to sample dilution below the surrogate reporting limit required from high analyte concentration and/or matrix interferences.

## CERTIFICATIONS

## Certified Analyses included in this Report

Analyte	Certifications
---------	----------------

No certified Analyses included in this Report

The CON-TEST Environmental Laboratory operates under the following certifications and accreditations:

Code	Description	Number	Expires
AIHA	AIHA-LAP, LLC	100033	02/1/2014
MA	Massachusetts DEP	M-MA100	06/30/2013
CT	Connecticut Department of Public Health	PH-0567	09/30/2013
NY	New York State Department of Health	10899 NELAP	04/1/2013
NH	New Hampshire Environmental Lab	2516 NELAP	02/5/2013
RI	Rhode Island Department of Health	LAO00112	12/30/2012
NC	North Carolina Div. of Water Quality	652	12/31/2012
NJ	New Jersey DEP	MA007 NELAP	06/30/2013
FL	Florida Department of Health	E871027 NELAP	06/30/2013
VT	Vermont Department of Health Lead Laboratory	LL015036	07/30/2013
WA	State of Washington Department of Ecology	C2065	02/23/2013
ME	State of Maine	2011028	06/9/2013
VA	Commonwealth of Virginia	1381	12/14/2012



**CHAIN OF CUSTODY RECORD**

 39 Spruce Street  
 East Longmeadow, MA 01028

 Page 2 of 3

Company Name: AMC Environmental

Telephone: 203-378-5020

 Page 34 of 37

Address: P.O. Box 423

Project # \_\_\_\_\_

# of Containers

Stratford, CT 06615

\*\*Preservation

Attention: Jason Pringle

Client PO# \_\_\_\_\_

\*\*\*Container Code

Project Location: Middlebrook School, Trumbull

DATA DELIVERY (check all that apply)

Dissolved Metals

Sampled By: Rick Onofrio &amp; Justin Proto

☐ FAX ☐ EMAIL ☐ WEBSITE

Field Filtered

Project Proposal Provided? (for billing purposes)

☐ PDF ☐ EXCEL ☐ GIS

Lab to Filter

☐ yes \_\_\_\_\_

☐ OTHER

Dissolved Metals

Project Proposal Provided? (for billing purposes)

☐ Enhanced Data Package

Field Filtered

Project Proposal Provided? (for billing purposes)

☐ Enhanced Data Package

Lab to Filter

Project Proposal Provided? (for billing purposes)

☐ Enhanced Data Package

Dissolved Metals

Project Proposal Provided? (for billing purposes)

☐ Enhanced Data Package

Field Filtered

Project Proposal Provided? (for billing purposes)

☐ Enhanced Data Package

Lab to Filter

Project Proposal Provided? (for billing purposes)

☐ Enhanced Data Package

Dissolved Metals

Project Proposal Provided? (for billing purposes)

☐ Enhanced Data Package

Field Filtered

Project Proposal Provided? (for billing purposes)

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Lab to Filter

Project Proposal Provided? (for billing purposes)

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Dissolved Metals

Project Proposal Provided? (for billing purposes)

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Field Filtered

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Lab to Filter

Project Proposal Provided? (for billing purposes)

☐ Enhanced Data Package

Dissolved Metals

Project Proposal Provided? (for billing purposes)

☐ Enhanced Data Package

Field Filtered

Project Proposal Provided? (for billing purposes)

☐ Enhanced Data Package

Lab to Filter

Project Proposal Provided? (for billing purposes)

☐ Enhanced Data Package

Dissolved Metals

Project Proposal Provided? (for billing purposes)

☐ Enhanced Data Package

Field Filtered

Con-Test Lab ID (laboratory use only)	Client Sample ID / Description	ANALYSIS REQUESTED											
		Beginning Date/Time	Ending Date/Time	Composite	Grab	Matrix	Code	Conc. Code	Soxhlet	8082A	8082B	8082C	8082D
7/11	0719PCB-03 W/GC-Type 1 (Fac A)	7/19/12		S	S	✓							
7/12	0719PCB-04 W/GC-Type 2 (Fac A)	7/19/12		S	S	✓							
7/13	0719PCB-05 W/GC-Type 3 (Fac A)	7/19/12		S	S	✓							
7/14	0719PCB-06 W/GC-Type 3 (Fac A)	7/19/12		S	S	✓							
7/15	0719PCB-07 W/GC-Type 3 (Fac A)	7/19/12		S	S	✓							
7/16	0719PCB-08 W/GC-Type 4 (Fac A-LL)	7/19/12		S	S	✓							
7/17	0719PCB-09 W/GC-Type 4 (Fac A-LL)	7/19/12		S	S	✓							
7/18	0719PCB-10 Window Sill Caulk (Fac B)	7/19/12		S	S	✓							
7/19	0719PCB-11 W/GC-Type 2 (Fac B)	7/19/12		S	S	✓							
7/20	0719PCB-12 W/GC-Type 5 (Fac C)	7/19/12		S	S	✓							

Comments: \_\_\_\_\_

Please use the following codes to let Con-Test know if a specific sample

may be high in concentration in Matrix/Conc. Code Box:

H - High; M - Medium; L - Low; C - Clean; U - Unknown

Detection Limit Requirements

O = other

Is your project MCP or RCP?

SL = sludge

MCP Form Required

RCP Form Required

MA State DW Form Required PWSID # \_\_\_\_\_

Other \_\_\_\_\_

 NELAC & AIHA Certified  
WBE/DBE Certified

Accredited in accordance with AIHA

WBE/DBE Certified

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## con-test

**Phone: 413-525-2332**  
**Fax: 413-525-6405**

## CHAIN OF CUSTODY RECORD

39 Spruce Street  
East Longmeadow, MA 01022

Page 3 of 3

IS INCORRECT, TURNAROUND TIME WILL NOT START UNTIL ALL QUESTIONS ARE ANSWERED BY OUR CLIENT.

**PLEASE BE CAREFUL NOT TO CONTAMINATE THIS DOCUMENT**

TURNAROUND TIME STARTS AT 9:00 A.M. THE DAY AFTER SAMPLE RECEIPT UNLESS THERE ARE QUESTIONS ON YOUR CHAIN. IF THIS FORM IS NOT FILLED OUT COMPLETELY OR



## Detailed Results

[Printer-Friendly](#) [Get Link](#) [Help](#)
Enter tracking number 

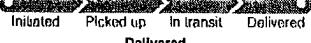
Detailed Results	Notifications
------------------	---------------

Tracking no.: 798665361517

Select time format: 12H | 24H

[E-mail notifications](#)

## Delivered



Signed for by: A.PIANKOWSKI

## Shipment Dates

## Destination

Ship date  Jul 26, 2012  
Delivery date  Jul 27, 2012 9:37 AMEAST LONGMEADOW, MA  
Signature Proof of Delivery 

## Shipment Options

[Help](#)

## Hold at FedEx Location

Hold at FedEx Location service is not available for this shipment.

## Shipment Facts

[Help](#)

Service type	Priority Pak	Delivered to	Shipping/Receiving
Weight	1.0 lbs/5 kg		

## Shipment Travel History

[Help](#)Select time zone:  Local Scan Time 

All shipment travel activity is displayed in local time for the location

Date/Time	Activity	Location	Details
Jul 27, 2012 9:37 AM	Delivered	EAST LONGMEADOW, MA	
Jul 27, 2012 8:22 AM	On FedEx vehicle for delivery	WINDSOR LOCKS, CT	
Jul 27, 2012 7:28 AM	At local FedEx facility	WINDSOR LOCKS, CT	
Jul 26, 2012 8:34 PM	At destination sort facility	EAST GRANBY, CT	
Jul 26, 2012 7:20 PM	Left FedEx origin facility	STRATFORD, CT	
Jul 26, 2012 6:23 PM	Picked up	STRATFORD, CT	
Jul 26, 2012 1:57 PM	Shipment information sent to FedEx		

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[FedEx Freight](#)  
[FedEx Custom Critical](#)  
[FedEx Trade Networks](#)  
[FedEx SupplyChain](#)

## Follow FedEx

[United States - English](#)

39 Spruce St.  
East Longmeadow, MA. 01028  
P: 413-525-2332  
F: 413-525-6405  
www.contestlabs.com



## Sample Receipt Checklist



CLIENT NAME: AMC Env

RECEIVED BY: AP

DATE: 7/27/12

1) Was the chain(s) of custody relinquished and signed?

Yes  No  No CoC Included

2) Does the chain agree with the samples?

Yes  No

If not, explain:

3) Are all the samples in good condition?

Yes  No

If not, explain:

4) How were the samples received:

On Ice  Direct from Sampling  Ambient  In Cooler(s)

Yes  No  N/A

Were the samples received in Temperature Compliance of (2-6°C)?

Temperature °C by Temp blank

Temperature °C by Temp gun

-22.1C

5) Are there Dissolved samples for the lab to filter?

Yes  No

Who was notified \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_

6) Are there any RUSH or SHORT HOLDING TIME samples?

Yes  No

Who was notified \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_

7) Location where samples are stored:

19

Permission to subcontract samples? Yes  No  N/A

(Walk-in clients only) if not already approved

Client Signature:

8) Do all samples have the proper Acid pH: Yes  No  N/A

9) Do all samples have the proper Base pH: Yes  No  N/A

10) Was the PC notified of any discrepancies with the CoC vs the samples: Yes  No  N/A

### Containers received at Con-Test

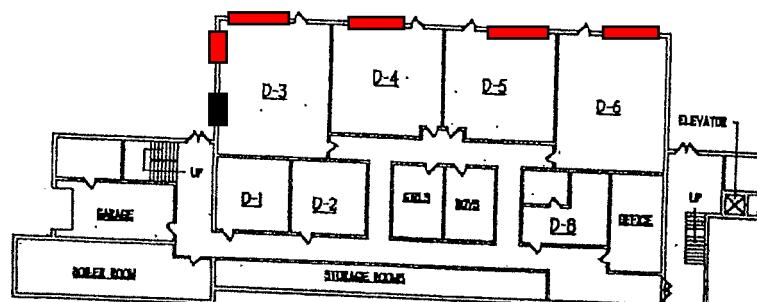
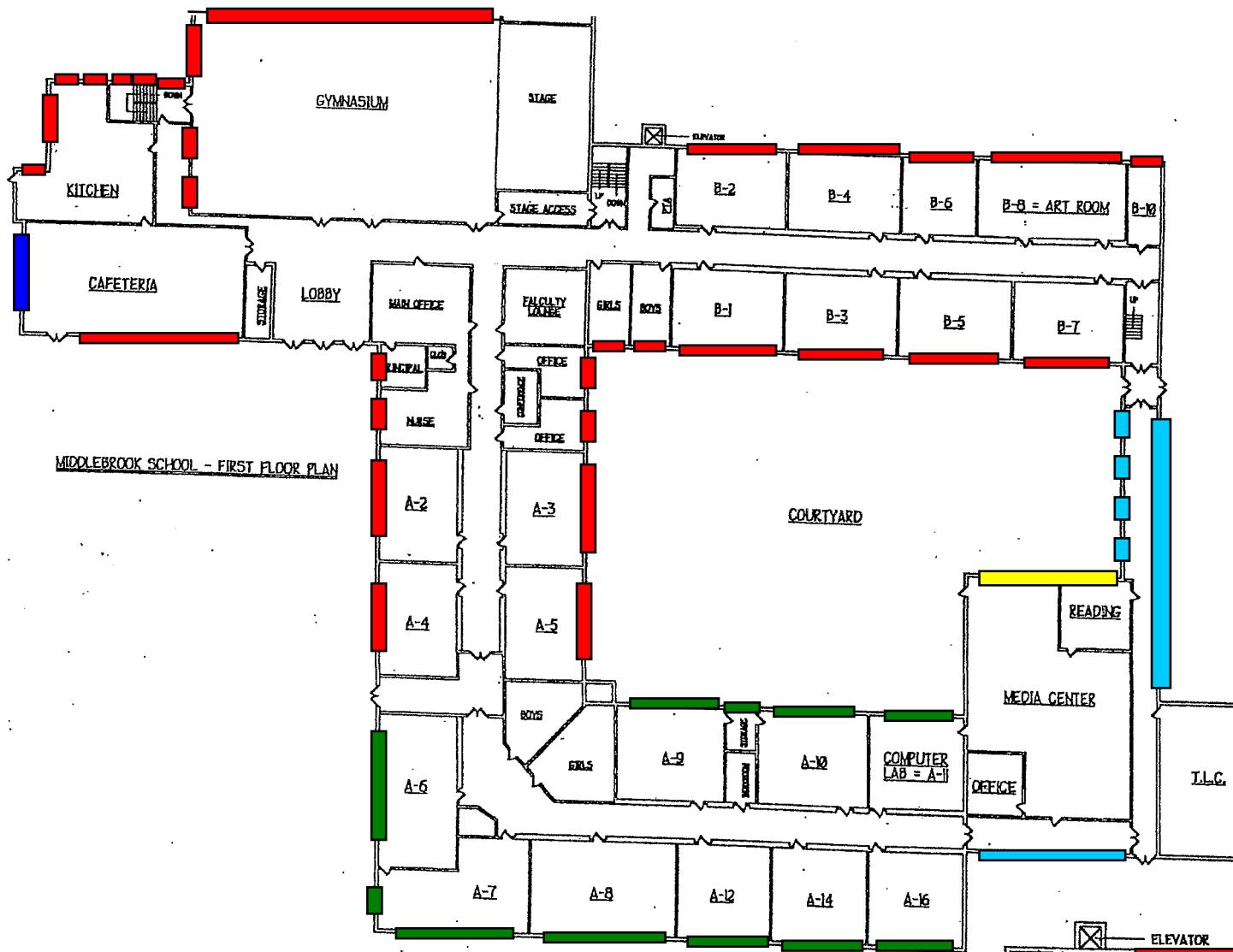
	# of containers		# of containers
1 Liter Amber		8 oz amber/clear jar	
500 mL Amber		4 oz amber/clear jar	
250 mL Amber (8oz amber)		2 oz amber/clear jar	
1 Liter Plastic		Air Cassette	
500 mL Plastic		Hg/Hopcalite Tube	
250 mL plastic		Plastic Bag / Ziploc	<u>23</u>
40 mL Vial - type listed below		PM 2.5 / PM 10	
Colisure / bacteria bottle		PUF Cartridge	
Dissolved Oxygen bottle		SOC Kit	
Encore		TO-17 Tubes	
Flashpoint bottle		Non-ConTest Container	
Perchlorate Kit		Other glass jar	
Other		Other	

Laboratory Comments:

40 mL vials: # HCl _____	# Methanol _____	Time and Date Frozen:
Doc# 277 # Bisulfate _____	# DI Water _____	
Rev. 3 May 2012 # Thiosulfate _____	Unpreserved _____	

**APPENDIX D**

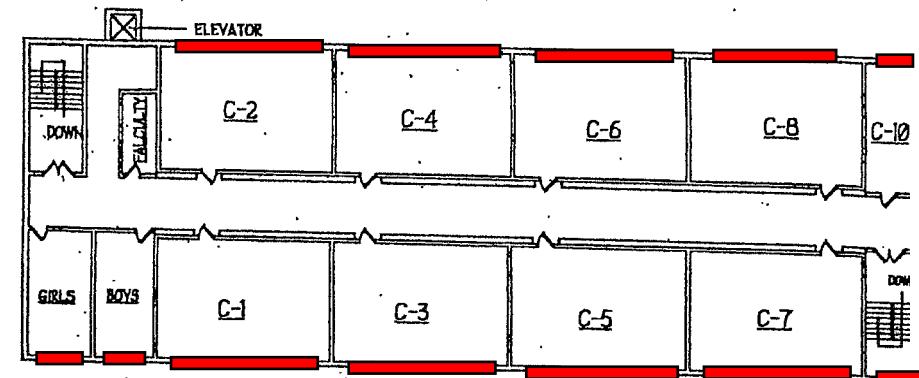
**DIAGRAM**



MIDDLEBROOK SCHOOL - LOWER LEVEL FLOOR PLAN (Located below B-Wing)

**Middlebrook School**  
**220 Middlebrooks Avenue**  
**Trumbull, CT 06611**  
**452-4411**

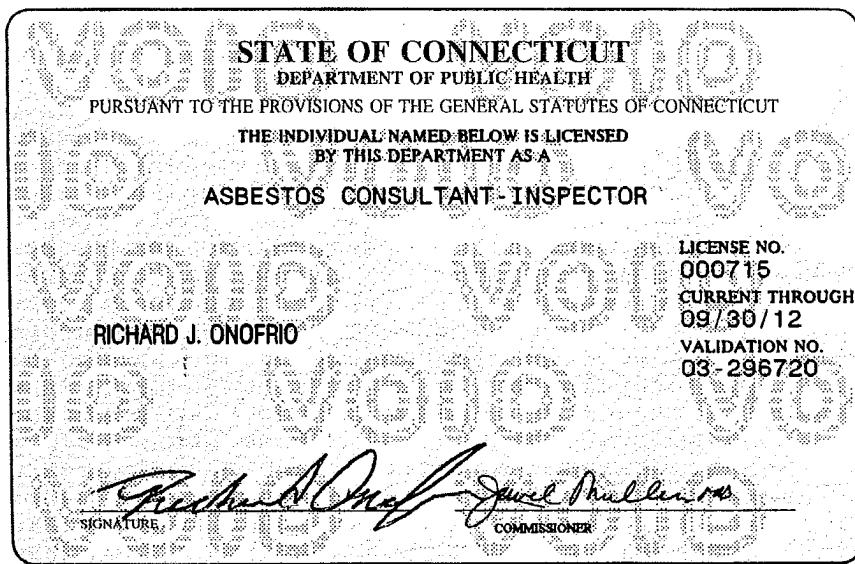
- Type 1
- Type 2
- Type 3
- Type 4
- Type 5
- NEW Windows



MIDDLEBROOK SCHOOL - SECOND FLOOR PLAN

**APPENDIX E**

**LAB AND INSPECTOR ACCREDITATIONS**



STATE OF CONNECTICUT  
DEPARTMENT OF PUBLIC HEALTH  
PURSUANT TO THE PROVISIONS OF THE GENERAL STATUTES OF CONNECTICUT

THE INDIVIDUAL NAMED BELOW IS CERTIFIED  
BY THIS DEPARTMENT AS A

LEAD INSPECTOR RISK ASSESSOR

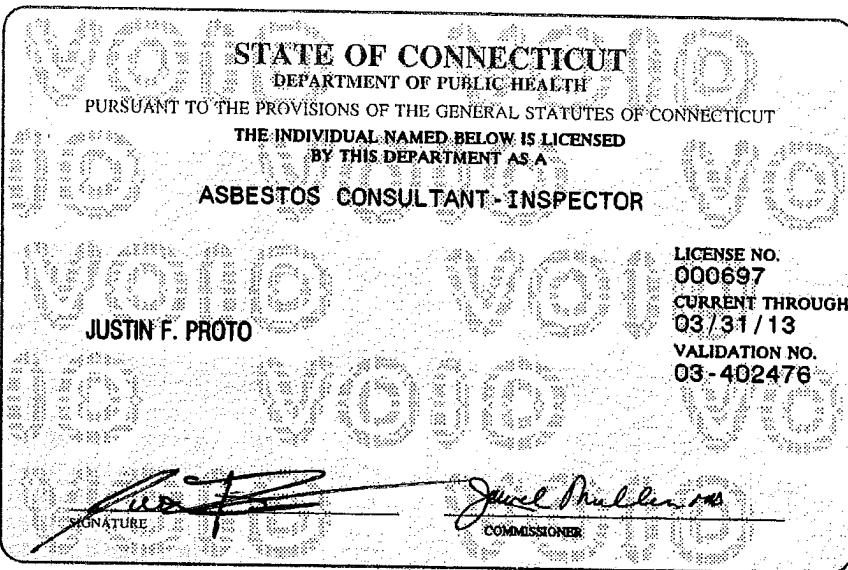
RICHARD J. ONOFRIO

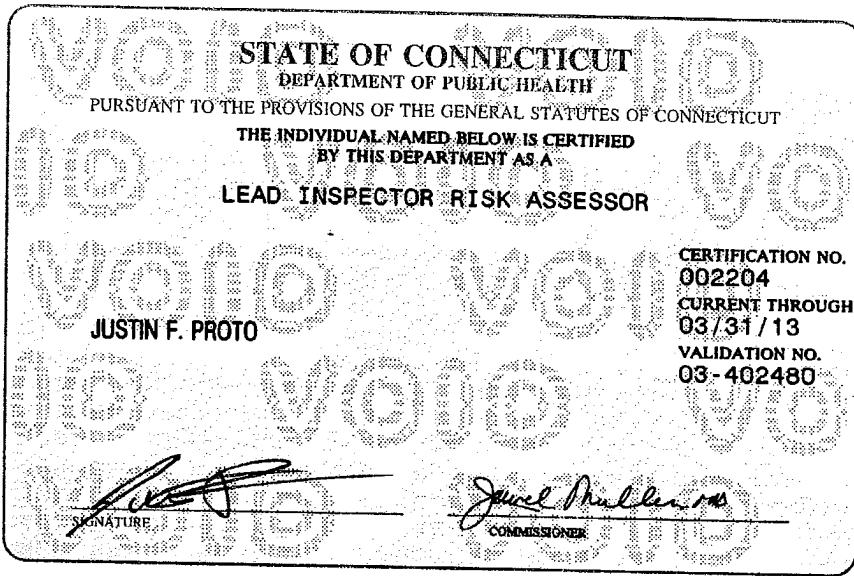
CERTIFICATION NO.  
002217  
CURRENT THROUGH  
09/30/12  
VALIDATION NO.  
03-296722

R. Onofrio

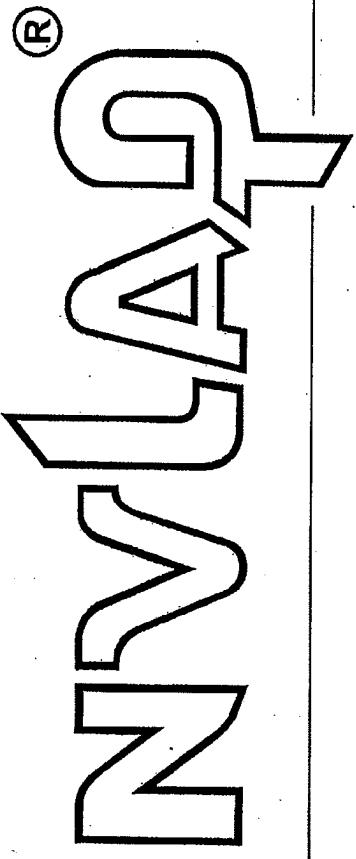
Jewel Mullen, RAS

COMMISSIONER





**United States Department of Commerce  
National Institute of Standards and Technology**



**Certificate of Accreditation to ISO/IEC 17025:2005**

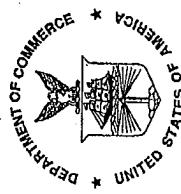
NVLAP LAB CODE: 101048-9

**EMSL Analytical, Inc.**  
New York, NY

*is accredited by the National Voluntary Laboratory Accreditation Program for specific services,  
listed on the Scope of Accreditation, for:*

**AIRBORNE ASBESTOS FIBER ANALYSIS**

*This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005.  
This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality  
management system (refer to joint ISO/I-LAC/IAF Communiqué dated January 2009).*



2012-07-01 through 2013-06-30

Effective dates

For the National Institute of Standards and Technology

A handwritten signature in black ink that reads 'Michael D. Meldrum'.



**National Voluntary  
Laboratory Accreditation Program**



**SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005**

**DRAFT**

**EMSL Analytical, Inc.**

307 W. 38th Street

New York, NY 10018

Jim Hall

Phone: 212-290-0051 Fax: 212-290-0058

E-Mail: ssiegel@emsl.com

URL: <http://www.emsl.com>

**AIRBORNE ASBESTOS FIBER ANALYSIS (TEM)**

**NVLAP LAB CODE 101048-9**

**NVLAP Code      Designation / Description**

18/A02

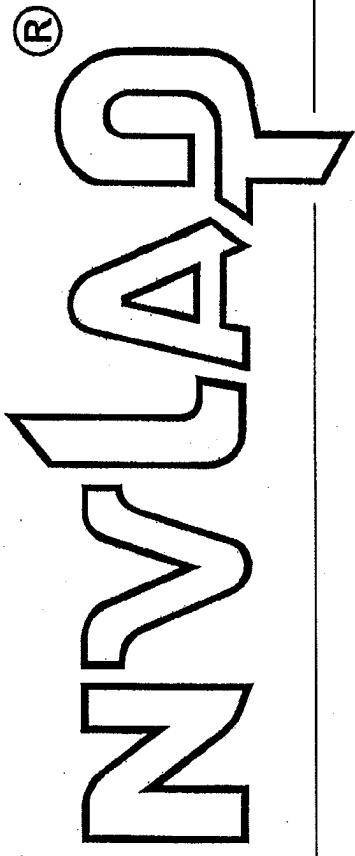
U.S. EPA's "Interim Transmission Electron Microscopy Analytical Methods-Mandatory and Nonmandatory-and Mandatory Section to Determine Completion of Response Actions" as found in 40 CFR, Part 763, Subpart E, Appendix A.

2012-07-01 through 2013-06-30

*Effective dates*

*For the National Institute of Standards and Technology*

United States Department of Commerce  
National Institute of Standards and Technology



## Certificate of Accreditation to ISO/IEC 17025:2005

NVLAP LAB CODE: 101048-9

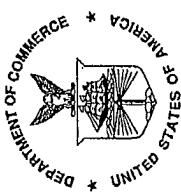
EMSL Analytical, Inc.

New York, NY

*is accredited by the National Voluntary Laboratory Accreditation Program for specific services,  
listed on the Scope of Accreditation, for:*

### BULK ASBESTOS FIBER ANALYSIS

*This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005.  
This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality  
management system (refer to joint ISO-ILAC-IAF Communiqué dated January 2009).*



2012-07-01 through 2013-06-30

*Effective dates*

*For the National Institute of Standards and Technology*

A handwritten signature in black ink that reads "Michael D. Meldrum".



**National Voluntary  
Laboratory Accreditation Program**



**SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005**

**EMSL Analytical, Inc.**

307 W. 38th Street

New York, NY 10018

Jim Hall

Phone: 212-290-0051 Fax: 212-290-0058

E-Mail: ssiegel@emsl.com

URL: <http://www.emsl.com>

**BULK ASBESTOS FIBER ANALYSIS (PLM)**

**NVLAP LAB CODE 101048-9**

**NVLAP Code      Designation / Description**

18/A01      EPA-600/M4-82-020: Interim Method for the Determination of Asbestos in Bulk Insulation Samples

2012-07-01 through 2013-06-30

*Effective dates*

Page 1 of 1

*Wm R. Hall*  
For the National Institute of Standards and Technology

NVLAP-01S (REV. 2005-05-19)

## SECTION 024119 - SELECTIVE DEMOLITION

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

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

## 1.2 SUMMARY

- A. This Section includes the following:

- 1. Demolition and removal of selected portions of a building or structure.
  - 2. Repair procedures for selective demolition operations.

- B. Related Sections include the following:

- 1. Division 1 Section "Construction Facilities and Temporary Controls" for temporary construction and environmental-protection measures for selective demolition operations.
  - 2. Division 1 Section "Cutting and Patching" for cutting and patching procedures for selective demolition operations.

## 1.3 DEFINITIONS

- A. Remove: Detach items from existing construction and legally dispose of them off-site, unless indicated to be removed and salvaged or removed and reinstalled.
- B. Remove and Salvage: Detach items from existing construction and deliver them to Owner.
- C. Remove and Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated.
- D. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

## 1.4 MATERIALS OWNERSHIP

- A. Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, demolished materials shall become Contractor's property and shall be removed from Project site.
- B. Historic items, relics, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, antiques, and other items of interest or value to

Owner that may be encountered during selective demolition remain Owner's property. Carefully remove and salvage each item or object in a manner to prevent damage and deliver promptly to Owner.

## 1.5 SUBMITTALS

- A. Proposed Dust-Control and Noise-Control Measures: Submit statement or drawing that indicates the measures proposed for use, proposed locations, and proposed time frame for their operation. Identify options if proposed measures are later determined to be inadequate.
- B. Stamped shoring layout drawings (if required) prepared by the General Contractor's Professional Engineer, indicating location, method and design loads for the temporary shoring system utilized.

## 1.6 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Standards: Comply with ANSI A10.6 and NFPA 241.
- C. Predemolition Conference: Conduct conference a project site to review methods and procedures related to selective demolition including, but not limited to, the following:
  1. Inspect and discuss condition of construction to be selectively demolished.
  2. Review structural load limitations of existing structure.
  3. Verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
  4. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.

## 1.7 PROJECT CONDITIONS

- A. All areas of the building will be fully occupied immediately adjacent to selective demolition areas. Conduct selective demolition so Owner's and occupant's operations will not be disrupted. Provide not less than 72 hours' notice to Owner of activities that will affect Owner's or occupant's operations.
- B. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities.
  1. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from authorities having jurisdiction.
- C. Owner assumes no responsibility for condition of areas to be selectively demolished.

1. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
  
- D. Hazardous Materials: Hazardous materials are present in portions of the building to be selectively demolished. A report on the presence of hazardous materials is included with the bid package. Examine report to become aware of locations where hazardous materials are present.
  1. Do not disturb hazardous materials or items suspected of containing hazardous materials except under procedures specified in Sections 020800 and 028219.
  2. The contractor shall provide the owner within 30 days of removal a copy of the hazardous waste disposal manifest in accordance with State of Connecticut Department of Environment Protection Regulations.
  
- E. Storage or sale of removed items or materials on-site will not be permitted.

## PART 2 - PRODUCTS

### 2.1 REPAIR MATERIALS

- A. Use repair materials identical to existing materials.
  1. If identical materials are unavailable or cannot be used for exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.
  2. Use materials whose installed performance equals or surpasses that of existing materials.
  
- B. Comply with material and installation requirements specified in individual Specification Sections.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.
  
- B. Inventory and record the condition of items to be removed and reinstalled and items to be removed and salvaged.

- C. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to the Architect.
- D. If required, engage a professional engineer to survey condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective demolition operations. Professional Engineer shall develop shoring layout plan for all temporary shoring and supervise the General Contractor's implementation of that plan.
- E. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.

### 3.2 PREPARATION

- A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
  - 1. Do not close or obstruct streets, walks, walkways, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
  - 2. Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction.
  - 3. Protect existing site improvements, appurtenances, and landscaping to remain.
- B. Temporary Facilities: Provide temporary barricades and other protection if required to prevent injury to people and damage to adjacent areas to remain.
  - 1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
  - 2. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
  - 3. Cover and protect furnishings and equipment that have not been removed.
- C. Temporary Partitions: If required, erect and maintain dustproof partitions and temporary enclosures to limit dust and dirt migration and to separate areas from fumes and noise.
- D. Temporary Shoring: Provide and maintain shoring, bracing, or structural support to preserve stability and prevent movement, settlement, or collapse of construction to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
  - 1. Strengthen or add new supports when required during progress of selective demolition.

### 3.3 POLLUTION CONTROLS

- A. Dust Control: Use water mist, temporary enclosures, and other suitable methods to limit spread of dust and dirt. Comply with governing environmental-protection regulations.

1. Do not use water when it may damage existing construction or create hazardous or objectionable conditions, such as ice, flooding and pollution.
2. Wet mop floors to eliminate trackable dirt and wipe down walls and doors of demolition enclosure. Vacuum carpeted areas.

B. Disposal: Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

1. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.

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

### 3.4 SELECTIVE DEMOLITION

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows.

1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
5. Maintain adequate ventilation when using cutting torches.
6. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
7. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
8. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
9. Dispose of demolished items and materials promptly.
10. Return elements of construction and surfaces that are to remain to condition existing before selective demolition operations began.

- B. Existing Facilities: Protect existing stairs, walkways, building entries, and other building facilities during selective demolition operations.
- C. Removed and Reinstalled Items: Comply with the following:
  - 1. Clean and repair items to functional condition adequate for intended reuse. Paint equipment to match new equipment.
  - 2. Pack or crate items after cleaning and repairing. Identify contents of containers.
  - 3. Protect items from damage during transport and storage.
  - 4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.
- D. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Owner, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.
- E. Concrete: Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals, using power-driven saw, then remove concrete between saw cuts.
- F. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, then remove masonry between saw cuts.

### 3.5 PATCHING AND REPAIRS

- A. General: Promptly repair damage to adjacent construction caused by selective demolition operations.
- B. Patching: Comply with Division 1 Section "Cutting and Patching."
- C. Repairs: Where repairs to existing surfaces are required, patch to produce surfaces suitable for new materials.
  - 1. Completely fill holes and depressions in existing masonry walls that are to remain with an approved masonry patching material applied according to manufacturer's written recommendations.
- D. Finishes: Restore exposed finishes of patched areas and extend restoration into adjoining construction in a manner that eliminates evidence of patching and refinishing.

### 3.6 DISPOSAL OF DEMOLISHED MATERIALS

- A. General: Promptly dispose of demolished materials. Do not allow demolished materials to accumulate on-site.
- B. Burning: Do not burn demolished materials.

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

**3.8 SELECTIVE DEMOLITION SCHEDULE**

A. Scope of Selective Demolition is indicated on the Drawings.

END OF SECTION 024119

January 17, 2014

Ms. Kimberly Tisa  
PCB Coordinator  
U.S. Environmental Protection Agency  
One Congress Street, Suite 1100 (CPT)  
Boston, MA 02114-2023

RE: Self Implementing On Site Cleanup and Disposal Plan  
Middlebrook Elementary School  
220 Middlebrook Avenue  
Trumbull, CT

Dear Ms. Tisa:

We are submitting this work plan in accordance with the notification requirements for a Self Implementing On-Site Cleanup and Disposal plan for the removal of PCB containing caulking and glazing compounds associated with the proposed renovations at the above referenced site. Additionally, this plan covers the removal of non-federally regulated building materials. The plan has been prepared and submitted in accordance with requirements of 40 CFR Part 761.61(a)(3).

The Trumbull Board of Education anticipates conducting the work during the summer of 2014 upon approval of the work plan. Please note this plan only covers the remediation of the windows.

Thank you for your attention to this matter and if you have any questions with regard to the plan please contact the undersigned.

Sincerely,



Jason Pringle  
Principal

cc: Trumbull Board of Education

Enclosure: Self Implementing On Site Clean Up and Disposal Plan

**Self-Implementing On Site  
Clean Up and Disposal Plan  
Middlebrook Elementary School  
Trumbull, Connecticut**

Trumbull Public Schools  
Trumbull, CT

January 17, 2014



**AMC Environmental, LLC  
622 Clinton Avenue  
Bridgeport, CT**

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# **Self-Implementing On Site Cleanup and Disposal Plan**

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## **1 INTRODUCTION**

AMC Environmental, LLC (AMC) has prepared this Self-Implementing Cleanup and Disposal Plan (SIP) for use by the Trumbull Board of Education (TBOE) in conducting site remediation tasks prior to the performance of site renovation activities at Middlebrook Elementary School located at 220 Middlebrook Avenue, Trumbull, Connecticut. The Site, which is part of the Trumbull Board of Education System, is owned by the Town of Trumbull. The TBOE will have contract oversight for the work contained in this SIP and therefore, will be responsible for the cleanup.

Correspondences and final approvals or actions should be addressed to:

Mr. Steve Kennedy  
Trumbull Board of Education  
6254 Main Street  
Trumbull, CT 06611  
Email: [skennedy@trumbullps.org](mailto:skennedy@trumbullps.org)

General correspondence and questions should be addressed to:

Mr. Steve Kennedy  
Trumbull Board of Education  
6254 Main Street  
Trumbull, CT 06611  
Email: [skennedy@trumbullps.org](mailto:skennedy@trumbullps.org)

### **1.1 Project Objectives**

The goal of Site remediation detailed in this SIP is to achieve compliance with applicable regulations as stated in 40 CFR Part 761.61(a), 761.61(c) and 761.62(a) and the Regulations of Connecticut State Agencies (RCSA) Section 22a-133k-1 through 22a-133k-3, inclusive, Remediation Standard Regulations (RSRs) and Section 22a-463 through 469, inclusive of the Connecticut General Statutes, governing Polychlorinated Biphenyls (PCBs). This SIP only addresses environmental issues related to PCBs and includes an outline of the approach and procedures that Contractors will follow to ensure achievement of the remedial objectives.

The remedial goals of the Site are as follows:

- To remove all caulking and glazing compounds containing PCBs  $\geq 50$  ppm associated with exterior window systems classified as PCB Bulk Product Waste that are to be disturbed by the proposed window replacement project.

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- To remove all caulking and glazing compounds containing PCBs <50 ppm associated with exterior window systems classified as CT only regulated Waste that are to be disturbed by the proposed window replacement project
- To remove all adjacent porous building materials (brick within six (6) inches or CMU within eight (8) inches) of the window systems contaminated with PCBs as PCB Bulk Product Waste that are to be disturbed by the proposed renovations to the site.
- To remove all soil adjacent to the building with total PCB concentrations >1 PPM contaminated by PCB-containing caulking and/or glazing compounds classified as a PCB Remediation Waste.

The approach developed for this project is to achieve the first remedial goal by removing PCB-containing caulking and glazing compounds classified as PCB Bulk Product Wastes and adjacent building materials. After removal, verification sampling will be performed. For this project, the PCB Bulk Product Wastes and potentially impacted building materials will be considered removed when all verification samples are <1 PPM total PCBs.

The second remedial goal is to remove all soil adjacent to the buildings with total PCB concentrations  $\geq$ 1 PPM contaminated by PCB containing caulking and/or glazing compounds classified as a Remediation Waste. In order to determine the soil removal boundaries, the soil was characterized per 40 CFR Part 761 Subpart N (Subpart N). After removal of soil; verification sampling will be performed per 40 CFR Part 761 Subpart O (Subpart O). Soil Characterization and removal activities will be discussed further in subsection 2.4 and 3.6.

## 1.2 Non-Federally Regulated Building Materials

In addition to this SIP to address federally-regulated PCB Bulk Product Wastes, the TBOE has coordinated with the Connecticut Department of Energy and Environmental Protection (CTDEEP) to develop a scope of work to remove all PCB-containing caulking and glazing compounds with total PCB concentrations  $\geq$ 1 PPM and <50 PPM that are not classified as federally-regulated PCB Bulk Product Wastes. These materials appear to meet the criteria of 40 CFR Part 761.3 as an Excluded PCB Product because the products were legally manufactured, processed, distributed and put into use prior to October 1, 1984. The products also appear to meet the other criteria under the definition of an Excluded PCB Product. Please see list below of Excluded PCB Products.

- Window Glazing Compound: TLC Room, Nurses Office, Café, Rooms A-4, A-8, A-9, A-16, B-7, B-14, C-1, C-7, D-6, outside Rooms A-6
- Window Frame Caulk: Nurses Office, outside Rooms A-2, B-5, B-7, outside Café, outside TLC corridor, Social Worker's Office
- Window Sill Caulk: Psychologist Office, Room B-4

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Please note, the window frame caulk in the TLC room was documented to contain PCBs >1 ppm despite the room being an addition to the building in 1997. It cannot be explained why this material contains PCBs therefore the windows will be removed as Federally regulated waste and not considered an excluded waste.

Upon the removal of the non-federally regulated building materials, the building materials previously adjacent to the non-federally regulated caulk will be sampled. If total PCB concentrations in the remaining building materials are  $\geq 1$  PPM and the material is scheduled to be left in place, then an encapsulant will be applied to the area where the caulking and/or glazing compounds were in contact with building materials and new caulking or glazing compound will be applied.

## 1.3 Site Description and Location

Middlebrook Elementary School is a two-story; brick clad building of approximately sixty-five thousand (65,000) square feet. The original construction was completed in 1952 and an addition was completed in 1958, 1963 and 1997 (see Figure 1 for an aerial view of the site). The location of the building and additions are shown on a site plan included as Figure 2 and a more detailed description is as follows:

The four building eras of the facility are composed of five (5) distinct window types. Sampling was performed by categorizing the different window types and building construction dates into homogenous groups and sampled accordingly. Several representative sets of samples were taken of each homogeneous building material. Typically, any given window consisted of interior and/or exterior caulking around the window frame, as well as window glazing compound. All windows were factory "milled" painted and were of metal construction. The inspector documented the building materials to range in condition from poor to good. The interior substrates within the school consist of CMU block walls. The exterior substrate is clad with brick. Additionally, concrete sills and columns were also present in certain locations.

The grounds around the school that were below the windows were also assessed and consisted of variable consistency including grass, soil, garden areas and limited section of pavement.

## 1.4 Facility and Renovation Project Description

The total area of the interior of Middlebrook Elementary School is approximately 65,000 square feet.

The building is separated into the following sections: original building built in 1952, 1958 (Classrooms), 1963 addition (Media Center and Corridor), and 1997 (TLC Room) addition. Throughout the schools there are 5 types of window systems. Please note

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this SIP covers the proposed window system updates. It is estimated that the following amounts of materials will be removed:

- Approximately two hundred and thirty (230) linear feet of Exterior Window Caulking Compounds containing PCBs  $\geq 50$  PPM, one hundred forty (140) square feet of Adjacent Building Material Substrate (Exterior Brick), and one hundred and ten (110) square feet of exterior concrete window sill.
- Approximately two hundred and thirty (230) linear feet of Interior Window Caulking Compounds containing PCBs  $\geq 50$  PPM and one hundred and ninety (190) square feet of Adjacent Building Material Substrate (Interior Block).
- Approximately two thousand three hundred and fifty (2,350) linear feet of Interior Glazing Compounds containing PCBs  $\geq 50$  PPM. Please note this material will be removed along with the window systems. There will not be any segregation of glazing from window system.
- Approximately two thousand (2,000) linear feet of exterior Glazing Compounds containing PCBs  $\geq 50$  PPM. Please note this material will be removed along with the window systems. There will not be any segregation of glazing from window system.
- Approximately nine (9) cubic yards of soil containing PCBs  $\geq 1$  PPM but  $< 50$  PPM.
- Approximately ten thousand (10,000) linear feet of Interior/Exterior Window Caulking Compound containing PCBs  $< 50$  PPM.

## 2 SITE CHARACTERIZATION

### 2.1 Sampling Program Description

Sampling was performed:

- To categorize source materials such as interior and exterior caulking and glazing compounds associated with exterior window, building expansion that will be disturbed during proposed renovation activities
- To ascertain PCB concentrations within adjacent building materials such as brick/ CMU block that are located adjacent to source materials identified to contain  $\geq 50$  PPM PCBs
- To characterize and delineate extent of impacts to soil, concrete, brick and CMU block that may have been affected by deteriorating PCB Bulk Product Wastes

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All source building materials sample analytical results are presented in Table 1 and the sample locations are shown on Diagrams PCB-01. All of the source building materials classified as being federally regulated that are scheduled for remediation are shown on Diagram PCB-04.

Sample analytical results from adjacent building materials in contact with PCB Bulk Product Waste are presented in Table 2 with the sample locations shown on Diagram PCB-02.

Soil sample analytical results are presented in Table 3 and the sample locations are shown on Diagram PCB-03, while specific areas requiring remediation are detailed on Diagram PCB-04.

Analytical data reports for all samples collected at the Site by AMC representatives are attached in Appendix B.

### 2.2 Bulk Source Product Building Material Sampling

An initial hazardous buildings inspection was performed on April 09, July 12 and July 17 of 2012 in response to a request from the Town of Trumbull School Systems. The purpose of the inspection was to identify potential hazardous materials that may be impacted during an anticipated window replacement project. Asbestos, lead, and PCB's were included in this assessment. During this preliminary inspection, a total of twenty-three (23) bulk samples were collected from various locations throughout the school. Out of the twenty-three (23) samples obtained, four (4) samples documented PCB concentration greater than or equal to 50 ppm. Additionally, twelve (12) samples document PCB concentration <50 ppm. All the remaining samples analyzed were reported as "None Detected" for PCB with Reporting Limit (RL) of the analytical method less than one (1) ppm;

Additional source material sampling was conducted on September 17 and 21 2012 by AMC Environmental representative Richard Onofrio. A total of thirty-four (34) bulk samples of caulking and glazing were collected for PCB analysis. Samples were collected from various locations both on the interior and exterior of the school. Samples were organized by building date and window type so that the building materials tested were truly representative.

Additional source material sampling was conducted on November 17, 2013 by AMC Environmental representative Jason Pringle. A total of three (3) bulk samples of window glazing were collected for PCB analysis. Samples were collected from the interior of Room A-6 (from 3 separate windows). Two (2) samples documented PCBs >50 ppm and one documented 2,000 ppm PCBs. Therefore, the interior window glazing for the Type 1 windows in the building will be considered to contain PCBs  $\geq$  50 ppm.

Sampling involved the removal of caulking, glazing, and soils using hand tools to collect representative bulk materials to determine PCB content. Tools utilized to collect samples were decontaminated between successive sampling using hexane to prevent

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cross contamination of samples. Each sample was placed in individual, sealed and labeled glass containers, and delivered to the laboratory under proper chain of custody. Analytical results are presented in Table 1 and sample locations are shown in Diagram PCB-01. Analytical reports are included in Appendix B.

## 2.3 Adjacent Building Material Substrate Sampling

On September 21 and October 15, 2012, AMC Environmental, LLC (AMC) representatives, Richard Onofrio and Justin Proto collected samples of substrates for PCB analysis.

Forty-three (43) samples of substrate materials were collected to evaluate contamination due to leaching from the "source" materials. The substrate samples included interior and exterior brick and mortar, structural pre-cast concrete, and painted CMU block.

Twenty-seven (27) core samples of the brick, mortar, and pre-cast concrete at the source/substrate interface (0-0.5 inches) to a depth of one-half (1/2) inch were collected on September 21, 2012. These samples were called "first course" of substrates. AMC Environmental conducted sampling of masonry in accordance with EPA "DRAFT" Standard Operating Procedure for Sampling Concrete in Field" (dated December 30, 1997). The sample location was prepared by first carefully removing the caulk (source material) using hand tools and then cleaning the surface using a wire brush, scrubbing the area with hexane, and rinsing the surface with water and hexane. The intent was to ensure complete removal of bulk source material prior to sampling adjacent porous substrates.

Samples were collected by using a mechanical drill to obtain enough substrate material for analysis. The sample collection tools were washed with soap and water then decontaminated using hexane between each sampling to avoid cross contamination.

Seven (7) first course samples documented PCB's in concentrations exceeding one (1) ppm. Two (2) samples detected PCB in concentrations less than one (1) ppm. All the remaining samples analyzed were reported as "None Detected" for PCB with Reporting Limit (RL) of the analytical method less than one (1) ppm; therefore, no additional sampling of subsequent courses was necessary at these locations.

Sixteen (16) core samples were collected on the follow up site visit on October 15, 2012. The majority of core samples collected during this visit were at second course locations. The CMU samples were obtained at three inch locations and the pre-cast concrete samples were collected from source locations. Of the sixteen samples, eight (8) samples contained concentrations that were greater than 1 ppm. The CMU block and mortar documented levels above 1 but below 50 ppm. The pre-cast concrete column documented levels of PCB greater than 50 ppm. This column was later found to be load bearing and therefore cannot be removed without further alterations to structure in this area.

Additional substrate material sampling was conducted on November 17, 2013 by AMC Environmental representative Jason Pringle. Thirteen (13) substrate samples were

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collected from the concrete, CMU and CMU Mortar for the type 5 windows in the TLC and Media Center Hallways. Seven (7) samples detected PCBs in concentrations less than 1 ppm. One (1) sample documented PCBs in concentrations exceeding 1 ppm and the remaining samples analyzed were reported as "None Detected". Therefore, additional substrate sampling in these areas will not be required. Please note, the concrete columns in the hallway outside Media Center documented PCBs >1 ppm. These columns were reported to be structural by the Architect for the project. Therefore, these columns will be encapsulated and be put into an O & M Plan.

Analytical results are presented in Table 2 and the sample locations are shown in Diagram PCB-02. Analytical reports are included in Appendix B.

## 2.4 Soil Sampling

AMC collected a total of thirty (30) composite exterior soil samples from ten (10) different areas at distances of eight (8) inches, sixteen (16) inches, and twenty-four (24) inches from the foundation walls approximately four (4) inches deep. Follow-up soil sampling is needed wherever the initial sampling indicates greater than or equal to one (1) ppm PCB to further delineate the contamination. Various tools were used to loosen the soil and the tools were washed with soap and water then decontaminated using hexane between each sampling to avoid cross contamination. Disposable plastic scoops were used to collect the samples. The scoops were disposed of after each sample collection to avoid cross contamination. Each sample was composited from three (3) sub-samples at the grid levels.

Seven (7) composite samples from four (4) of the ten (10) areas tested were reported to have PCB concentrations greater than or equal to one (1) ppm. Samples from the other six (6) areas were less than one (1) ppm. Composite soil samples were also collected from areas that showed concentrations of PCB greater than 1 ppm. Samples were obtained from the 8 ", 16 ", and 24" from the base of the schools foundations at four (4) inches deep. Results indicate that levels of PCBs >1 are present within the soil from areas outside rooms of the A-wing of the building.

Analytical results are presented in Table 3 and the sample locations are shown in Diagram PCB-03. Analytical reports are included in Appendix B.

## 3 REMEDIATION PROCEDURES

PCB Bulk Product Waste (caulking and/or glazing compounds), Adjacent Porous Building Material and PCB Remediation Wastes (such as soil), (see Section 2.4) will be removed utilizing abatement work practices and engineering controls to limit the potential release of PCB dust/debris.

All materials will be containerized and then transported for appropriate disposal. The removal of PCB Bulk Product Waste, Adjacent Porous Building Material and Remediation Wastes will be performed by a hazardous materials abatement contractor, utilizing workers appropriate hazard communication training, under supervision of an appropriately educated and trained third party (ON-SITE ENVIRONMENTAL

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CONSULTANT-AMC ENVIRONMENTAL) that will oversee appropriate removal techniques and confirm thorough removal of identified materials.

The goal of building material remediation efforts is to ensure that all PCB Bulk Product Wastes and the associated building materials are removed from areas that are being renovated.

The guidelines provided below present the general procedures that are to be followed for the removal of building materials and excavation of soil but the contractor will have to determine exact removal actions during the performance of the work.

Areas that Federally Regulated PCB materials exist within a window system will be removed, and disposed of accordingly. Areas that Non-Federally Regulated PCB materials exist within a window system will be removed and disposed of accordingly. This includes material generated during the removal of PCB-containing caulking and/or glazing compounds. For this remediation project, the remedial standard for all verification samples will be total PCB concentrations <1 PPM. Achieving this remedial standard at all verification sampling locations will allow for the remaining building materials to remain in place and to be repaired during subsequent renovations activities. Materials not achieving the remedial standard may be encapsulated dependent of EPA approval. Section 3.5 discusses the verification sampling in more detail.

### 3.1 Safety and Monitoring Requirements

To prevent exposure to contaminated dust, Control Areas will be established outside of the Regulated/Containment/Soil Excavation Areas. Only properly trained personnel associated with the removal, abatement, and soil excavation actions will be allowed within the Control Areas that will be established by placing barriers with signs indicating that access to the area is restricted. The on-site environmental consultant will maintain the Control Areas and escort unauthorized personnel from the area promptly. Only those personnel actively working on the removal, abatement, and soil excavation actions will be allowed within the Regulated/Containment Area and they shall be equipped with the appropriate Personal Protective Equipment (PPE).

For interior removals, dust monitoring will be performed in the Control Area immediately outside the Regulated/Containment Area prior to initiating the remedial action, during performance of the action, and following the remediation which will include the breakdown of the Regulated/Containment Area. Monitoring will be performed for total suspended particulates (TSP).

The background concentration within each interior Control Area will be determined prior to initiating remedial actions and a control area background level will be established. If, during the performance of air monitoring during remediation, dust levels outside the Regulated/Containment Area are observed to increase by 20-percent over the background level determined prior to the remediation, the contractor shall be instructed

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Middlebrook School  
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to stop work, re-establish the regulated Containment Area and associated engineering controls, and then will be required to decontaminate the remainder of the Control Area outside Regulated/Containment Area prior to restarting work on the remediation.

For soil excavation activities, the remediation contractor will be required to employ dust suppression measures, most likely watering, to prevent dust generation. It is not anticipated that OSHA limits for dust or PCB exposures will be approached. The dust suppression will be employed to prevent the potential release of PCBs to the surrounding environment and the contractor will be directed to employ dust suppression measures if any dust generation is observed.

## 3.2 Public Communication

Public outreach will be performed both prior to initiating and during the project to inform the community of the activities that will be performed at the Site to address PCB contamination. The scope and protocols to be followed are detailed in the attachment included in Appendix C.

## 3.3 Engineering Control Descriptions

Engineering controls to be implemented for interior and exterior remediation will follow along similar guidelines as used when conducting asbestos abatement activities. That is, modeled after OSHA Class I asbestos engineering controls for interior remediation work, and modeled after exterior OSHA Class II asbestos engineering controls for exterior remediation work. A description of these activities is as follows, while a more detailed description can be found in the PCB Remediation Technical Specification located in Appendix E.

### 3.3.1 Interior Remediation Procedures

Interior Remediation Procedures are as follows:

- Areas where PCB Bulk Products will be removed are to be pre-cleaned using HEPA filtered equipment and/or wet methods as appropriate to collect all loose dust and debris which may contain PCB.
- After pre-cleaning, movable objects will be removed from the work areas. Fixed objects will be enclosed with one layer six (6) mil polyethylene sheeting sealed with tape.
- Any openings between the Remediation Area and the non-remediation areas, including the outside of the building, will be sealed off with critical barriers consisting of a minimum of one (1) layer of six (6) mil polyethylene sheeting securing the edges with tape.
- A Negative Pressure Enclosure (NPE) will be constructed around the work area by covering of floor and wall surfaces with two (2) layers of six (6) mil

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Polyethylene sheeting sealed with tape. Polyethylene will be applied alternately to floors and walls.

- The Contractor will create a negative pressure differential in the range of 0.02 to 0.04 inches of water column between the Remediation Area and surrounding areas by the use of acceptable HEPA filtered negative air pressure equipment. No air movement system or air filtering equipment will discharge unfiltered air outside the Remediation Area. The contractor shall continually monitor the pressure differential to ensure that the NPE is functioning appropriately and will stop work if the pressure differential is outside acceptable limits. Work will recommence after an acceptable pressure differential has been established.
- Signs will be posted outside the enclosure to deter unauthorized personnel from entering.
- Removal work practices within the regulated containment will be implemented which facilitate the removal of the PCB Bulk Product Waste and associated Building Material while also limiting the amount of dust and debris to be generated. The contractor will remove eight (8) inches or one (1) course of adjacent porous building material substrates around the PCB Bulk Product Waste if required.
- All building materials removed during the remediation will be wrapped in poly sheeting and transported to the waste storage area. The poly sheeting will be secured with tape to ensure that no dust is released during the transport and the contractor will be responsible for the remediation of any new releases caused by spillage.
- Verification sampling will be performed as described below to determine that all building materials, as outlined in this SIP, have been removed.

### 3.3.2 Exterior Remediation Procedures

Exterior remediation procedures are as follows:

- Where necessary, the ground adjacent to and beneath areas where PCB Bulk Products and Building Material will be removed, will be remediated after performance of the Bulk Product/Building Material removal and will be protected by the contractor during the remediation activities. During removal of PCB Bulk Products and associated Building Material, ground surfaces in the regulated areas will be covered with two (2) layers of six (6) mil polyethylene sheeting to capture/collect any debris generated, and secured to prevent movement. The sheeting will extend a minimum of ten (10) feet beyond the building area to be remediated.
- Any building openings such as windows, doors, vents, etc. in the immediate vicinity of the exterior remediation areas will be sealed off with critical barriers consisting of a minimum of one (1) layer of six (6) mil polyethylene sheeting securing the edges with tape.

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- A Negative Pressure Enclosure (NPE) will be constructed around the work area by covering of floor and wall surfaces with two (2) layers of six (6) mil polyethylene sheeting sealed with tape. Polyethylene sheeting will be applied alternately to floors and walls.
- The Contractor will create a negative pressure differential in the range of 0.02 to 0.04 inches of water column between the Remediation Area and surrounding areas by the use of acceptable HEPA filtered negative air pressure equipment. No air movement system or air filtering equipment will discharge unfiltered air outside the Remediation Area. The contractor shall continually monitor and document the pressure differential to ensure that the NPE is functioning appropriately. In the event of inadequate pressure differential, the Contractor will stop work. Work will recommence after an acceptable pressure differential has been established.
- Signs will be posted outside each enclosure to prevent unauthorized personnel from entering.
- Removal work practices within the regulated containment will be implemented which facilitate the removal of the PCB Bulk Product Waste and associated building material while also limiting the amount of dust and debris to be generated. The contractor will remove six (6) inches and/or 1 course of CMU block of adjacent building material substrate around the PCB Bulk Product Waste as required.
- All Building Materials removed during the remediation will be wrapped in poly sheeting and transported to the waste storage area. The poly sheeting will be secured with tape to ensure that no dust is released during the transport and the contractor will be responsible for the remediation of any new releases caused by spillage.
- Verification sampling will be performed as described below to determine that all building materials, as outlined in this SIP, have been removed.

### 3.4 Cleanliness Verification

For interior and exterior containments, the entire containment will be HEPA vacuumed to remove all debris. Upon conclusion of cleaning, the on-site environmental consultant will then inspect the area to determine that each area has been cleaned of all visible dust generated during abatement. For interior containments, two (2) wipe samples will be collected from horizontal areas where dust will accumulate within each containment. For exterior containments, two (2) wipe samples will be performed on horizontal building materials that were within the containment.

For areas within the containments, all wipe samples obtained from the poly sheeting that will be disposed will be required to be  $<10.0 \mu/100 \text{ cm}^2$ .

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An estimated amount of cleanliness verification wipe samples is included in Table 4. However, the actual number performed in the field will depend upon the number of containments established by the Contractor for the abatement actions.

If any of the containment areas fail the cleanliness verification procedures, inspection or wipe samples, the Contractor shall re-clean the unacceptable area followed by follow-up inspections and testing until the areas are found to be acceptable.

### 3.5 Verification Sampling

Approval of verification on a frequency less than that specified in Subpart O is requested for this remediation project. Based on the existing sample data and this SIP for the project, the proposed verification sampling frequency is one sample per every 50 linear feet of interface between building caulk and building material substrates that are porous materials.

All verification samples from porous materials will be collected following the EPA Region 1 Standard Operating Procedure. Table 4 lists the areas where samples will be collected for Federally-Regulated caulking and/or glazing compounds and the estimated number of verification samples to be collected. Additionally, Table 4 lists the areas where samples will be collected for Non-Federally Regulated caulking and/or glazing compounds and the estimated number of verification samples to be collected.

Additional details as to sampling protocols are as follows:

- At locations where PCB Bulk Product Wastes are bordered on either side by porous materials (e.g. concrete, brick, masonry) both sides of the removal action will be treated in the calculation of linear feet for verification sampling. If at all possible, verification samples on either side of the caulked joint will be staggered so as to "spread" the location of the verification samples.
- Any material present behind the PCB containing caulking and/or glazing compounds and in contact with a porous surface will be removed and disposed with the caulking and/or glazing compounds.
- No verification samples will be collected when the PCB Bulk Product Waste is classified as a glazing if the glazing is applied to two non-porous surfaces (e.g. glass and metal window frame). Paint on painted metal window frames will be considered to be a porous surface. However, no attempt will be made to segregate materials and the window, glazing, and frame will be totally removed. Thus, the metal frame would have limited the potential impact of PCBs and the building materials in contact with the metal frame will not be considered in the determination of linear feet for verification sampling.

The on-site environmental consultant will collect verification samples at the approved frequency and will be responsible for verifying that sufficient samples have been

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collected and that the remedial goal has been achieved prior to initiation of "clean" demolition activities. Clean demolition activities will commence after the on-site environmental consultant has determined that remedial requirements have been achieved. In the case where verification samples do not achieve the remedial goal, the on-site environmental consultant will instruct the remedial contractor to reestablish the appropriate controls and regulated area and to continue the removal of Building Materials using removal procedures as stated above.

## 3.6 Soil Remediation

Soil remediation areas are easily accessible and therefore may be performed with the use of an excavator or similar type of equipment that will be live loaded into lined roll-off containers or dump trailers for transport to the appropriate disposal facility. Verification samples will be collected from the areas of excavated soil upon completion of removal. Representative soil grab samples will be collected from the entire remediated areas.

Soil excavation will be backfilled with certified clean soil meeting the CTDEEP Remediation Standards Regulations (RSRs) for the Residential Direct Exposure Criteria (RDEC) and Groundwater Classification B (GB) Pollutant Mobility Criteria (PMC).

## 3.7 Waste Characterization, Transport and Disposal

Wastes will be pre-characterized to the satisfaction of the selected disposal facility prior to initiating any remedial activities. All wastes generated during building remediation activities that will be disposed of as PCB Bulk Product Waste will be transported for disposal at a Non-TSCA-permitted facility.

All wastes generated during soil remediation activities will be transported for disposal as PCB Remediation Wastes at a concentration less than fifty (50) PPM at a facility permitted to receive such waste. It is anticipated that approximately nine (9) cubic yards of soil will be disposed in this manner.

## 3.8 Equipment Decontamination

All movable equipment, tools, and sampling equipment which has contacted the PCB Bulk Product or Remediation Wastes will be decontaminated prior to leaving the site. Decontamination procedures will comply with either Section 761.79(b)(3)(i)(A), Section 761.79(b)(3)(ii)(A) or Section 761.79(c)(2).

All decontamination wastes, PPE, and polyethylene that contacts PCB Bulk Product or Remediation Wastes will be disposed of as PCB Wastes with concentrations greater than 50 PPM. These wastes will be segregated as to matrix, aqueous, non-aqueous liquids, or solid materials (e.g., PPE), and stored in drums or lined containers prior to transport from the site for disposal.

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Aqueous and non-aqueous liquids will be tested for PCB content and shipped offsite for disposal at permitted facility to receive such wastes. Solid Wastes will be containerized with the other regulated PCB wastes generated during the remediation project for transport and disposal.

### **3.9 Notification and Certification**

The removal and abatement measures described within this SIP will be initiated after receiving written approval of the plan from EPA. Notification of intent to perform these remedial measures is provided to EPA with this submittal and will also be provided to the CTDEEP and school and local officials.

Also enclosed with this submittal, in accordance with EPA 40 CFR 761.61(a)(3), is a written certification from TBOE, indicating the location of all reports detailing sample collection and analysis procedures used to assess or characterize the PCB contamination for this SIP are available for EPA inspection.

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## 4 DOCUMENTATION

Documentation of the field activities will be performed on a daily basis by the contractor and remediation monitor during the performance of the remediation and will be summarized at the conclusion of the remediation in a Remedial Action Report (RAR).

### 4.1 Field Notes

The field inspector will maintain a daily log of on-site activities. That log will include, but not be limited to the following:

- Daily health and safety meetings
- Personnel and equipment on site
- Field procedures and observations
- Remediation progress and extents
- Sample locations, selection criteria, samples collected, analyses performed, sample handling
- Telephone or other instructions
- Equipment decontamination
- Building structure substrate/soil verification testing
- Waste transporter information

### 4.2 Photographs

Photographs will be taken of representative activities, such as remediation, sample locations, and soil excavation. The final extents of the remediation/excavations will also be photographed. Copies of selected photographs will be included in the RAR.

### 4.3 Survey

The horizontal extents of the soil excavations will be documented by reference to existing fixed site features such as building or fence lines. Vertical extents will be measured from the surrounding ground surface. The RAR will include documentation of the extent and depth of the soil excavation.

### 4.4 Transport and Treatment/Disposal Certifications

Manifests and/or Bills of Lading for transportation, treatment and disposal of waste materials and certifications of the treatment or disposal of wastes, if necessary, will be obtained from the transporter and from the treatment/disposal facility. Copies of these forms will be included in the RAR.

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### **4.5 Report**

The RAR will be prepared upon receipt of all analytical data confirming that the removal action was complete and receipt of certifications of treatment/disposal from the treatment/disposal facility. The RAR will include the following:

- Site description
- A description of field procedures
- Verification sample locations and analytical results
- A photographic record of the remediation, excavation and backfilling
- Figures showing the extent of excavations and restoration
- Waste characterization sample data
- Waste transport and treatment disposal information
- Copies of waste manifests and bills of lading

### **4.6 Recordkeeping**

All records and documents required by 40 CFR Part 761, including all those records required under Subpart K, will be prepared for and maintained by Middlebrook Elementary School and TBOE. The records shall be maintained in a centralized location for a minimum of three (3) years and will be available for inspection by representatives of EPA if required.

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### **SECTION 5: SCHEDULE AND PLAN CERTIFICATION**

It is the intent of the Owner (Town of Trumbull) and the Board of Ed (Trumbull Public Schools) to begin the removal of PCB Remediation Waste Materials in the summer of 2014. It is anticipated that the removal and cleanup should be completed within a four to six week period during the summer of 2014. Upon completing the PCB Remediation and verification sampling confirming that the Project Objectives have been met within each work area, the renovation work shall commence.

The Owner hereby certifies that all the sampling plans, sample collection procedures, sample preparation procedures, extraction procedures and instrumental/chemical analysis procedures used to assess or characterize the PCB contamination at the cleanup site, are on file at the School and available for EPA inspection.

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Owner's Representative  
Director of Facilities

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Date

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AMC Environmental, LLC  
Principal in Charge

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Date

---

Remediation Contactor  
(To be determined)

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Date

This work plan was prepared to support applications under the Code of Federal regulations Title 40 Section 761.79 (b)(3) and 40 CFR 761.6 (a)(6) for EPA review of decontamination and sampling approaches for specified nonporous materials impacted by specified non-liquid PCB-contaminated ceiling tile and dust identified at Middlebrook School. Decontamination sampling procedures and post abatement acceptance criteria will be based on post abatement visual inspections and applicable confirmatory wipe and air sampling.

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## **APPENDIX A**

### **Non-Federally Regulated PCB-Containing Building Materials Scope of Work**

The location of those materials classified as Excluded PCB Products with total PCB concentrations  $\geq 1$  PPM and  $<50$  PPM based upon sample results of homogeneous material are shown on Diagram PCB-01 and sample results for the caulking and/or glazing compounds are found in Table 1.

All caulking and/or glazing compounds containing  $\geq 1$  PPM and  $<50$  PPM shall be removed without the removal of associated adjacent porous building substrates to start utilizing the same engineering controls described for interior and exterior removals within this document. Following the removal of these caulking and/or glazing compounds; the following actions will be performed:

- Verification samples of adjacent porous building materials substrates will be collected at a frequency of 1 per every 50 linear feet of homogenous caulk or glazing removed.
- If the verification sample is  $<1$  PPM then no further action will be performed.
- If the verification sample is  $\geq 1$  PPM then one of the following two actions will be performed:
  - Six-inches of building materials will be removed from either side of the caulk for areas that are within the demolition/renovation area of the project.
  - Building materials will be encapsulated using materials and procedures that conform to the attachment included in this appendix.

## **APPENDIX B**

### **Analytical Results**

## **APPENDIX C**

### **Public Communication Procedure**

[insert date]

### Draft Notification to Parents, Teachers and Employee Organizations

Middlebrook Elementary School will commence a demolition and renovation program starting on [insert date]. During this program there will be removal of asbestos containing materials, PCB bulk product waste, PCB-contaminated building materials, and PCB-contaminated soil previously identified at the school.

The asbestos and PCB abatement programs were authorized by the State of Connecticut Departments of Public Health (CT DPH) and Energy and Environmental Protection (CT DEEP) and the United States Environmental Protection Agency Region 1 (EPA) after careful planning and thorough review.

It is anticipated that workers and students will use the Middlebrook Elementary School building while removal and abatement is ongoing. To prevent exposure of these persons to contaminated dust, Control Areas will be established outside of the Regulated/Containment/Soil Excavation Areas. Only properly trained personnel associated with the removal, abatement and soil excavation actions will be allowed within the Control Areas that will be established by placing barriers with signs indicating that access to the area is restricted. Oversight will be provided to prevent unauthorized persons from entering these restricted areas.

The asbestos and PCB abatement work will be performed by a Connecticut Department of Public Health licensed asbestos abatement contractor and personnel experienced in the handling of PCB and Asbestos contaminated materials, [contractor name]. Asbestos and PCB abatement work will be monitored continuously by AMC Environmental, an independent environmental consultant hired by the Trumbull Board of Education to conduct air testing during asbestos and PCB abatement activities.

As required by the CT DPH, CT DEEP and EPA, this notification is being sent to parents, teachers, and employee organizations at Middlebrook Elementary School. Any questions about the project may be directed to Steve Kennedy, Director of Plant Operations, Trumbull Board of Education at (203) 452-4306.

We appreciate your patience and understanding during this process.

Sincerely,

Steve Kennedy

State of Connecticut  
Department of Public Health

Division of Environmental Health  
410 Capitol Avenue, MS#51AIR  
Hartford, CT 06134-0308  
860-509-7367

State of Connecticut  
Department of Energy & Environmental Protection

79 Elm Street  
Hartford, CT 06106  
860-424-3329

Asbestos/PCB Consultant

AMC Environmental  
622 Clinton Avenue  
Bridgeport, CT 06605  
203-378-5020

Asbestos/PCB Abatement Contractor

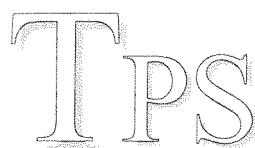
To be determined  
Street Address  
City, State Zip Code  
Contact Number

cc:

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## **APPENDIX D**

### **Notification and Certification**



# TRUMBULL PUBLIC SCHOOLS

6254 MAIN STREET  
TRUMBULL, CONNECTICUT 06611

PLANT OPERATIONS  
TEL. 203 452 4306  
FAX 203 452 4308

January 22, 2014

Ms. Kimberly N. Tisa  
Region 1 PCB Administrator  
United States Environmental Protection Agency  
1 Congress Street, Suite 1100 (CPT)  
Boston, MA 02114-2023

Via Mail

Re: Notification and Certification Pursuant to 40 CFR 761.61(a)(3)(i)(E)  
Self-Implementing Clean Up Plan for  
Middlebrook Elementary School  
220 Middlebrook Avenue  
Trumbull, CT

Dear Ms. Tisa:

Attached is a copy of the remedial plan developed to address PCB-containing building materials at Middlebrook Elementary School for review by EPA. Implementation of this plan will allow for the safe removal and proper disposal of PCB-containing materials prior to the renovation of structures located at the site. This letter and the attached remedial plan constitute the notification required to federal authorities at least 30 days prior to the date of initiating remediation under 761.61(a)(3)(i). Work will not commence without having received approval from the EPA. This letter and attached remedial plan will also be forwarded to state officials at the Connecticut Department of Energy and Environmental Protection, and local officials with the Town of Trumbull to satisfy requirements for notification of state and local officials.

This certification is to accompany the Self-Implementing Cleanup Plan for the removal and abatement of building materials and soil remediation work to be performed prior to and during renovation of structures on the site. The project includes the abatement of materials that contain PCBs greater than 50 PPMs which is federally regulated. The project also includes the abatement of materials that contain PCBs less than 50 PPM, therefore is regulated by the State of Connecticut DEEP. This letter serves the notification to EPA as well as the DEEP for PCB materials regulated by each agency. The contract for this work shall be administered by the Trumbull Public Schools. The site is owned by the Town of Fairfield. AMC Environmental has prepared this plan under the provisions specified in 761.61(c) and 761.61(a) for remedial work to be performed at the site.

Certification Pursuant to 40 CFR 761.61(a)(3)(i)(E)

I certify that all sampling plans, sample collection procedures, sample preparation procedures, extraction procedures, and instrumental/chemical analysis procedures used to access or characterize the PCB contamination at the cleanup site are on file at the offices of AMC Environmental, LLC located at 622 Clinton Avenue, Bridgeport, CT and are available for EPA inspection.

If you have any questions you may contact Steve Kennedy at 203-452-4306 or via email at [skennedy@trumbullps.org](mailto:skennedy@trumbullps.org).

Sincerely,



Steve Kennedy

cc: Gary Trombly, CT DEEP  
Patricia Frillici, Principal, Middlebrook School  
P. Sulik, Trumbull-Monroe Health District  
G. Cialfi, Superintendent, Trumbull Public Schools

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## **APPENDIX E**

### **PCB Remediation Technical Specification**

## GENERAL

### 1.1 SECTION INCLUDES

- A. PCB-contaminated materials containing greater than or equal to 50 PPM of PCB have been identified on interior and exterior materials within Middlebrook School. These areas will be impacted by the proposed window system replacement project. The removal of these materials and remediation and decontamination shall be performed in accordance with this section.
- B. The PCB-containing materials containing greater than or equal to 50 PPM of PCB requiring removal and proper disposal have been identified in the following materials in the Building:
  1. Exterior/Interior window caulking compounds, Exterior/Interior window glazing compounds.
- C. The PCB-containing materials containing less than 50 PPM of PCB requiring removal and proper disposal have been identified in the following materials in the Building:
  1. Adjacent porous brick/CMU block and associated mortar
  2. Exterior/Interior window caulking compounds, Exterior/Interior window glazing compounds.
  3. Soil in limited areas adjacent to  $\geq 50$  ppm caulking/glazing.
- D. Refer to PCB Remediation Site Plan Diagram PCB-04 for specific work area locations.

### 1.2 GENERAL REQUIREMENTS

- A. The Contractor shall furnish all labor, materials, facilities, equipment, installation services, employee training, notifications, 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 the Occupational Safety and Health Administration (OSHA), the United States Environmental Protection Agency (USEPA), the State of Connecticut Department of Environmental Protection 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.
- B. All project personnel engaged in the work covered under this section shall be trained with OSHA 40-Hour HAZWOPER training in accordance with OSHA Regulations 29 CFR 1910 and 1926. Workers that perform work/abate materials in the areas that contain asbestos containing materials are required to be asbestos licensed and meet all state and federal requirements.
- C. The Contractor shall be responsible for removing and disposing of all exterior window caulking compounds, interior window glazing compounds, adjacent porous

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brick/CMU block, associated mortar and contaminated soil identified in this Specification. Specific work area locations are identified on the PCB Remediation Site Plan Diagrams (Diagram PCB-04).

D. Federally-regulated PCB-containing caulk and/or glazing compounds (classified as PCB Bulk Product Waste) are defined as any building material manufactured with total PCB concentrations  $\geq 50$  PPM. All federally regulated caulking and/or glazing compounds shall be removed by the contractor and all associated building materials in contact with the subject caulking and/or glazing compounds shall be removed by the contractor as required.

Non-porous building materials shall be removed and disposed of as PCB Bulk Product Waste as shown on the Contract Drawings and Site Remedial Plan. Exterior window systems with the subject PCB-containing glazing compounds and associated metal frames and window glass shall be removed and disposed of as PCB Bulk Product Waste.

Porous building materials abutting exterior and/or interior window caulking compounds shown on the Contract Drawings and Site Remedial Plan shall be removed at least eight (8) inches of interior CMU Block from the source material and six (6) inches of exterior brick from the source material on adjacent to the window systems.

E. Non-federally regulated PCB Containing caulk and/or glazing compounds is defined as any building material manufactured with total PCB concentrations  $>1$  PPM but  $<50$  PPM. All non-federally regulated caulking and/or glazing compounds shall be removed from the site and disposed of by the contractor per these specifications.

Building materials that have documented PCB concentrations  $>1$  PPM and are scheduled to remain shall have an encapsulant applied by the contractor per these specifications in areas that were previously in contact with caulking/glazing. If the total PCB concentrations in the building materials are documented to be  $>1$  PPM are scheduled to be removed, the contractor will be required to remove six (6) inches of the adjacent porous building material. After removal, the remaining building materials may remain in place if the materials are  $<1$  PPM. Please see list below of Excluded PCB Products.

- Window Glazing Compound: TLC Room, Nurses Office, Café, Rooms A-4, A-8, A-9, A-16, B-7, B-14, C-1, C-7, D-6, outside Rooms A-6
- Window Frame Caulk: Nurses Office, outside Rooms A-2, B-5, B-7, outside Café, outside TLC corridor, Social Worker's Office
- Window Sill Caulk: Psychologist Office, Room B-4

F. The contractor is responsible for appropriately cleaning all building materials in contact with federally and non-federally regulated caulking and/or glazing compounds.

G. The owner's On-Site Environmental Consultant shall oversee the Contractor's activities during all PCB related activities. Upon completion of removal, the On-Site

Environmental Consultant shall perform verification sampling. Removal will be considered complete when all verification samples document <1 PPM for PCBs.

- H. All activities involving the disturbance of PCB containing caulk/glazing and associated building materials are covered under these specifications. All work shall be performed in accordance with, but not limited to OSHA Regulation 29 CFR 126, EPA 40 CFR Part 761, RCSA 22a-463 through -469 inclusive, and the PCB Site Remedial Plan where applicable.
- I. The abatement work shall include the removal, transportation, and disposal of all PCB Wastes as identified in the Contract Documents, PCB Site Remedial Plan, and Specifications prior to any phased or planned renovation/demolition work involving the identified PCB areas.
- J. All PCB abatement materials shall be disposed of by the Contractor as PCB Bulk Product Waste  $\geq$ 50 ppm in accordance with 40 CFR Part 761. Remediated soil shall be disposed of as PCB Remediation Waste <50 PPM.
- K. All PCB related work in demolition and/or renovation areas shall be scheduled when school is not in session. Work performed shall be completed ten (10) days prior to any scheduled school event involving students.

### 1.3 SUBMITTALS AND PRE-ABATEMENT MEETINGS

- A. The following documents shall be submitted to the Owner, Construction Administrator and the Owner's Consultant prior to the performance of any work involving PCBs or demolition/renovation:
  1. PCB Work Plan and Health and Safety Plan: A site-specific written work plan that describes the methods to be used for the removal and containment of PCB-containing materials and associated debris, and the contractor's plan to protect workers and to prevent PCB contamination migrating from the work areas. The work plan shall include floor plans and/or site plans indicating the proposed work areas for all PCB removal work as outlined in this Specification. The plan shall also include the Emergency Response Plan that covers contingency plans for unforeseen emergencies. This plan may be reviewed to determine compliance with basic regulatory requirements and requirements of these specifications. Acceptance of the plan will not in any way relieve the Contractor of responsibility of any potential hazards. These hazards remain with the sole responsibility of the Contractor.
  3. Training Documentation: Documentation of OSHA 40-Hour HAZWOPER Training for all employees and subcontractors to be used for the abatement work and 8-Hour HAZWOPER Supervisor Training for the designated on-site Health and Safety Officer for the abatement work shall be submitted to the Owner's Consultant prior to workers arriving on the job site.
  4. Medical Evaluations and Respirator Fit Testing: Documentation stating each worker received the following:
    - a. Medical monitoring within the previous twelve (12) months as required

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by 29 CFR 1910.120.

b. Respirator fit testing (for workers who plan to wear a tight fitting respirator) within the previous twelve (12) months as required by 29 CFR 1910.134.

5. **PCB Disposal Plan:** A written plan that details the Contractor's plan for transportation and disposal of PCB-containing wastes generated during the project. The Disposal Plan shall identify:

- a. Waste packaging, labeling, placarding and manifesting procedures.
- b. The name, address and 24-hour contact number for the proposed Non-TSCA Approved landfill to which waste generated during the project will be transported.
- c. The name, address, contact person(s) and state-specific permit numbers for proposed waste transporters, and EPA identification number for firms that will transport hazardous waste.
- d. The license plate numbers of vehicles to be used in transporting of the waste from the site to the disposal facility.
- e. 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 if the waste is to be disposed of outside of the State of Connecticut.

6. No abatement shall commence until a copy of all required submittals have been received and found acceptable to the Owner and the Owner's Representatives. Workers added to the Contractor's original list will be allowed to perform work only upon submittal, and receipt of, all the above required paperwork to the Owner and Owner's Representatives.

7. **Material Safety Data Sheets:** Material Safety Data Sheets (OSHA Form 174 or equivalent) and manufacturer's information shall be provided for all chemicals and materials to be used during the project.

8. Notice shall be provided to the Owner and the Owner's Representatives at least five (5) business days prior to the start of work under this specification.

B. The following documents shall be submitted to the Owner's Consultant within twenty-one (21) calendar days following removal of waste from the site:

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

C. The Architect/Design Consultant upon receipt, review and substantial approval of all pre-abatement submittals and upon verification that all material and equipment required for the project are available to the contractor will arrange for pre-abatement meeting between the abatement contractor, superintendent and foreman and the Owner Representative(s). The purpose of the meeting is to discuss any aspects of the submittals needing clarification or amplification and to discuss any aspects of

the project execution and the sequence of operations. The abatement contractor and his employees shall be prepared to provide any supplemental evidence and information to the Owner's Representative pertaining to any aspects of the submittals or the materials and equipment. This meeting will be held no later than five (5) days prior to scheduled commencement. If the contractor fails to provide each and every submittal in a form acceptable to the Design Consultant **5 days prior** to this meeting, then the contractor will be responsible to pay the Design Consultant for review time at the rate of \$100.00 per hour, with a minimum charge of five (5) hours. Upon satisfactory resolution of any outstanding items or questions, the Owner's representative will issue a written order to proceed to the abatement contractor. **No abatement work shall be initiated prior to the written order to proceed.** The Contractor's failure to provide the submittals in accordance with the above shall not relieve the Contractor of his responsibility to complete the work in the time frame specified.

#### 1.4 DEFINITIONS

- A. Contaminant Zones – Areas of active abatement and the waste storage area.
- B. Abatement – The removal of PCB contaminated building materials in the manner specified in this section.
- C. Federally-Regulated PCB Bulk Product Wastes – As defined in §761.3, means 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 50 PPM PCBs.
- D. Non-Federally Regulated PCB Waste – 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  $\geq$  PPM and  $< 50$  PPM PCBs.
- E. PCB Waste – PCB-containing caulk and glazing (Federally-regulated and non-federally regulated PCB) and abutting building materials to the subject caulk and glazing.
- F. PCB Site Remedial Plan – “Self-Implementing Cleanup Plan, Middlebrook Elementary School”, Prepared by AMC Environmental, LLC, September 2013.
- G. Remedial Action Level – Concentration to which PCB contaminated building materials must be removed to verify completion of the abatement work.
- H. PCB Contaminated Building Materials – Consists of those caulking and/or glazing compounds identified as PCB Bulk Product Wastes and/or non-federally regulated materials. Also may include the building materials in which the caulking and/or glazing compounds are in contact with which includes, but not limited to, window frames, window glass, brick, concrete, mortar, metal and stone window sills.
- I. Suitable Waste Storage Container – A Container in which PCB wastes are placed for storage prior to transport offsite for disposal that is water tight, lined, and equipped with a cover to prevent the infiltration of rainwater into the container.
- J. Verification Sampling – sampling performed by the On-Site Environmental Consultant to determine the completion of abatement activities as per the PCB Site Remedial Plan.
- K. Waste Storage Area – The secured location in which the contractor shall store PCB wastes prior to offsite transport for disposal. The Contractor shall consult with the Owner and the On-Site Environmental Consultant to identify the location of Waste

Storage Areas prior to generating any wastes. This area shall be secured and signed by the Contractor.

L. Owner – The Owner is the Trumbull Board of Education, as further defined in the General Conditions.

M. On-Site Environmental Consultant – the onsite representative for the Owner responsible for overseeing daily work activities. The On-Site Environmental Consultant shall approve all containments prior to performance of abatement work, sampling during and after abatement activities, and for verifying that abatement has been successfully performed and allowing containments to be removed.

## 1.5 APPLICABLE STANDARDS AND REGULATIONS

A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only. Where a conflict or overlap among regulations and/or these specifications exist, the most stringent requirements shall apply. The Owner's Consultant will determine which requirements are most stringent.

### 1. AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

a. ANSI.Z89.1 Personnel Protective Equipment-Protective Headwear for Industrial Workers-Requirements (Latest Revision) ANSI.Z87

### 2. CODE OF FEDERAL REGULATIONS (CFR)

a.	29 CFR Subpart D	Walking-Working Surface
b.	29 CFR 1910.120	Hazardous Waste Operations and Emergency Response
c.	29 CFR 1910.134	Respiratory Protection Standard
d.	29 CFR 1910.1200	Hazard Communication
e.	29 CFR 1926.20	General Health and Safety Provisions
f.	29 CFR 1926.57	Ventilation
g.	29 CFR 1926.59	Hazard Communication Program
h.	29 CFR 1926.62	Lead Exposure in Construction
i.	29 CFR 1926.65	Hazardous Waste Operations and Emergency Response
j.	29 CFR 1926.95	Criteria for Personal Protective Equipment
k.	29 CFR 1926, Subpart H	Materials Handling, Storage, Use and Disposal
l.	29 CFR 1926, Subpart L	Scaffolding
m.	29 CFR 1926, Subpart M	Fall Protection
n.	29 CFR 1926, Subpart X	Ladders
o.	29 CFR 1926, Subpart Z	Toxic and Hazardous Substances
p.	40 CFR 50.6	National Primary and Secondary Ambient Air Quality Standards for Particulate Matter
q.	40 CFR 260	Hazardous Waste Management System: General
r.	40 CFR 261	Identification and Listing of Hazardous Waste
s.	40 CFR 262	Standards Applicable to Generators of Hazardous Waste
t.	40 CFR 263	Standards Applicable to Transporters of Hazardous Waste
u.	40 CFR 264	Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
v.	40 CFR 265	Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities

w.	40 CFR 268	Land Disposal Restrictions
x.	40 CFR 700	Toxic Substances Control Act (TSCA)
y.	40 CFR 761	PCBs Manufacturing, Processing, Distribution in Commerce and Use Prohibitions
z.	49 CFR 105	Hazardous Materials Program. Definitions and General Procedures
aa.	49 CFR 171	General Information, Regulations and Definitions
bb.	49 CFR 172	Hazardous Material Tables. Special Provisions, Hazardous Materials Communications, Emergency Response Information, and Training Requirements
cc.	49 CFR 173	Shippers-General Requirements for Shipments and Packaging's
dd.	49 CFR 177	Carriage by Public Highway
ee.	49 CFR 178	Specifications for Packaging's

3. NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH (NIOSH) Publication Number 87-10B Respiratory Decision Logic

a. NIOSH/OSHA Booklet 3142 Lead in Construction

b. Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities (NIOSH Publication 85-115)

4. U.S. DEPARTMENT OF LABOR, OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA)

a. PUB 3126 Working with Lead in the Construction Industry

b. 29 CFR 1910, Subpart I, Appendix B-Non-Mandatory Compliance Guidelines for Hazard Assessment and Personal Protective Equipment Selection

5. REGULATIONS OF CONNECTICUT STATE AGENCIES (RCSA)

a. Hazardous Waste 22a-449(c)-100 through 119

b. Hazardous Waste Transporter Permits 22a-449(c)-11

c. Permit Fees for Hazardous Waste Materials Management 22a-454-1

6. UNITED STATES ENVIRONMENTAL PROTECTION AGENCY GUIDANCE

a. 40 CFR Part 761

## 1.6 POSTING AND RECORD MAINTENANCE REQUIREMENTS

A. The following items shall be conspicuously displayed proximate to but outside of abatement work areas. The contractor shall assure that the posted regulations are not altered, defaced or covered by other materials.

1. Exit Routes

2. Emergency exit procedures and routes

B. Emergency Phone Numbers

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1. 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 Transportation Emergency Center (CHEMTREC); the Connecticut State Department of Public Health's office; the contractor (on-site and after hours numbers); and the environmental consultant (on-site and after hours numbers).

C. Warning Signs

1. 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:

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

D. Items Available On-Site

1. The contractor shall maintain the following items on-site and available for review by all employees and authorized visitors:
  - a. Project Health and Safety Plan (HASP)
  - b. Certificates of Training for all workers and the project Supervisor
  - c. Codes, Standards and Publications
    - 1) Copies of applicable codes, standards, and publications
  - d. MSDS
    - 1) Material Safety Data Sheets (MSDS) for all chemicals used during the project.
  - e. Compliance Programs
    - 1) Copies of the contractor's written hazard communication, respirators protection, and confined space entry programs.

1.7 MINIMUM REQUIREMENTS FOR WORKER HEALTH AND SAFETY

A. GENERAL

1. The contractor is responsible and liable for the health and safety of all on-site personnel and the off-site community affected by the project. All on-site workers or other persons entering the abatement work areas, decontamination areas or waste handling and staging areas shall be knowledgeable of and comply with the requirements of the site-specific

Health and Safety Plan (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 to be performed under this project.

2. The contractor shall not initiate on-site work in the contaminated areas until the HASP has been finalized, and approved by the Owner's Consultant.
3. 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 the Architect.
4. Any discrepancies between the contractor's HASP and these specifications or federal and state regulations shall be resolved in favor of the more stringent requirements that provide the highest degree of protection to the project personnel and the surrounding community and environment, as determined by the Owner's Consultant.
5. 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 contractor employees at all times. It is the contractor's responsibility to comply with all applicable health and safety regulations.

## B. HEALTH AND SAFETY PLAN

1. The contractor shall prepare and submit a site-specific Health and Safety Plan (HASP) to the Owner's Consultant a minimum of twenty-one (21) business days prior to commencement of abatement work. The HASP shall govern all work conducted at the site during the abatement of PCB-containing materials and related debris: waste handling, sampling, and management; and waste transportation.
2. At a minimum, the HASP shall address the requirements set forth in 29 CFR 1910.120, as further outlined below:
  - a. Health and Safety Organization
  - b. Site Description and Hazard Assessment
  - c. Training (HAZWOPPER)
  - d. Medical Surveillance
  - e. Work Areas
  - 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
  - l. Telephone List
  - m. Emergency Response and Evacuation Procedures and Routes
  - n. Site Control
  - o. Permit-Required Confined Space Procedures (If Applicable)
  - p. Spill Containment Plan
  - q. Heat and Cold Stress
  - r. Record Keeping

## s. Community Protection Plan

3. The HASP shall be reviewed by all persons prior to entry into the abatement, decontamination, or waste staging areas, whether a representative of the contractor, owner, architect/engineer, environmental consultant, subcontractors, waste transporter or federal, state or local regulatory agency. Such review shall be acknowledged and documented by the contractor's Health and Safety Officer by obtaining the name, signature and affiliation of all persons reviewing the HASP.
4. The HASP shall be maintained so as to be readily accessible and reviewable by all site personnel throughout the duration of the abatement project and until all waste materials are removed from the site and disposed of at the appropriate disposal facility.
5. The Contractor's on-site Health and Safety Officer shall be responsible for ensuring that project personnel and site visitors are informed of and comply with the provisions of the HASP at all times during the project.

## C. WORK AREAS

1. The contractor shall establish and clearly identify work areas in the field. Access by equipment, site personnel, and the public to the work areas shall be limited as follows:
  - a. Abatement Zone-The Abatement Zone(s) shall consist of all areas where abatement, waste handling and staging activities are ongoing and the immediately surrounding locale or other areas where contamination could occur. Each Abatement Zone shall be visibly delineated with a chain link fence around the waste container (exterior) and caution tape (interior) at a minimum, and restricted from access by all persons except those directly necessary to the completion of the respective abatement tasks. The Abatement Zones shall be relocated and delineated as necessary as work progresses from one portion of the project site to another, to limit access to each abatement area and to minimize risk of exposure to site workers and the general public. Access shall be controlled at the periphery of the Abatement 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 Abatement Zones shall wear the appropriate level of protection established in the HASP.
  - b. Decontamination Zone-The Decontamination Zone is the transition zone between the abatement area and the clean support zone of the project site, and is intended to reduce the potential for contaminants from being dispersed from the Abatement Zone to clean areas of the site. The Decontamination Zone shall consist of a buffer area surrounding each Abatement 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 clearly delineated with orange construction fencing (exterior) and caution tape (interior) at a minimum and labeled with signage as provided in Part 1.5 of this Section. All

emergency response and first aid equipment shall be readily maintained in these Zones. All protective equipment and clothing shall be removed or decontaminated in the Decontamination Zone prior to exiting to the Support Zone.

- c. Support Zone - The Support Zone will consist of the area outside the Decontamination Zones and the remainder of the project site. Administrative and other support functions and any activities that by nature need not be conducted in the Abatement or Decontamination Zone related to the project shall occur in the Support Zone. Access to the Abatement and Decontamination Zones shall be controlled by the Health and Safety Officer and limited to those persons necessary to complete the abatement work and who have reviewed and signed the HASP.
2. Within each interior Abatement Zone, negative pressure enclosures shall be established to prevent the dispersal of PCB's during abatement work. Each negative pressure enclosure shall consist of polyethylene sheeting (6 mil), warning signs, and negative air filtration equipment with HEPA filtered exhaust systems.

#### D. PERSONNEL PROTECTIVE EQUIPMENT

1. The contractor shall be responsible to determine and provide the appropriate level of personal protective equipment in accordance with applicable regulations and standards necessary to protect the contractor's employees and the general public from all hazards present.
2. 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 work activities.
3. The contractor shall establish in the HASP criteria for the selection and use of personal protective equipment (PPE).
4. The PPE to be utilized for the project shall be selected based upon the potential hazards associated with the project site and the work to be performed. Appropriate protective clothing shall be worn at all times within the Abatement Zone.
5. The contractor shall provide the appropriate level of respiratory protection to all field personnel engaged in activities where respiratory hazards exist or there is a potential for such hazard to exist.
6. The contractor shall provide, as necessary, protective coveralls, disposable gloves and other protective clothing for all personnel that will be actively involved in abatement activities or waste handling activities or otherwise present in the Abatement Zones. Coveralls shall be of Tyvek or equivalent material. Should the potential for exposure to liquids exist, splash-resistant disposable suits shall be provided and utilized.
7. Protective coveralls, and other protective clothing shall be donned and removed within the Decontamination Zone and shall be disposed of at the end of each day. Ripped coveralls shall be immediately replaced after appropriate decontamination has been completed to the satisfaction of the

Health and Safety Officer. Protective clothing shall not be worn outside of the Decontamination Zone.

8. 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, safety shoes and hard hats shall be in conformance with ANSI Z89.1 (1969) and ANSI 241.1 (1967), respectively.
9. 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 in accordance with 40 CFR 262.

#### E. STANDARD SAFETY AND HEALTH PROCEDURES AND ENGINEERING CONTROLS

1. The following provisions shall be employed to promote overall safety, personnel hygiene and personnel decontamination:
  - a. 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.
  - b. All prescription eyeglasses in use on this project shall be safety glasses conforming to ANSI Standard Z87.1.
  - c. 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.
  - d. All PPE used on site shall be decontaminated or disposed of at the end of each work day. Discarded PPE shall be placed in sealed CTDOT-approved 55-gallon barrels for off-site disposal.
  - e. Respirators shall be dedicated to each employee, and not interchanged between workers without cleaning and sanitizing.
  - f. 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 abatement and decontamination work zones. Prior to performing these activities, each employee shall thoroughly cleanse their face, hands, arms and other exposed areas,
  - g. All personnel shall thoroughly cleanse their face, hands, arms and other exposed areas prior to using toilet facilities.
  - h. No alcohol, tobacco, illicit drugs or firearms will be allowed on the site at any time.

### PART 2 - PRODUCT

#### 2.1 MATERIALS AND EQUIPMENT

- A. All materials shall be delivered in the original packages, containers, or bundles

bearing the name of the manufacturer and the product name.

B. House Keeping of Work Site

1. The Contractor shall protect adjacent structures and surfaces from traffic or any other damage. The Contractor shall repair and reestablish damaged building materials that are to remain in place prior to the acceptance of the work.
2. The Contractor shall keep all surfaces as free as practical from accumulations of PCB-containing materials and other waste materials during the abatement work.
3. All loose and/or non-intact PCB-containing materials and other debris shall be thoroughly collected and securely containerized in the final waste receptacles at the conclusion of each work day.
4. All disposable personal protective equipment shall be placed in the designated waste receptacles at the conclusion of each work day or at any time that such items are removed or changed.

C. Damaged or deteriorating materials shall not be used and shall be removed from the premises.

D. Fire Retardant Polyethylene sheet in a roll size to minimize the frequency of joints shall be delivered to job site with factory label indicating four (4) or six (6) mil.

E. Tape or adhesive spray capable of sealing joints in adjacent polyethylene sheets and for attachment of polyethylene sheets to finished or unfinished surfaces of dissimilar materials and capable of adhering under both dry and wet conditions, including use of amended water.

F. Tools and Equipment – Provide suitable tools for PCB removal and cleanup.

G. The Contractor shall have air monitoring equipment of type and quantity to monitor operations and conduct personnel exposure surveillance per OSHA requirements.

H. The Contractor shall have available sufficient inventory on site for materials necessary for the job including protective clothing, respirators, filter cartridges, polyethylene sheeting of proper size and thickness, tape, and air filters.

I. The Contractor shall provide temporary electrical power sources such as generators (when required). The electrical power supply shall be sufficient for all equipment required for this work in operation throughout the duration of the work.

J. The Contractor shall provide sufficient water to properly execute the required work adequately in the event water service is not available.

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

L. Ladders and/or scaffolds shall be in compliance with OSHA 29 CFR 1926 Subpart L

and X requirements.

- M. OSHA Fall Protection Standard 29 CFR 1926 Subpart M shall be complied with if work is performed above six (6) feet.
- N. All labels and warning signs shall conform to OSHA 29 CFR 1926, USEPA 40 CFR Part 761, and USDOT 49 CFR Part 172 as appropriate.

## PART 3 - EXECUTION

### 3.1 GENERAL

- A. All labor, materials, tools, equipment, services, testing, insurance, and incidentals which are necessary or required to perform the work in accordance with applicable governmental regulations, industry standards and codes, and these Specifications shall be provided by the Contractor. The Contractor shall be prepared to work all shifts and weekends throughout the course of this work.
- B. Prior to the beginning of work pertaining to these specifications, the Owner's Representatives and Contractor shall perform a visual survey of each work area and review conditions at the site to perform a safety evaluation.
- C. The Contractor shall inform and instruct all workers in all aspects of personnel protection, work procedures, emergency evacuation procedures and use of equipment including procedures unique to this work.
- D. The Contractor shall shut down and/or isolate heating, cooling, and ventilation air systems or zones to prevent contamination and PCB dispersal to other areas of the building. Lock and tag out circuits associated with heating and cooling units.
- E. The Contractor shall shut down and lock out electrical power, including all receptacles and light fixtures, when feasible. The use or isolation of electrical power will be coordinated with all other ongoing uses of electrical power at the site.
- F. The Contractor shall coordinate all power and fire alarm isolation with the appropriate representatives. When necessary, provide temporary power and adequate lighting and ensure safe installation of electrical equipment, including ground fault protection and power cables, in compliance with applicable electrical codes and OSHA requirements. The Contractor is responsible for proper connection and installation of electrical wiring. Connections must be performed by a State of Connecticut Licensed Electrician.

### 3.2 INTERIOR AND EXTERIOR CONTAINMENTS

Containments for interior and/or exterior abatement work shall be constructed in the same manner.

The abatement Contractor shall establish a Control Area around each area where removal

actions are being performed. Only properly trained personnel associated with the removal or abatement will be allowed within the Control Areas that will be established by placing barriers with signs indicating that access to the area is restricted. The Contractor's field inspector will maintain the Control Areas and escort unauthorized personnel from the area promptly. Only those personnel actively working on the removal, abatement, and soil excavation actions will be allowed within the Regulated/ Containment Area and they shall be equipped with appropriate Personal Protective Equipment (PPE).

The Contractor shall pre-clean the work areas using HEPA filtered equipment (vacuum) and/or wet methods as appropriate, collecting and properly containing all dust and debris identified as PCB Waste. Vacuum units, of suitable size and capabilities for the project, shall have HEPA filters capable of trapping and retaining at least 99.97 percent of all mono-dispersed particles of three micrometers in diameter or larger. Do not use methods that raise dust, such as dry sweeping or vacuuming with equipment not equipped with HEPA filters.

After pre-cleaning, movable objects shall be removed from the work areas with the utmost care to prevent damage of any kind and relocated to a temporary storage location coordinated with the On-Site Environmental Consultant. The Contractor is responsible for protecting all fixed objects that are permanent fixtures or are too large to remove and remain inside the Regulated Area. Fixed objects shall be enclosed with one layer of six (6) mil polyethylene sheeting sealed with tape.

The Contractor shall ensure that no personnel or equipment be permitted to leave the Control Area until proper decontamination procedures (including HEPA vacuuming, wet wiping and showering) to remove all PCB debris have occurred. No PCB contaminated materials or person shall enter the Clean Room.

The Contractor shall seal off all window, doorways, skylights, ducts, grilles, diffusers, vents, light fixtures, electrical receptacles, suspended ceiling tile systems and any other openings between the Regulated Area and the uncontaminated areas outside of the Regulated Area, including the outside of the building, with critical barriers consisting of a minimum of one (1) layer of six (6) mil polyethylene sheeting securing the edges with tape and glue. Doorways and corridors which will not be used for passage during work and separate the regulated areas from occupied areas must be sealed with fixed critical barriers constructed of 2"x4" wood or metal framing 16" O.C., with 1/4" plywood on the occupied side and two layers of six (6) mil polyethylene sheeting on the Regulated Area side to prevent unauthorized access or air flow.

A Negative Pressure Enclosure (NPE) shall be constructed by the Contractor via covering of floor and wall surfaces with polyethylene sheeting sealed with tape. Polyethylene shall be applied alternately to floors and walls. Cover floors first, with a layer of six (6) mil polyethylene sheeting, so the polyethylene extends at least twelve (12) inches up on wall. Cover wall with a layer of six (6) mil polyethylene sheeting to twelve (12) inches beyond the wall/floor intersection, thus overlapping the floor material by a minimum of twenty-four (24) inches. Repeat the process for the second layer of polyethylene. There shall be no seams at wall-to-floor joints.

Conspicuously label and maintain emergency and fire exits from the Regulated Area

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satisfactory to fire officials.

The Contractor shall create a negative pressure differential in the range of 0.02 to 0.04 inches of water column between the Regulated Area and surrounding areas by the use of acceptable negative air pressure equipment. Exhaust air filtration units shall be equipped with HEPA filters capable of providing sufficient air exhaust to create a minimum pressure differential of 0.02 inches of water column, and to allow a sufficient flow of air through the areas providing 4 air changes per hour. The Contractor shall provide a sufficient quantity of HEPA air filters to maintain the pressure differential throughout the duration of the project. An Automatic warning system shall be incorporated into the equipment to indicate pressure drop or unit failure. Continuously monitor the pressure differential between the Regulated Area and surrounding areas to ensure exhaust air filtration equipment maintains a minimum pressure differential of 0.02 inches of water column. The Contractor shall provide actual air flow measurement of filtration units while the unit is in place and calculate actual air exchange rates. No air movement system or air filtering equipment shall discharge unfiltered air outside the Regulated Area.

### 3.3 DECONTAMINATION ENCLOSURE SYSTEMS

- A. The Contractor shall establish a personnel and equipment decontamination system contiguous to each work area. Access between the contained and uncontained areas shall be through this decontamination enclosure only. The decontamination system shall be constructed of two layers of six-mil polyethylene sheeting.
- B. Equipment to be utilized in connection with the PCB-containing materials removal, 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 from the project site.
- C. All non-disposable equipment and tools employed in the course of the project will be decontaminated according to 761.79(c)(2)(ii), at the conclusion of each work day through the following sequence:
  1. Initial tap water rinse, to remove gross debris
  2. Tap water and Hexane wash
  3. Tap water rinse
  4. Second tap water and Alconox wash
  5. Second tap water rinse
- D. The wash water and decontamination liquids shall be captured and containerized in 55-gallon barrels for proper off-site disposal.

### 3.4 THE CONTRACTOR SHALL POST WARNING SIGNS TO DETER UNAUTHORIZED PERSONNEL FROM ENTRY. ADDITIONAL SIGNS MAY REQUIRE POSTING FOLLOWING CONSTRUCTION OF WORKPLACE ENCLOSURE BARRIERS.

### 3.5 PCB ABATEMENT PROCEDURES

The Site Supervisor, acting as the OSHA Competent Person, shall be at the site at all times during the performance of abatement work.

The Contractor shall not begin abatement work until authorized by the On-Site Environmental Consultant, following a pre-abatement visual inspection of each Regulated Area.

All workers and authorized persons shall enter and leave the Regulated Area through the worker decontamination unit, leaving contaminated protective clothing in the airlock for disposal of as PCB contaminated waste. No one shall eat, drink, smoke, chew gum, or tobacco, or apply cosmetics while in a Regulated Area.

The following details the extent of each phase of operation designated for this work. Phase areas may be combined or divided at the direction of the On-Site Environmental Consultant. Proceed through the sequencing of the work phases under the direction of the Engineer.

See the PCB Site Remedial Plan and other Contract Drawings provided for the site for specific locations of PCB containing caulk and glazing. The specific locations for these materials and amount of associated building materials to be removed as well are indicated on these drawings and the PCB Site Remedial Plan.

During removal, the Contractor shall spray PCB containing building material with water using airless spray equipment capable of providing a “mist” application to reduce airborne dust. Hose length shall be sufficient to reach all of the Regulated Area. Do not “flood” the area with hose type water supply equipment with the potential to create water releases from the regulated area.

The Contractor shall employ mechanical methods such as cutting, grinding, and pneumatic hammers to remove PCB contaminated wastes. The methods employed must not damage the integrity of the containment structure and shall not create a breach through which contaminated dust may escape. The Contractor shall be responsible for all costs associated with decontamination and remediation in the case of a containment breach.

In order to minimize PCB concentrations inside the Regulated Area, the Contractor shall remove the materials in manageable sections. In addition, PCB Waste materials removed from any elevated level shall be carefully lowered to the floor.

The Contractor shall promptly place the PCB Waste material in disposal containers (six (6) mil polyethylene bags/poly-lined dumpster, etc.) as it is removed. Large components removed intact may be wrapped in one (1) layer of six (6) mil polyethylene sheeting secured with tape and glue. As the disposal containers are filled, the Contractor shall promptly seal the containers, apply caution labels and clean the containers before transportation to the airlock. Bags shall be securely sealed to prevent accidental opening and leakage by taping in gooseneck fashion. Small components and PCB Waste material with sharp-edged components (e.g. nails, screws, metal lath, tin sheeting) which could tear polyethylene bags and sheeting shall be placed in clean drums and sealed with locking ring tops.

All waste containers shall be leak-tight. Containers shall be decontaminated by wet cleaning

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and HEPA vacuuming within the airlock prior to exiting the Regulated Area. Wet clean each container thoroughly before moving to a Waste Holding Area.

The Contractor shall regulate an area that only trained personnel will be prohibited during the execution of the soil excavation. Soil excavation may be performed by mechanical methods as long as there are no visible emissions. The contractor is responsible for the excavation and disposal of nine (9) cubic yards of soil. The contractor is also responsible for the replacement of the appropriate amount of screened top soil and/or mulch in the areas of excavation. Shall the amount of replacement soil/mulch exceed nine (9) cubic yards, the amount exceeded will be considered an extra.

If at any time during PCB Waste removal, the On-Site Environmental Consultant should suspect contamination of areas outside the Regulated Area, the Contractor shall immediately stop all abatement work and take steps to decontaminate these areas and eliminate causes of such contamination. Unprotected individuals shall be prohibited from entering contaminated areas.

After completion of abatement work; all surfaces from which PCB Waste has 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 not permitted). Cleaning shall also include the use of HEPA filtered vacuum equipment.

The Contractor shall also remove and containerize all visible accumulations of PCB Waste and/or PCB contaminated debris which may have splattered or collected on the polyethylene engineering controls/barriers.

The Contractor shall clean surfaces of contaminated containers and equipment thoroughly by vacuuming with HEPA filtered equipment and wet sponging or wiping before moving such items into airlock for final cleaning and removal to uncontaminated areas.

- A. The Contractor shall remove contamination from the exteriors of all non-disposable equipment such as; air filtration devices, scaffolding, ladders, extension cords, hoses and other equipment inside the Regulated Area. All non-disposable equipment and tools employed in the course of the project will be decontaminated according to 761.79(c)(2)(ii), at the conclusion of each work day through the following sequence:
  1. Initial tap water rinse, to remove gross debris
  2. Tap water and Hexane wash
  3. Tap water rinse
  4. Second tap water and Alconox wash
  5. Second tap water rinse.

These materials are also subject to verification wipe sampling upon completion of remediation to confirm adequate decontamination per 40 CFR 761.79(b).

The Contractor shall wet wipe the Regulated Area beginning at the point farthest away from the negative air filtration units using cotton rags or lint free paper towels. Rags and towels

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shall be disposed of after each use as PCB Remediation Waste. Workers should avoid the use of dirty rags to insure proper cleaning of surfaces. Mop the entire floor with a clean mop head and amended. Water shall be changed frequently.

Once the Regulated Area surfaces have dried, the On-Site Environmental Consultant shall perform a thorough post abatement visual inspection. The On-Site Environmental Consultant will visually inspect the Regulated Area and the surrounding Control Area to determine that the Contractor has sufficiently decontaminated and removed any dust that might contain PCBs. All surfaces within the Regulated Area, including but not limited to ledges, beams, and hidden locations shall be inspected for visible residue. Evidence of dust contamination that would be indicative of PCB contamination identified during this inspection will require further cleaning as specified. The area shall be re-cleaned at the Contractor's expense, until the standard of cleaning is achieved.

Once the area has received a satisfactory post-abatement visual inspection, any equipment, tools or materials not required for completion of the work, shall be removed by the Contractor from the Regulated Area. Negative air filtration devices shall remain in place and operating for the remainder of the clean-up operation.

### 3.6 PHASED PCB ABATEMENT PROCEDURES

Should the potential exist for an unsafe condition to be produced by removing PCB contaminated building materials prior to removing clean materials, then the Contractor shall notify the Owner and On-Site Environmental Consultant of such concerns and mitigate potentially unsafe conditions.

Should PCB contaminated building material need to remain to prevent an unsafe situation, the On-Site Environmental Consultant shall collect the required verification samples prior to the performance of any demolition in the area. The Contractor shall then physically demarcate the line of clean building materials as determined by the verification sampling on the structure by painting or otherwise marking the structure so that it is clearly visible.

Once the area is marked, the Contractor may remove clean building materials as described elsewhere in the Contractor Document. After the clean building materials have been removed to the marked line, PCB Contaminated building materials shall be abated according to the procedures state in section 3.4 of this specification.

### 3.7 POST-ABATEMENT RE-OCCUPANCY PROCEDURES

The On-Site Environmental Consultant shall collect verification samples per the EPA Region 1 Standard Operating Procedure for Sampling CMU Block at the frequency specified in the approved PCB Site Remedial Plan. Analysis of verification samples will be expedited but the Contractor shall expect 48 to 72 hours (these hours do not include weekend and/or holiday hours) delay until analytical results are available. Analysis of wipe verification sampling will be expedited but the Contractor shall expect and 48 to 72 hours (these hours do not include weekend and/or holiday hours) delay until analytical results are available. Asbestos air clearance sampling, if required, will be conducted alongside wipe verification sampling and analyzed within the 48 to 72 hour period of wipe sample analysis.

**Federally Regulated PCB Waste:** In areas where PCB Wastes have been removed along with the associated building materials as required, the remedial standard to be achieved by all verification samples is <1 PPM total PCBs. If this standard is achieved then additional re-occupancy work (asbestos re-occupancy air sampling and wipe verification sampling) will be performed. If the remedial standard is exceeded, the Contractor shall be instructed to remove additional building materials as instructed by the On-Site Environmental Consultant.

**Non-Federally Regulated PCB Waste:** Work involving non-federally regulated PCB waste shall be removed and the associated building materials removed and cleaned in accordance with these Specifications and left in place. The remedial standard to be achieved by the verification samples collected from associated building materials is <1 PPM total PCBs. If this standard is achieved and the building materials to be left in place, then additional re-occupancy work (asbestos re-occupancy air sampling, wipe verification sampling on poly sheeting and equipment as well as substrate sampling) will be performed. If this standard is not achieved and the building materials are to be left in place, then an encapsulant shall be applied by the Contractor to the work area where the caulk and glazing were in contact with the building materials and after the encapsulant has sufficiently dried, new caulk or glazing shall be applied by the Contractor.

**Soil Waste (Remediation Waste):** Upon completion of contaminated soil in the appropriate areas verification soil samples will be obtained. The remedial standard to be achieved by the verification samples collected from soil adjacent to the excavated soil is <1 PPM total PCBs. Areas that do not achieve the verification criteria will require the Contractor to excavate an addition four (4) inches of soil until acceptable verification samples are obtained.

Following the collection and analysis of verification samples indicating that remediation goals have been achieved or the encapsulation of other materials, the On-Site Environmental Consultant shall collect wipe samples of poly sheeting surfaces within the Containment Area to determine if the decontamination performed by the Contractor has been sufficient to remove potentially PCB containing dust. The On-Site Environmental Consultant shall obtain expedited analyses of these samples from an outside laboratory, but the Contractor shall expect 48 to 72 hours (these hours do not include weekend and/or holiday hours) delay until analytical results are available. The On-Site Environmental Consultant shall instruct the Contractor to perform additional decontamination if wipe sample results are  $\geq 1.0 \mu\text{g}/100 \text{ cm}^2$ . Areas which do not comply shall continue to be cleaned by and at the Contractors expense, until the specified Standard of Cleaning is achieved as evidenced by results of wipe testing. When the Regulated Area passes the re-occupancy clearance, controls established by these Specifications may be removed.

The Contractor shall be aware that some PCB containing materials also contain regulated concentrations of asbestos. Asbestos air clearance sampling shall be performed alongside wipe/substrate verification sampling within each containment if required.

Wipe/substrate sampling will not begin until after the areas has achieved an acceptable post abatement visual inspection and verification sample results indicate compliance with remedial standards.

Analysis shall follow the requirements of EPA Methods 3540 and 8082.

Each homogeneous Regulated Area which does not meet the clearance criteria shall be thoroughly re-cleaned using HEPA vacuuming and/or wet cleaning, with negative pressure ventilation system in operation. New samples shall be collected in the Regulated Area. The process shall be repeated until the Regulated Area passes the test, with the cost of repeat sampling being borne entirely by the Contractor.

For a PCB Waste abatement project with more than one homogeneous Regulated Area, the release criterion shall be applied independently to each Regulated Area.

These clearance sampling procedures shall be implemented for both interior and exterior NPE work areas.

### 3.8 REPLACEMENT MATERIALS

The contractor is responsible for the replacement including labor, equipment and materials of the appropriate amount of screened top soil and mulch in the areas of excavation. Shall the amount of replacement soil/mulch exceed nine (9) cubic yards, the amount exceeded will be considered an extra.

### 3.9 POST ABATEMENT PROCEDURES

The Contractor shall remove all remaining polyethylene, including critical barriers, and airlocks with the negative air filtration devices in operation. HEPA vacuum and /or wet wipe any visible residue which is uncovered during this process. All waste generated during this teardown process shall be discarded as PCB Bulk Product Waste.

### 3.10 ON-SITE WASTE MANAGEMENT

#### A. SOLID HAZARDOUS WASTES

1. All solid waste material containment system components, used personnel protective equipment, 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 CT DOT-approved 55-gallon barrels.
2. If roll-off containers are to be utilized for containerization of the abatement wastes, the following shall apply:
  - a. All roll off containers or other similar vessels utilized shall be leak-tight and lined with 6-mil polyethylene sheeting or equivalent impermeable lining, and equipped with a secured and impermeable cover.
  - b. The impermeable cover shall remain securely in place at all times when material 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.
3. If 55-Gallon barrels are to be utilized for waste containerization, the barrels

shall consist of suitable DOT-approved 55-gallon barrels that are leak-tight and free of corrosion, perforations, punctures, or other damage. All barrels shall be securely covered and sealed at the conclusion of each work day. 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 disposal facility.

4. A waste roll off and barrel staging area shall be designated prior to initiation of the abatement work, and approved by the Owner's Consultant.

## B. DECONTAMINATION AND LIQUID WASTE MATERIALS

1. The Contractor shall decontaminate all moveable equipment that contacted PCB Wastes in accordance with the procedures specified in accordance with the procedures specified in 40 CFR Part 761.79(c). This process shall employ double wash/rinse procedures as specified in 40 CFR Part 761 Subpart S or swab non-porous surfaces that have contacted PCB wastes with a solvent.
2. Under no circumstances shall decontamination fluids or liquid wastes be discharged to the ground surface or subsurface at the site.
3. Liquid materials, including equipment or personal decontamination fluids or similar liquids generated during excavation work at the site shall be placed directly into appropriately sized and sealed vessels immediately upon generation.
4. Acceptable vessels for the storage of liquid wastes may include DOT approved 55-gallon barrels, steel or polyethylene tanks, fractioning tanks or tank trucks. All proposed vessels shall be compatible with the intended liquid contents.
5. Container staging areas shall be designated prior to initiation of the removal work and approved by the Owner's Consultant.
6. All storage vessels to be used in the containerization and transportation of liquid waste materials shall be free of corrosion, perforations, punctures or other condition that may impair its ability to securely contain liquid.
7. Temporary staging of liquid waste vessels at the site shall be in a manner that will prevent freezing of contained liquids. Should the potential exist for liquid containers to freeze during exterior storage at the site, arrangements shall be made with the Owner's Consultant to identify and utilize an appropriate alternate storage location acceptable to the Owner's Consultant.
8. All liquid storage vessels utilized and staged at the site shall be stored in an area on the property that will not interfere with facility operations or normal flow of vehicle or pedestrian traffic, and in a manner that will minimize the potential for tipping, vandalism or damage by vehicular traffic.

## C. LABELING OF WASTE CONTAINERS

1. All waste containers must be labeled with the name of the waste contained; the date in which the first material was placed in the vessel; and the last date at which addition of waste occurred.
2. All waste containers containing PCB-containing materials, PCB-containing debris, containment system components, used personnel protective equipment, personal and equipment wash water and decontamination fluids,

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or other wastes generated during the abatement work shall be labeled as follows:

HAZARDOUS WASTE-Federal law prohibits improper disposal.  
If found, contact the nearest police or public safety authority or the U.S.  
Environmental Protection Agency.

Generator's Name: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Manifest Document No.: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

3. Such marking must be durable, in English and printed on or affixed to the surface of the package or on a label, tag or sign; displayed on a background of sharply contrasting color; un-obscured by labels or attachments and located away from any other marking (such as advertising) that could substantially reduce its effectiveness.
4. All markings and storage of Federally Regulated PCB Waste shall comply with 40 CFR 761.40, 40 CFR 761.45 and 40 CFR 761.65.

### 3.11 WASTE TRANSPORTATION AND DISPOSAL

- A. All waste packaging, labeling and transportation activities shall be performed in accordance with applicable State of Connecticut and US Department of Transportation Regulations at 49 CFR Parts 171, 172, 173, 177, and 178, and any and all other applicable federal, state and local laws and regulations.
- B. All hazardous wastes shall be shipped using state-specific standard manifest documents. The Contractor shall supply and complete the manifest documents in accordance with all applicable state and federal regulations. All manifest documents shall be signed by a representative of the Owner and appropriate copies shall be provided to the Owner's representative prior to removing the waste from the site.
- C. The Contractor or their designated waste disposal subcontractor providing waste transportation services shall possess a valid Waste Hauler's Permit issued by the State of Connecticut Department of Environmental Protection (CTDEP). In addition, if the waste is to be transported and disposed of out of Connecticut State, applicable permits for those states or territories through which the waste will be transported and for where it will be disposed will be required. It is the responsibility of the Contractor to identify the appropriate disposal facility and associated travel route(s) and to identify the pertinent permits that will be required and to provide copies of the applicable permits to the Owner's Consultant prior to removing the waste from the site.
- D. Any PCB Waste materials which also contain other hazardous contaminants shall

be disposed of in accordance with EPA's Resource Conservation and Recovery Act (RCRA), CTDEEP, and ConnDOT, and/or EPA requirements. Materials may be required to be stored on-site and tested by the On-Site Environmental Consultant to determine proper waste disposal requirements.

### 3.12 CERTIFICATION OF ABATEMENT WORK AND CLOSEOUT

The Contractor should provide the Owner and On-Site Environmental Consultant, within 30 days after PCB Waste has been disposed of, a compliance package; which shall include, but not limited to, the following:

- A. The Contractor shall certify in writing to the Owner's Consultant that all abatement work and waste disposal has been completed in accordance with this specification and all applicable federal and state regulations.
- B. The Contractor shall certify supply the Owner and Owner's Representative a complete copy of the site supervisor's job log.
- C. The Contractor shall submit the original completed waste shipment record to the On-Site Environmental Consultant.

### 3.13 METHOD OF MEASUREMENT

No measurement will be made for the abatement work in this Section. The completed work shall be paid as a lump sum. The lump sum bid price for PCB abatement shall include the specialty services of the PCB Removal Contractor including: labor, materials, equipment, insurance, permits, notifications, submittals, personal air sampling, personal protection equipment, temporary enclosures, utility costs, incidentals, fees and labor incidental to the removal of PCB Wastes, including close out documentation.

Measurement for payment for waste disposal will be on a per ton basis. The unit price for PCB Bulk Product Waste Disposal shall include providing adequate containers for storage of PCB wastes until they are removed from the site and the transport and disposal of these materials at Non-TSCA regulated facility. Payment for the disposal of PCB Bulk Product Waste disposal shall be made when the Contractor submits manifest with the mass of waste disposed and signed by the receiving facility and the Certificates of Disposal provided by the waste disposal facility for each manifested load to the Engineer. Once the manifest and Certificate of Disposal has been received, the Owner shall make payment to the Contractor.

Deducts from payment for containments without negative pressure will be made on a per containment basis. The deduct cost shall account for construction of containment as described in this section without the negative pressure generating air handling units and HEPA filtration of discharge air.

<u>Pay Item</u>	<u>Pay Unit</u>
PCB Abatement	Lump Sum
PCB Waste Disposal	Per Ton

### Unit Price Schedule – Additional or Reduced PCB Abatement

This section applies only to items beyond the scope specified in the Contract Documents or if there is a reduction in the scope of work or the requirements of the work. Costs associated with the use of unit price items are inclusive of all labor, equipment, materials and overhead and profit.

Item	Item Description	Unit	Add/Deduct Cost
1	Containment Area – Set up of containment area (up to 400 square feet area) as described in these specifications.	EA	
2	Containment Area – Set up of containment area (up to 400 square feet area) as described in these specifications except for installation of equipment used to create and maintain negative pressure.	EA	
3	≥50 ppm PCB Contaminated caulk abatement with removal of 6" of building materials on either side of the caulked joint.	LF	
4	<50 ppm PCB Contaminated caulk abatement with removal of 6" of building materials on either side of the caulked joint.	LF	
5	≥50 ppm PCB Contaminated caulk abatement with removal of 12" of building materials on either side of the caulked joint.	LF	
6	<50 ppm PCB Contaminated caulk abatement with removal of 12" of building materials on either side of the caulked joint.	LF	
7	≥50 ppm PCB Contaminated caulk/glazing abatement with no removal of building materials.	LF	
8	<50 ppm PCB Contaminated caulk/glazing abatement with no removal of building materials.	LF	
9	PCB Contaminated substrate materials (brick/block) – removal of 6"	LF	
10	PCB Contaminated substrate materials (brick/block) – removal of 12"	LF	
11	PCB Contaminated soil removal	Cu. Yd.	
Item	Item Description	Unit	Add/Deduct Cost
12	≥50 ppm PCB Contaminated and asbestos containing caulk abatement with removal of 6" of building materials on either side of the caulked joint.	LF	
13	<50 ppm PCB Contaminated and asbestos containing caulk abatement with removal of 6" of building materials on either side of the caulked joint.	LF	
14	≥50 ppm PCB Contaminated and asbestos	LF	

	containing caulk abatement with removal of 12" of building materials on either side of the caulked joint.		
15	<50 ppm PCB Contaminated and asbestos containing caulk abatement with removal of 12" of building materials on either side of the caulked joint.	LF	
16	≥50 ppm PCB Contaminated and asbestos caulk/glazing abatement with no removal of building materials.	LF	
17	<50 ppm PCB Contaminated and asbestos caulk/glazing abatement with no removal of building materials.	LF	

**END SECTION**

## **TABLES**

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**Bulk Source Caulking and/or Glazing Compounds Sample Results**

**Adjacent Building Material Substrate Sample Results**

**Adjacent Soil Sample Results**

**Quantification of Materials to be Abated & Verification Sample**

**Estimates Table**

**TABLE 1**  
**Bulk Source Caulking and/or Glazing Compounds Sample Results**

<u>Date Sampled</u>	<u>Sample Number</u>	<u>Sample ID</u>	<u>Component</u>	<u>Building Date</u>	<u>Window Type</u>	<u>Location</u>	<u>Int/Ext</u>	<u>Results</u>
4/9/2012	0409PCB01		Window glazing compound (composite)	1956	1	Room A-6	Int	3000
4/9/2012	0409PCB02		Window glazing compound	1968	5	Hallway to TLC	Int	82
4/9/2012	0409PCB03		Window glazing compound	1953	2	Room B-7	Int	9.1
7/17/2012	0717PCB01		Window frame caulk		-	TLC Room	Int	3.4
7/17/2012	0717PCB02		Window glazing compound		-	TLC Room	Int	4.4
7/17/2012	0717PCB03		Window glazing compound	1953	2	Room C-7	Int	16
7/17/2012	0717PCB04		Window glazing comopund	1953	2	Room D-6	Int	12
7/17/2012	0717PCB05		Window frame caulk	1953	2 (4)	Room D-3	Int	ND
7/19/2012	0719PCB01		Window frame caulk	1956	1	Façade A	Ext	ND
7/19/2012	0719PCB02		Window frame caulk	1953	2	Façade A	Ext	ND
7/19/2012	0719PCB03		Window glazing compound	1956	1	Façade A	Ext	1.3
7/19/2012	0719PCB04		Window glazing compound	1953	2	Façade A	Ext	50
7/19/2012	0719PCB05		Window frame caulk	1953	3	Façade A	Ext	1.1
7/19/2012	0719PCB06		Window glazing compound	1953	3	Façade A	Ext	ND
7/19/2012	0719PCB07		Window frame caulk	1953	3	Façade A	Ext	5.9
7/19/2012	0719PCB08		Window frame caulk	1953	4	Façade A (LL)	Ext	ND
7/19/2012	0719PCB09		Window glazing comopund	1953	4	Façade A (LL)	Ext	ND
7/19/2012	0719PCB10		Window sill caulk	1953	2	Façade B (ML)	Ext	2.2
7/19/2012	0719PCB11		Window glazing compound	1953	2	Façade B (ML)	Ext	ND
7/19/2012	0719PCB12		Window frame caulk	1968	5	Façade C	Ext	5.2
7/19/2012	0719PCB13		Window frame caulk	1968	5	Façade D	Ext	17100
7/19/2012	0719PCB14		Window frame caulk (composite)	1956	1	Courtyard	Ext	3.9
7/19/2012	0719PCB15		Window frame caulk (composite)	1953	2	Courtyard	Ext	16
9/17/2012	PCBBulk01		Window frame caulk	1953	3	Nurse	Int	4.5
9/17/2012	PCBBulk02-1		Window glazing compound	1953	2	Nurse	Int	11.3
9/17/2012	PCBBulk02-2		Window glazing compound	1953	2	Room A-4	Int	0.97
9/17/2012	PCBBulk02-3		Window glazing compound	1953	2	Room B-14	Int	1.2
9/17/2012	PCBBulk02-4		Window glazing compound	1953	2	Room C-1	Int	6.1
9/17/2012	PCBBulk03-1		Window sill caulk	1953	2	Psychologist Office	Int	3
9/17/2012	PCBBulk04-1		Window glazing compound	1956	1	Room A-8	Int	1.3
9/17/2012	PCBBulk04-2		Window glazing compound	1956	1	Room A-9	Int	1.7
9/17/2012	PCBBulk04-3		Window glazing compound	1956	1	Room A-16	Int	9.3

**TABLE 1**  
**Bulk Source Caulking and/or Glazing Compounds Sample Results**

<u>Date Sampled</u>	<u>Sample Number</u>	<u>Sample ID</u>	<u>Component</u>	<u>Building Date</u>	<u>Window Type</u>	<u>Location</u>	<u>Int/Ext</u>	<u>Results</u>
9/17/2012	PCBBulk05		Window frame caulk	1968	5	O/S Media	Int	170
9/17/2012	PCBBulk06-1		Window glazing compound	1968	5	O/S Media	Int	136
9/17/2012	PCBBulk06-2		Window glazing compound	1968	5		Int	7700
9/17/2012	PCBBulk07-1		Window glazing compound	1997		TLC Room	Int	0.92
9/17/2012	PCBBulk08-1		Window frame caulk	1997		TLC Room	Int	2.2
9/17/2012	PCBBulk09-1		Window glazing compound	1953	3	Café	Int	13
9/21/2012	PCBBulk01		Window frame caulk (top layer)	1953	3	Façade A - outside Café	Ext	1
9/21/2012	PCBBulk02		Window frame caulk (bottom layer)	1953	3	Façade A - outside Café	Ext	2.1
9/21/2012	PCBBulk03		Window sill caulk	1953	3	Façade A - outside Café	Ext	ND
9/21/2012	PCBBulk04-1		Window frame caulk (top layer)	1953	2	Façade A	Ext	2.5
9/21/2012	PCBBulk04-2		Window frame caulk	1953	2	Courtyard (B-7)	Ext	ND
9/21/2012	PCBBulk04-3		Window frame caulk	1953	2	Courtyard (office)	Ext	0.83
9/21/2012	PCBBulk05-1		Window frame caulk (bottom layer)	1953	2	Façade A	Ext	0.87
9/21/2012	PCBBulk05-2		Window frame caulk	1953	2	Courtyard (B-7)	Ext	ND
9/21/2012	PCBBulk05-3		Window frame caulk	1953	2	Courtyard (office)	Ext	ND
9/21/2012	PCBBulk06-1		Window glazing compound	1953	2	Courtyard (B-7)	Ext	ND
9/21/2012	PCBBulk06-2		Window glazing compound	1953	2	Courtyard (office)	Ext	ND
9/21/2012	PCBBulk07-1		Window frame caulk	1956	1	Courtyard (A-9)	Ext	ND
9/21/2012	PCBBulk07-2		Window frame caulk	1956	1	Façade D (A-16)	Ext	ND
9/21/2012	PCBBulk08-1		Window glazing compound	1956	1	Courtyard (A-9)	Ext	ND
9/21/2012	PCBBulk08-2		Window glazing compound	1956	1	Façade D (A-16)	Ext	ND
9/21/2012	PCBBulk09-1		Window frame caulk	1956	1	Façade D (A-16)	Ext	ND
9/21/2012	PCBBulk10-1		Window frame caulk	1953	2	Façade B (D-6)	Ext	ND
9/21/2012	PCBBulk11-1		Window frame caulk	1968	5	Façade D	Ext	ND
9/21/2012	PCBBulk11-2		Window frame caulk	1968	5	Façade D	Ext	19800
11/17/2013	PCB11-14		Window glazing compound		1	Room A-6 (right)	Int	1.7
11/17/2013	PCB11-15		Window glazing compound		1	Room A-6 (left)	Int	1.4
11/17/2013	PCB11-16		Window glazing compound		1	Room A-6 (center)	Int	2000

**TABLE 2**  
**Adjacent Building Material Substrate Sample Results**

<u>Date Sampled</u>	<u>Sample Number</u>	<u>Sample ID</u>	<u>Component</u>	<u>Building Date</u>	<u>Window Type</u>	<u>Location</u>	<u>Int/Ext</u>	<u>Results</u>
9/21/2012	PCBSub01-1		Brick - source	1953	3	Façade A (Café)	Ext	ND
9/21/2012	PCBSub02-1		Brick Mortar - source	1953	3	Façade A (Café)	Ext	ND
9/21/2012	PCBSub03-1		Concrete window sill - source	1953	3	Façade A (Café)	Ext	ND
9/21/2012	PCBSub04-1		Brick - source	1953	2	Façade A (Nurse)	Ext	ND
9/21/2012	PCBSub04-2		Brick - source	1953	2	Courtyard (B-7)	Ext	ND
9/21/2012	PCBSub04-3		Brick - source	1953	2	Façade B ( D-3)	Ext	ND
9/21/2012	PCBSub05-1		Brick Mortar - source	1953	2	Façade A (Nurse)	Ext	ND
9/21/2012	PCBSub05-2		Brick Mortar - source	1953	2	Courtyard (B-7)	Ext	ND
9/21/2012	PCBSub05-3		Brick Mortar - source	1953	2	Façade B ( D-3)	Ext	ND
9/21/2012	PCBSub06-1		Concrete window sill - source	1953	2	Façade A (A-2)	Ext	1.6
9/21/2012	PCBSub06-2		Concrete window sill - source	1953	2	Courtyard (B-7)	Ext	0.13
9/21/2012	PCBSub06-3		Concrete window sill - source	1953	2	Façade B ( D-3)	Ext	ND
9/21/2012	PCBSub07-1		Brick - source	1956	1	Façade D (A-8)	Ext	ND
9/21/2012	PCBSub07-2		Brick - source	1956	1	Façade A (A-7)	Ext	ND
9/21/2012	PCBSub07-3		Brick - source	1956	1	Courtyard (comp. lab)	Ext	ND
9/21/2012	PCBSub08-1		Brick Mortar - source	1956	1	Façade D (A-8)	Ext	ND
9/21/2012	PCBSub08-2		Brick Mortar - source	1956	1	Façade A (A-7)	Ext	0.18
9/21/2012	PCBSub08-3		Brick Mortar - source	1956	1	Courtyard (comp. lab)	Ext	ND
9/21/2012	PCBSub09-1		Concrete window sill - source	1956	1	Façade A (A-7)	Ext	ND
9/21/2012	PCBSub10-1		Brick - source	1968	5	TLC Hall	Ext	ND
9/21/2012	PCBSub10-2		Brick - source	1968	5	Façade D (Library)	Ext	181
9/21/2012	PCBSub11-1		Brick Mortar - source	1968	5	TLC Hall	Ext	ND
9/21/2012	PCBSub11-2		Brick Mortar - source	1968	5	Façade D (Library)	Ext	260
9/21/2012	PCBSub12-1		Concrete Block CMU - source	1968	5	Library Hall	Int	33
9/21/2012	PCBSub12-2		Concrete Block CMU - source	1968	5	Library Hall	Int	31
9/21/2012	PCBSub13-1		Block Mortar - source	1968	5	Library Hall	Int	37
9/21/2012	PCBSub13-2		Block Mortar - source	1968	5	Library Hall	Int	17
10/15/2012	PCBSub01-1		CMU 3" at jamb	1968	5	Library Hall	Int	7.4
10/15/2012	PCBSub01-2		CMU 3" at jamb	1968	5	Library Hall	Int	6.3
10/15/2012	PCBSub01-3		CMU 3" at jamb	1968	5	TLC Hall	Int	0.77
10/15/2012	PCBSub02-1		CMUM 3" at jamb	1968	5	Library Hall	Int	11.7

**TABLE 2**  
**Adjacent Building Material Substrate Sample Results**

<u>Date Sampled</u>	<u>Sample Number</u>	<u>Sample ID</u>	<u>Component</u>	<u>Building Date</u>	<u>Window Type</u>	<u>Location</u>	<u>Int/Ext</u>	<u>Results</u>
10/15/2012	PCBSub02-2		CMUM 3" at jamb	1968	5	Library Hall	Int	10.5
10/15/2012	PCBSub02-3		CMUM 3" at jamb	1968	5	TLC Hall	Int	0.57
10/15/2012	PCBSub03-1		Concrete pillars 1"	1968	5	Library Hall	Int	4.2
10/15/2012	PCBSub03-2		Concrete pillars 1"	1968	5	Library Hall	Int	4.6
10/15/2012	PCBSub04-1		Brick 1"	1968	5	TLC Hall	Ext	ND
10/15/2012	PCBSub04-2		Brick 2nd course	1968	5	Outside Library	Ext	ND
10/15/2012	PCBSub04-3		Brick 2nd course	1968	5	Outside Library	Ext	ND
10/15/2012	PCBSub05-1		Brick Mortar 1"	1968	5	TLC Hall	Ext	0.16
10/15/2012	PCBSub05-2		Brick Mortar 2nd Course	1968	5	Library Hall	Ext	ND
10/15/2012	PCBSub05-3		Brick Mortar 2nd Course	1968	5	Library Hall	Ext	ND
10/15/2012	PCBSub06-1		Concrete column source	1968	5	Library Hall	Ext	183
10/15/2012	PCBSub06-2		Concrete column source	1968	5	Library Hall	Ext	57
11/17/2013	PCB11-01		Concrete 3"			Outside Library	Ext	ND
11/17/2013	PCB11-02		Concrete 3"			Outside Library	Ext	ND
11/17/2013	PCB11-03		Concrete 6"			Outside Library	Ext	ND
11/17/2013	PCB11-04		Concrete 6"			Outside Library	Int	0.45
11/17/2013	PCB11-05		Concrete 6"			Outside Library	Int	0.39
11/17/2013	PCB11-06		CMU 6"			TLC Hall	Int	ND
11/17/2013	PCB11-07		CMUM 6"			TLC Hall	Int	ND
11/17/2013	PCB11-08		CMU 6"			Library	Int	0.9
11/17/2013	PCB11-09		CMUM 6"			Library	Int	2.27
11/17/2013	PCB11-10		CMU 6"			Library	Int	0.97
11/17/2013	PCB11-11		CMUM 6"			Library	Int	0.36
11/17/2013	PCB11-12		CMU 9"			TLC Hall	Int	0.085
11/17/2013	PCB11-13		CMUM 9"			TLC Hall	Int	0.091

**TABLE 3**  
**Adjacent Soil Sample Results**

<u>Date Sampled</u>	<u>Sample Number</u>	<u>Sample ID</u>	<u>Component</u>	<u>Building Date</u>	<u>Window Type</u>	<u>Location</u>	<u>Results in mg/Kg</u>
10/24/2012	10-24soilM01-1		Composite - 8 inches	1956	1	O/S Rooms A-6 & A-8	1.4
10/24/2012	10-24soilM02-1		Composite - 16 inches	1956	1	O/S Rooms A-6 & A-8	2.5
10/24/2012	10-24soilM03-1		Composite - 24 inches	1956	1	O/S Rooms A-6 & A-8	1
10/24/2012	10-24soilM01-2		Composite - 8 inches	1956	1	O/S Rooms A-10, A-12, A-16	7.9
10/24/2012	10-24soilM02-2		Composite - 16 inches	1956	1	O/S Rooms A-10, A-12, A-16	4.5
10/24/2012	10-24soilM03-2		Composite - 24 inches	1956	1	O/S Rooms A-10, A-12, A-16	0.9
10/24/2012	10-24soilM01-3		Composite - 8 inches	1956	1	O/S Rooms A-7, A-9, A-11	5.9
10/24/2012	10-24soilM02-3		Composite - 16 inches	1956	1	O/S Rooms A-7, A-9, A-11	0.65
10/24/2012	10-24soilM03-3		Composite - 24 inches	1956	1	O/S Rooms A-7, A-9, A-11	0.13
10/24/2012	10-24soilM04-1		Composite - 8 inches	1968	5	O/S Hall	0.52
10/24/2012	10-24soilM05-1		Composite - 16 inches	1968	5	O/S Library Hall	0.37
10/24/2012	10-24soilM06-1		Composite - 24 inches	1968	5	O/S Library Hall	ND
10/24/2012	10-24soilM04-2		Composite - 8 inches	1968	5	O/S TLC Hall	ND
10/24/2012	10-24soilM05-2		Composite - 16 inches	1968	5	O/S TLC Hall	ND
10/24/2012	10-24soilM06-2		Composite - 24 inches	1968	5	O/S TLC Hall	ND
10/24/2012	10-24soilM04-3		Composite - 8 inches	1968	5	Courtyard o/s TLC Hall	0.27
10/24/2012	10-24soilM05-3		Composite - 16 inches	1968	5	Courtyard o/s TLC Hall	0.2
10/24/2012	10-24soilM06-3		Composite - 24 inches	1968	5	Courtyard o/s TLC Hall	0.16
10/24/2012	10-24soilM07-1		Composite - 8 inches	1953	3	O/S Café	0.13
10/24/2012	10-24soilM08-1		Composite - 16 inches	1953	3	O/S Café	ND
10/24/2012	10-24soilM09-1		Composite - 24 inches	1953	3	O/S Café	ND
10/24/2012	10-24soilM10-3A		Composite - 8 inches	1953	2	O/S Rooms A-2, A-4, Nurse	1.1
10/24/2012	10-24soilM11-3A		Composite - 8 inches	1953	2	O/S Rooms B-10, B-4	ND
10/24/2012	10-24soilM12-3A		Composite - 24 inches	1953	2	O/S Rooms A-2, A-4, Nurse	0.87
10/24/2012	10-24soilM10-2		Composite - 8 inches	1953	2	O/S Rooms B-10, B-4	ND
10/24/2012	10-24soilM11-2		Composite - 16 inches	1953	2	O/S Rooms B-10, B-4	ND
10/24/2012	10-24soilM12-2		Composite - 24 inches	1953	2	O/S Rooms B-10, B-4	ND
10/24/2012	10-24soilM10-3B		Composite - 8 inches	1953	2	O/S Rooms B-10, B-4	ND
10/24/2012	10-24soilM11-3B		Composite - 16 inches	1953	2	O/S Rooms A-3, B-3, B-7	0.73
10/24/2012	10-24soilM12-3B		Composite - 24 inches	1953	2	O/S Rooms A-3, B-3, B-7	ND

**Table 4**  
**Quantification of Materials to be Abated and Verification Sample Estimates**  
**Middlebrook Elementary School**  
**Trumbull, CT**

Removal Location	Caulking Compounds to be Removed	Glazing Compounds to be Removed	Adjacent Porous Building Material Substrate to be Removed	Verification Samples
Nurse Principal's Office A-2 A-4	Approximately 250 linear feet of interior and exterior window caulking containing <50 PPM PCBs	Approximately 700 linear feet of exterior glazing compounds containing >50 PPM PCBs around perimeter of windows in contact with window frame and glass	Approximately 110 square feet of porous exterior concrete window sill in contact with window caulk.	4 chip samples from the porous concrete block  4 chip samples from the porous brick  2 wipe samples within each containment for a total of 8 wipe samples assuming 4 containments for removal in this location
A-6 A-7 A-8 A-12 A-14 A-16	Approximately 950 linear feet of exterior window caulking containing <50 PPM PCBs	Approximately 2800 linear feet of interior glazing compounds containing >50 PPM PCBs around perimeter of windows in contact with window frame and glass	N/A	4 chip samples from the porous concrete block  6 chip samples from the porous brick  2 wipe samples within each containment for a total of 12 wipe samples assuming 6 containments for removal in this location
A-9 A-10 Computer Lab	Approximately 325 linear feet of exterior window caulking containing <50 PPM PCBs	Approximately 730 linear feet of interior glazing compounds containing >50 PPM PCBs around perimeter of windows in contact with window frame and glass	N/A	3 chip samples from the porous concrete block  3 chip samples from the porous brick  2 wipe samples within each containment for a total of 6 wipe samples assuming 3 containments for removal in this location

**Table 4**  
**Quantification of Materials to be Abated and Verification Sample Estimates**  
**Middlebrook Elementary School**  
**Trumbull, CT**

Removal Location	Caulking Compounds to be Removed	Glazing Compounds to be Removed	Adjacent Porous Building Material Substrate to be Removed	Verification Samples
Social Worker Psychology A-3 A-5	Approximately 252 linear feet of interior and exterior window caulking compounds containing <50 PPM PCBs	Approximately 1,000 linear feet of exterior glazing containing >50 PPM PCBs	Approximately 110 square feet of porous exterior concrete window sill in contact with window caulk.	4 chip samples from the porous block  2 wipe samples within each containment for a total of 8 wipe samples assuming 4 containments for removal in this location
B-1 B-3 B-5 B-7	Approximately 330 linear feet of exterior window caulking containing < 50 PPM PCBs	Approximately 1,500 linear feet of exterior window glazing containing <50 PPM PCBs	N/A	5 chip samples from the porous block  2 wipe samples within each containment for a total of 10 wipe samples assuming 5 containments for removal in this location
B-2 B-4 B-6 B-8 B14	Approximately 420 linear feet of exterior window caulking compounds containing < 50 PPM PCBs	Approximately 1,800 linear feet of exterior window glazing containing <50 PPM PCBs	N/A	2 chip samples from the porous block  2 wipe samples within each containment for a total of 2 wipe samples assuming 1 containment for removal in this location
TLC Corridor TLC Courtyard	Approximately 110 linear feet of interior and exterior window caulking compounds containing >50 PPM PCBs	Approximately 210 linear feet of interior glazing containing >50 PPM PCBs	Approximately 75 square feet (8") of interior CMU Block in contact with window caulk. Approximately 55 square feet (6") of exterior brick in contact with window caulk. Approximately 40 square feet of block.	4 chip samples from the porous block  4 chip samples from the porous brick  2 wipe samples within each containment for a total of 4 wipe samples assuming 2 containments for removal in this location

**Table 4**  
**Quantification of Materials to be Abated and Verification Sample Estimates**  
**Middlebrook Elementary School**  
**Trumbull, CT**

Removal Location	Caulking Compounds to be Removed	Glazing Compounds to be Removed	Adjacent Porous Building Material Substrate to be Removed	Verification Samples
Media Corridor	Approximately 150 linear feet of interior and exterior window caulking compounds containing >50 PPM PCBs	Approximately 270 linear feet interior glazing compound containing >50 PPM PCBs	Approximately 28 square feet (8") interior CMU Block in contact with window caulk. Approximately 75 square feet (6") exterior brick. Encapsulate concrete structural columns.	2 chip samples from the porous block  2 chip samples from the porous brick  6 wipe samples within each containment for a total of 6 wipe samples assuming 1 containments for removal in this location
TLC Room	Approximately 35 linear feet of interior window caulking compounds containing < 50 PPM PCBs	Approximately 55 linear feet interior glazing compound containing <50 PPM PCBs	N/A	2 chip samples from the porous block  2 chip samples from the porous brick  2 wipe samples within each containment for a total of 2 wipe samples assuming 1 containment for removal in this location
Media Center	Approximately 176 linear feet of exterior window caulking containing < 50 PPM PCBs	Approximately 160 linear feet exterior glazing compound containing <50 PPM PCBs	N/A	2 chip samples from the porous block  2 wipe samples within each containment for a total of 4 wipe samples assuming 2 containment for removal in this location

**Table 4**  
**Quantification of Materials to be Abated and Verification Sample Estimates**  
**Middlebrook Elementary School**  
**Trumbull, CT**

Removal Location	Caulking Compounds to be Removed	Glazing Compounds to be Removed	Adjacent Porous Building Material Substrate to be Removed	Verification Samples
Gymnasium Stage Cafeteria	Approximately 710 linear feet of exterior caulking containing < 50 PPM PCBs	Approximately 1400 linear feet of interior glazing compound containing <50 PPM PCBs	N/A	6 chip samples from the porous block  10 chip samples from the porous brick  14 wipe samples from within these locations
C-1 C-3 C-5 C-7	Approximately 330 linear feet of exterior window caulking compounds containing <50 PPM PCBs	Approximately 1,500 linear feet of interior glazing compound containing <50 PPM PCBs	N/A	4 chip samples from the porous block  2 wipe samples within each containment for a total of 8 wipe samples assuming 4 containments for removal in this location
C-2 C-4 C-6 C-8 C-10	Approximately 330 linear feet of exterior window caulking compounds containing <50 PPM PCBs	Approximately 1,500 linear feet of interior glazing compound containing <50 PPM PCBs	N/A	4 chip samples from the porous block  2 wipe samples within each containment for a total of 10 wipe samples assuming 5 containment for removal in this location
D-3 D-4 D-5 D-6	Approximately 190 linear feet of exterior window caulk containing <50 PPM PCBs	Approximately 320 linear feet of interior glazing compound containing <50 PPM PCBs	N/A	2 chip samples from the porous block  2 wipe samples within each containment for a total of 8 wipe samples assuming 4 containments for removal in this location

**Table 4**  
**Quantification of Materials to be Abated and Verification Sample Estimates**  
**Middlebrook Elementary School**  
**Trumbull, CT**

Remvoal Location	Soil/Asphalt to be Removed			Verification Samples
SOIL 1952 Section Type 2 Windows outside Principal office, Nurse's Office, A-2, A-4  1958 Section Type 1 Windows outside Rooms A-6, A-7, A-8, A-12, A-14, A-16	Remove approximately 9 cubic yards of soil containing PCBs greater than 1 PPM.			18 composite soil samples from 8", 16", 24" and 30" (where applicable) from foundation of building

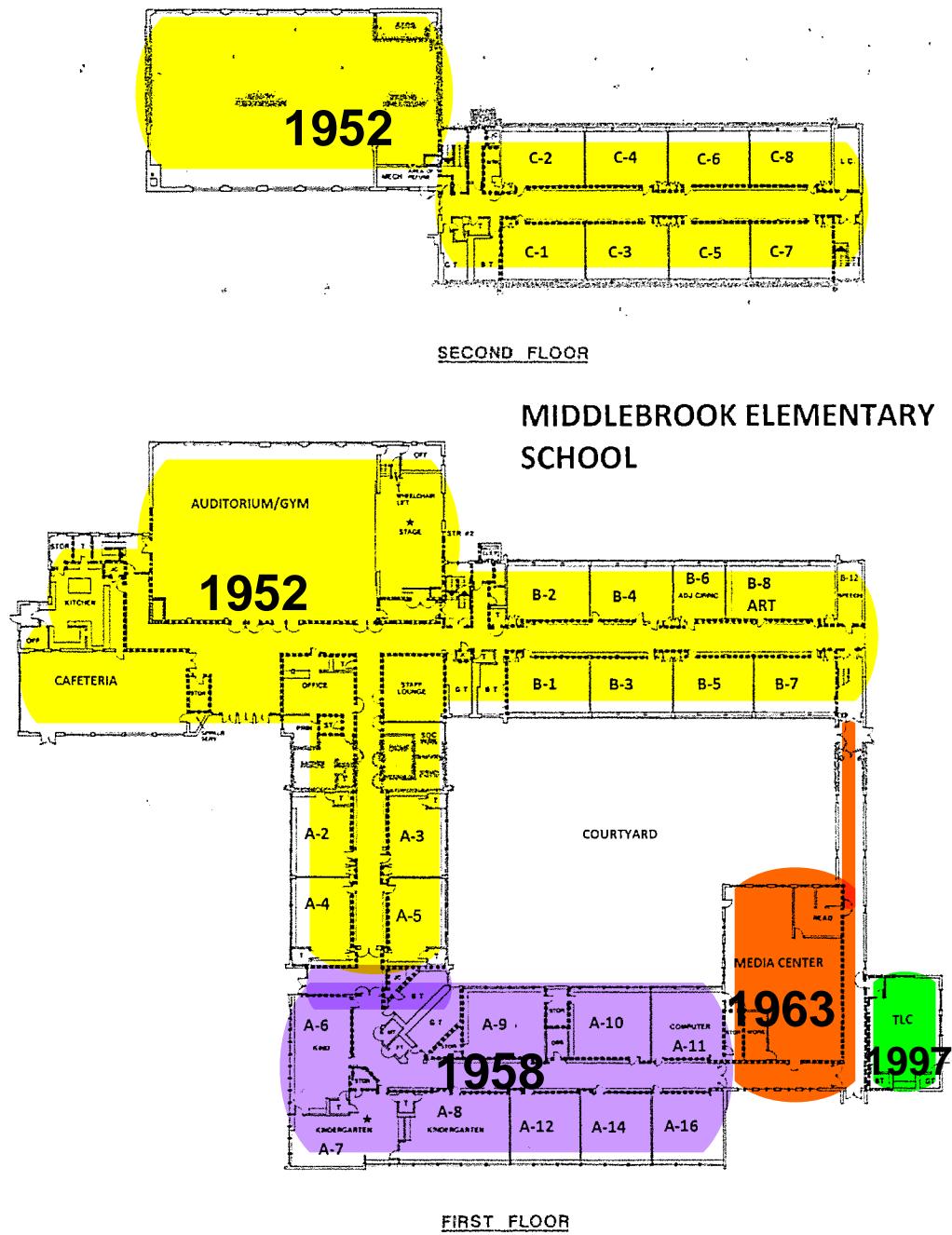
## **FIGURES**

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### **Site Aerial Building Era site Plan**



Figure 1



**Figure 2**

## **DIAGRAMS**

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**PCB Source Samples >50 PPM**

**PCB Source Samples <50 PPM**

**PCB Substrates and Soil Sample Locations**

**Hazardous Remediation Area**

## **PHOTOS**

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**Middlebrook Elementary School  
220 Middlebrook Avenue  
Trumbull, CT**



**Cafeteria**



**Outside  
Cafeteria**



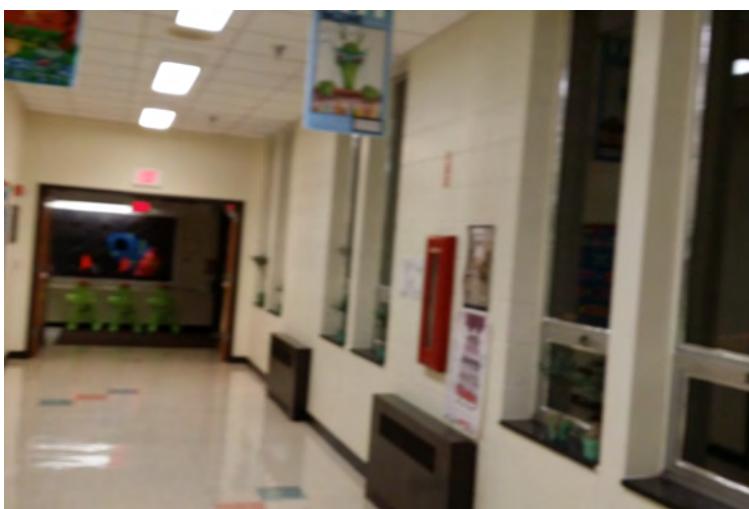
**Nurses Office**



**Outside  
Nurses Office**



**Room A-2**



**Corridor outside  
Media Center**



**Outside  
Gymnasium and  
D-Wing Windows**



**Outside  
Stage**



**Outside  
D-Wing**



**Outside  
A-Wing**



**Outside  
A-2 and A-4**



**Outside  
A-7 to A-16**



**Outside  
A-16**

## SECTION 079200 - JOINT SEALANTS

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

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

## 1.2 SUMMARY

- A. This Section includes joint sealants for the following applications, including those specified by reference to this Section:

- 1. Exterior joints in the following vertical surfaces and horizontal non-traffic surfaces:

- a. Perimeter joints windows and adjacent materials.

- 2. Interior joints in the following vertical surfaces and horizontal non-traffic surfaces:

- a. Perimeter joints between interior wall surfaces, sills and frames of windows.

- B. Related Sections include the following:

- 1. Division 8 Section "Aluminum Windows"
  - 2. Division 8 Section "Glazed Aluminum Curtain Walls"
  - 3. Division 8 Section "Aluminum Framed Entrances and Storefronts".

## 1.3 PERFORMANCE REQUIREMENTS

- A. Provide elastomeric joint sealants that establish and maintain watertight and airtight continuous joint seals without staining or deteriorating joint substrates.
- B. Provide joint sealants for interior applications that establish and maintain airtight and water-resistant continuous joint seals without staining or deteriorating joint substrates.

## 1.4 SUBMITTALS

- A. Product Data: For each joint-sealant product indicated.
- B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

- C. Samples for Verification: For each type and color of joint sealant required, provide Samples with joint sealants in **1/2-inch- (13-mm-)** wide joints formed between two **6-inch- (150-mm-)** long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.
- D. Product Certificates: For each type of joint sealant and accessory, signed by product manufacturer.
- E. SWRI Validation Certificate: For each elastomeric sealant specified to be validated by SWRI's Sealant Validation Program.
- F. Qualification Data: For Installer.
- G. Preconstruction Field Test Reports: Indicate which sealants and joint preparation methods resulted in optimum adhesion to joint substrates based on preconstruction testing specified in "Quality Assurance" Article.
- H. Compatibility and Adhesion Test Reports: From sealant manufacturer, indicating the following:
  - 1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
  - 2. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.
- I. Field Test Report Log: For each elastomeric sealant application.
- J. Product Test Reports: Based on comprehensive testing of product formulations performed by a qualified testing agency, indicating that sealants comply with requirements.
- K. Warranties: Special warranties specified in this Section.

## 1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Manufacturer's authorized Installer who is approved or licensed for installation of elastomeric sealants required for this Project.
- B. Source Limitations: Obtain each type of joint sealant through one source from a single manufacturer.

## 1.6 PROJECT CONDITIONS

- A. Do not proceed with installation of joint sealants under the following conditions:
  - 1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below **40 deg F (5 deg C)**.
  - 2. When joint substrates are wet.
  - 3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
  - 4. Contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

## 1.7 WARRANTY

- A. Special Installer's Warranty: Installer's standard form in which Installer agrees to repair or replace elastomeric joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
  - 1. Warranty Period: Two years from date of Substantial Completion.
- B. Special Manufacturer's Warranty: Manufacturer's standard form in which elastomeric sealant manufacturer agrees to furnish elastomeric joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.
  - 1. Warranty Period: 20 years from date of Substantial Completion.
- C. Special warranties specified in this Article exclude deterioration or failure of elastomeric joint sealants from the following:
  - 1. Movement of the structure resulting in stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression caused by structural settlement or errors attributable to design or construction.
  - 2. Disintegration of joint substrates from natural causes exceeding design specifications.
  - 3. Mechanical damage caused by individuals, tools, or other outside agents.
  - 4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

## PART 2 - PRODUCTS

## 2.1 MANUFACTURERS

- A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products listed in other Part 2 articles.

## 2.2 MATERIALS, GENERAL

- A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer, based on testing and field experience.
- B. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

## 2.3 ELASTOMERIC JOINT SEALANTS

- A. Elastomeric Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.
- B. Stain-Test-Response Characteristics: Where elastomeric sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.
- C. Suitability for Immersion in Liquids. Where elastomeric sealants are indicated for Use I for joints that will be continuously immersed in liquids, provide products that have undergone testing according to ASTM C 1247 and qualify for the length of exposure indicated by reference to ASTM C 920 for Class 1 or 2. Liquid used for testing sealants is deionized water, unless otherwise indicated.
- D. Suitability for Contact with Food: Where elastomeric sealants are indicated for joints that will come in repeated contact with food, provide products that comply with 21 CFR 177.2600.
- E. Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 100/50, for Use NT.
  - 1. Basis of Design: Pecora Corporation – Silicone Sealant #890
  - 2. Subject to compliance with the requirements, provide the specified product or a comparable product by the following:
    - a. Pecora Corporation
    - b. Dow Corning Corporation
    - c. Tremco Incorporated
    - d. Sika Corporation

## 2.4 JOINT-SEALANT BACKING

- A. General: Provide sealant backings of material and type that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- B. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin), O (open-cell material), B (bicellular material with a surface skin), or any of the preceding types, as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance:
- C. Elastomeric Tubing Sealant Backings: Neoprene, butyl, EPDM, or silicone tubing complying with ASTM D 1056, nonabsorbent to water and gas, and capable of remaining resilient at

temperatures down to **minus 26 deg F (minus 32 deg C)**. Provide products with low compression set and of size and shape to provide a secondary seal, to control sealant depth, and to otherwise contribute to optimum sealant performance.

D. **Bond-Breaker Tape:** Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

## 2.5 MISCELLANEOUS MATERIALS

- A. **Primer:** Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
- B. **Cleaners for Nonporous Surfaces:** Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.
- C. **Masking Tape:** Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. **Surface Cleaning of Joints:** Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
  1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
  2. Clean porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:

- a. Masonry.
- 3. Remove laitance and form-release agents from concrete.
- 4. Clean nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:
  - a. Vinyl
- B. Joint Priming: Prime joint substrates, where recommended in writing by joint-sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Acoustical Sealant Application Standard: Comply with recommendations in ASTM C 919 for use of joint sealants in acoustical applications as applicable to materials, applications, and conditions indicated.
- D. Install sealant backings of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
  - 1. Do not leave gaps between ends of sealant backings.
  - 2. Do not stretch, twist, puncture, or tear sealant backings.
  - 3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.
- E. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- F. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
  - 1. Place sealants so they directly contact and fully wet joint substrates.

2. Completely fill recesses in each joint configuration.
3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

G. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

1. Remove excess sealant from surfaces adjacent to joints.
2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
3. Provide concave joint configuration per Figure 5A in ASTM C 1193, unless otherwise indicated.
4. Provide flush joint configuration where indicated per Figure 5B in ASTM C 1193.
5. Provide recessed joint configuration of recess depth and at locations indicated per Figure 5C in ASTM C 1193.
  - a. Use masking tape to protect surfaces adjacent to recessed tooled joints.

### 3.4 FIELD QUALITY CONTROL

A. Field-Adhesion Testing: Field test joint-sealant adhesion to joint substrates as follows:

1. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab; Method B, Exposed Surface Finish Hand Pull Tab; or Method C, Field-Applied Sealant Joint Hand Pull Flap, in Appendix X1 in ASTM C 1193, as appropriate for type of joint-sealant application indicated.
  - a. For joints with dissimilar substrates, verify adhesion to each substrate separately; do this by extending cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.
2. Inspect joints for complete fill, for absence of voids, and for joint configuration complying with specified requirements. Record results in a field-adhesion-test log.
3. Inspect tested joints and report on the following:
  - a. Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each type of product and joint substrate. Compare these results to determine if adhesion passes sealant manufacturer's field-adhesion hand-pull test criteria.
  - b. Whether sealants filled joint cavities and are free of voids.
  - c. Whether sealant dimensions and configurations comply with specified requirements.
4. Record test results in a field-adhesion-test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant fill, sealant configuration, and sealant dimensions.

5. Repair sealants pulled from test area by applying new sealants following same procedures used originally to seal joints. Ensure that original sealant surfaces are clean and that new sealant contacts original sealant.
- B. Evaluation of Field Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

### 3.5 CLEANING

- A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

### 3.6 PROTECTION

- A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

END OF SECTION 079200

## SECTION 081743 – FRP TEXTURE FLUSH DOORS

## PART 1 - GENERAL

## 1.1 SECTION INCLUDES

- A. Fiberglass reinforced polyester (FRP) flush doors.

## 1.3 REFERENCES

- A. AAMA 1503-98 - Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections.
- B. ANSI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors and Hardware Reinforcements.

## 1.4 PERFORMANCE REQUIREMENTS

- A. General: Provide door assemblies that have been designed and fabricated to comply with specified performance requirements, as demonstrated by testing manufacturer's corresponding standard systems.
- B. Air Infiltration: For a single door 3'-0" x 7'-0", test specimen shall be tested in accordance with ASTM E 283 at pressure differential of 6.24 psf. Door shall not exceed 0.90 cfm per linear foot of perimeter crack.
- C. Water Resistance: For a single door 3'-0" x 7'-0", test specimen shall be tested in accordance with ASTM E 331 at pressure differential of 7.50 psf. Door shall not have water leakage.
- D. Indoor air quality testing per ASTM D 6670-01: GREENGUARD Environmental Institute Certified including GREENGUARD for Children and Schools Certification.
- E. Hurricane Test Standards, Single Door with Single-Point Latching:
  1. Uniform Static Load, ASTM E 330: Plus or minus 75 pounds per square foot.
  2. Forced Entry Test, 300 Pound Load Applied, SFBC 3603.2 (b)(5): Passed.
  3. Cyclic Load Test, SFBC PA 203: Plus or minus 53 pounds per square foot.
  4. Large Missile Impact Test, SFBC PA 201: Passed.
- F. Swinging Door Cycle Test, Doors and Frames, ANSI A250.4: Minimum of 25,000,000 cycles.
- G. Swinging Security Door Assembly, Doors and Frames, ASTM F 476: Grade 40.
- H. Salt Spray, Exterior Doors and Frames, ASTM B 117: Minimum of 500 hours.
- I. Sound Transmission, Exterior Doors, STC, ASTM E 90: Minimum of 25.

- J. Thermal Transmission, Exterior Doors, U-Value, AAMA 1503-98: Maximum of 0.29 BTU/hr x sf x degrees F. Minimum of 55 CRF value.
- K. Surface Burning Characteristics, FRP Doors and Panels, ASTM E 84:
  - 1. Flame Spread: Maximum of 200, Class C.
  - 2. Smoke Developed: Maximum of 450, Class C.
- L. Surface Burning Characteristics, Class A Option On Interior Faces of FRP Exterior Panels and Both Faces of FRP Interior Panels, ASTM E 84:
  - 1. Flame Spread: Maximum of 25.
  - 2. Smoke Developed: Maximum of 450.
- M. Impact Strength, FRP Doors and Panels, Nominal Value, ASTM D 256: 15.0 foot-pounds per inch of notch.
- N. Tensile Strength, FRP Doors and Panels, Nominal Value, ASTM D 638: 14,000 psi.
- O. Flexural Strength, FRP Doors and Panels, Nominal Value, ASTM D 790: 21,000 psi.
- P. Water Absorption, FRP Doors and Panels, Nominal Value, ASTM D 570: 0.20 percent after 24 hours.
- O. Indentation Hardness, FRP Doors and Panels, Nominal Value, ASTM D 2583: 55.
- P. Gardner Impact Strength, FRP Doors and Panels, Nominal Value, ASTM D 3029: 120 in-lb.
- S. Abrasion Resistance, Face Sheet, Taber Abrasion Test, 25 Cycles at 1,000 Gram Weight with CS-17 Wheel: Maximum of 0.029 average weight loss percentage.
- T. Stain Resistance, ASTM D 1308: Face sheet unaffected after exposure to red cabbage, tea, and tomato acid. Stain removed easily with mild abrasive or FRP cleaner when exposed to crayon and crankcase oil.
- U. Chemical Resistance, ASTM D 543. Excellent rating.
  - 1. Acetic acid, Concentrated.
  - 2. Ammonium Hydroxide, Concentrated.
  - 3. Citric Acid, 10%.
  - 4. Formaldehyde.
  - 5. Hydrochloric Acid, 10%
  - 6. Sodium hypochlorite, 4 to 6 percent solution.
- V. Compressive Strength, Foam Core, Nominal Value, ASTM D 1621: 79.9 psi.
- W. Compressive Modulus, Foam Core, Nominal Value, ASTM D 1621: 370 psi.
- X. Tensile Adhesion, Foam Core, Nominal Value, ASTM D 1623: 45.3 psi.
- Y. Thermal and Humid Aging, Foam Core, Nominal Value, 158 Degrees F and 100 Percent Humidity for 14 Days, ASTM D 2126: Minus 5.14 percent volume change.

## 1.5 SUBMITTALS

- A. Comply with Section 013300 - Submittal Procedures.
- B. Product Data: Submit manufacturer's product data, including description of materials, components, fabrication, finishes, and installation.
- C. Shop Drawings: Submit manufacturer's shop drawings, including elevations, sections, and details, indicating dimensions, tolerances, materials, fabrication, doors, panels, framing, hardware schedule, and finish.
- D. Samples:
  - 1. Door: Submit manufacturer's sample of door showing face sheets, core, framing, and finish.
  - 2. Color: Submit manufacturer's samples of standard colors of doors and frames.
- E. Test Reports: Submit certified test reports from qualified independent testing agency indicating doors comply with specified performance requirements.
- F. Manufacturer's Project References: Submit list of successfully completed projects including project name and location, name of architect, and type and quantity of doors manufactured.
- G. Maintenance Manual: Submit manufacturer's maintenance and cleaning instructions for doors, including maintenance and operating instructions for hardware.
- H. Warranty: Submit manufacturer's standard warranty.

## 1.6 QUALITY ASSURANCE

- A. Manufacturer's Qualifications:
  - 1. Continuously engaged in manufacturing of doors of similar type to that specified, with a minimum of 25 years successful experience.
  - 2. Door and frame components from same manufacturer.
  - 3. Evidence of a compliant documented quality management system.

## 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying opening door mark and manufacturer.
- B. Storage: Store materials in clean, dry area indoors in accordance with manufacturer's instructions.
- C. Handling: Protect materials and finish from damage during handling and installation.

## 1.8 WARRANTY

- A. Warrant doors, frames, and factory hardware against failure in materials and workmanship, including excessive deflection, faulty operation, defects in hardware installation, and deterioration of finish or construction in excess of normal weathering.
- B. Warranty Period: Ten years starting on date of shipment.

## PART 2 PRODUCTS

## 2.1 FRP FLUSH DOORS

- A. Acceptable Manufacturers
  - 1. Basis of Design : Special-Lite, Inc., PO Box 6, Decatur, Michigan 49045.
  - 2. Cline Doors – Equivalent product to Basis of Design.
  - 3. Commercial Door Systems – Equivalent product to Basis of Design.

## 2.2 GENERAL

- A. Model: SL-17 Flush Doors with SpecLite3 fiberglass reinforced polyester (FRP) face sheets.
- B. Door Opening Size: As indicated on the Drawings.
- C. Construction:
  - 1. Door Thickness: 1-3/4 inches.
  - 2. Stiles and Rails: Aluminum Alloy 6063-T5, minimum of 2-5/16-inch depth.
  - 3. Corners: Mitered.
  - 4. Provide joinery of 3/8-inch diameter full-width tie rods through extruded splines top and bottom as standard tubular shaped stiles and rails reinforced to accept hardware as specified.
  - 5. Securing Internal Door Extrusions: 3/16-inch angle blocks and locking hex nuts for joinery. Welds, glue, or other methods are not acceptable.
  - 6. Furnish extruded stiles and rails with integral reglets to accept face sheets. Lock face sheets into place to permit flush appearance.
  - 7. Rail caps or other face sheet capture methods are not acceptable.
  - 8. Extrude top and bottom rail legs for interlocking continuous weather bar.
  - 9. Meeting Stiles: Pile brush weatherseals. Extrude meeting stile to include integral pocket to accept pile brush weatherseals.
  - 10. Bottom of Door: Install bottom weather bar with nylon brush weatherstripping into extruded interlocking edge of bottom rail.
  - 11. Glue: Use of glue to bond sheet to core or extrusions is not acceptable.
- D. Face Sheet:
  - 1. Material: SpecLite3 FRP, 0.120-inch thickness, finish color throughout. Abuse-resistant engineered surface.
  - 2. Texture: Pebble.

3. Color: To be selected from manufacturers full range of standard colors.

E. Core:

1. Material: Poured-in-place polyurethane foam.
2. Density: Minimum of 5 pounds per cubic foot.
3. R-Value: Minimum of 9.

F. Cutouts:

1. Manufacture doors with cutouts for required vision lites, louvers, and panels.
2. Factory install vision lites, louvers, and panels.

G. Hardware:

1. Premachine doors in accordance with templates from specified hardware manufacturers and hardware schedule.
2. Factory install hardware.

## 2.3 MATERIALS

A. Aluminum Members:

1. Extrusions: ASTM B 221.
2. Sheet and Plate: ASTM B 209.
3. Alloy and Temper: As required by manufacturer for strength, corrosion resistance, application of required finish, and control of color.

B. Components: Door and frame components from same manufacturer.

C. Fasteners:

1. Material: Aluminum, 18-8 stainless steel, or other noncorrosive metal.
2. Compatibility: Compatible with items to be fastened.
3. Exposed Fasteners: Screws with finish matching items to be fastened.

## 2.4 FABRICATION

A. Sizes and Profiles: Required sizes for door and frame units, and profile requirements shall be as indicated on the Drawings.

B. Coordination of Fabrication: Field measure before fabrication and show recorded measurements on shop drawings.

C. Assembly:

1. Complete cutting, fitting, forming, drilling, and grinding of metal before assembly.
2. Remove burrs from cut edges.

D. Welding: Welding of doors or frames is not acceptable.

E. Fit:

1. Maintain continuity of line and accurate relation of planes and angles.
2. Secure attachments and support at mechanical joints with hairline fit at contacting members.

**2.7 HARDWARE**

- A. Premachine doors in accordance with templates from specified hardware manufacturers and hardware schedule.
- B. Factory install hardware.
- C. Hardware Schedule: As specified in Section 08710, except as follows.
  - 1. Hinges: SL-11HD continuous hinges by Special-Lite. Hinge covers to be factory painted to match doors.
  - 2. Removal mullions: SL-60 non-electric and SL-60E pre-wired for use with electric hardware.

**2.8 VISION LITES**

- A. Factory Glazing: 1-inch glass insulating units.
- B. Lites in Exterior Doors: Allow for thermal expansion.
- C. Rectangular Lites:
  - 1. Size: As indicated on the Drawings.
  - 2. Factory glazed with screw-applied aluminum stops anodized to match perimeter door rails.

**2.9 ALUMINUM FINISHES**

- A. Anodized Finish: Class I finish, 0.7 mils thick.
  - 1. Clear 215 R1, AA-M10C12C22A41, Class I, 0.7 mils thick.

**PART 3 EXECUTION****3.1 EXAMINATION**

- A. Examine areas to receive doors. Notify Architect of conditions that would adversely affect installation or subsequent use. Do not proceed with installation until unsatisfactory conditions are corrected.

**3.2 PREPARATION**

- A. Ensure openings to receive frames are plumb, level, square, and in tolerance.

**3.3 INSTALLATION**

- A. Install doors in accordance with manufacturer's instructions.
- B. Install doors plumb, level, square, true to line, and without warp or rack.
- C. Anchor frames securely in place.

- D. Separate aluminum from other metal surfaces with bituminous coatings or other means approved by Architect.
- E. Set thresholds in bed of mastic and backseal.
- F. Install exterior doors to be weathertight in closed position.
- G. Repair minor damages to finish in accordance with manufacturer's instructions and as approved by Architect.
- H. Remove and replace damaged components that cannot be successfully repaired as determined by Architect.

#### 3.4 FIELD QUALITY CONTROL

- A. Manufacturer's Field Services: Manufacturer's representative shall provide technical assistance and guidance for installation of doors.

#### 3.5 ADJUSTING

- A. Adjust doors, hinges, and locksets for smooth operation without binding.

#### 3.6 CLEANING

- A. Clean doors promptly after installation in accordance with manufacturer's instructions.
- B. Do not use harsh cleaning materials or methods that would damage finish.

#### 3.7 PROTECTION

- A. Protect installed doors to ensure that, except for normal weathering, doors will be without damage or deterioration at time of substantial completion.

END OF SECTION 081743

## SECTION 084113 - ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

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

## 1.2 SUMMARY

A. This Section includes the following:

1. Exterior and interior aluminum-framed storefronts.
  - a. Glazing is retained mechanically with gaskets on four sides.
2. Exterior manual-swing aluminum doors.
3. Exterior aluminum door frames.

B. Related Sections include the following:

1. Division 7 Section "Joint Sealants" for installation of joint sealants installed with aluminum-framed systems and for sealants to the extent not specified in this Section.

## 1.3 PERFORMANCE REQUIREMENTS

A. General: Provide aluminum-framed systems, including anchorage, capable of withstanding, without failure, the effects of the following:

1. Structural loads.
2. Thermal movements.
3. Movements of supporting structure indicated on Drawings including, but not limited to, story drift and deflection from uniformly distributed and concentrated live loads.
4. Dimensional tolerances of building frame and other adjacent construction.
5. Failure includes the following:
  - a. Deflection exceeding specified limits.
  - b. Thermal stresses transferred to building structure.
  - c. Framing members transferring stresses, including those caused by thermal and structural movements, to glazing.
  - d. Glazing-to-glazing contact.
  - e. Noise or vibration created by wind and thermal and structural movements.
  - f. Loosening or weakening of fasteners, attachments, and other components.
  - g. Sealant failure.
  - h. Failure of operating units to function properly.

B. Structural Loads:

1. Wind Loads: As indicated on Drawings.
2. Seismic Loads: As indicated on Drawings.

C. Deflection of Framing Members:

1. Deflection Normal to Wall Plane: Limited to 1/175 of clear span for spans up to **13 feet 6 inches (4.1 m)** and to 1/240 of clear span plus **1/4 inch (6.35 mm)** for spans greater than **13 feet 6 inches (4.1 m)** or an amount that restricts edge deflection of individual glazing lites to **3/4 inch (19 mm)**, whichever is less.
2. Deflection Parallel to Glazing Plane: Limited to 1/360 of clear span or **1/8 inch (3.2 mm)**, whichever is smaller.

D. Structural-Test Performance: Provide aluminum-framed systems tested according to ASTM E 330 as follows:

1. When tested at positive and negative wind-load design pressures, systems do not evidence deflection exceeding specified limits.
2. When tested at 150 percent of positive and negative wind-load design pressures, systems, including anchorage, do not evidence material failures, structural distress, and permanent deformation of main framing members exceeding 0.2 percent of span.
3. Test Durations: As required by design wind velocity but not less than 10 seconds.

E. Thermal Movements: Provide aluminum-framed systems that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): **120 deg F (67 deg C)**, ambient; **180 deg F (100 deg C)**, material surfaces.
2. Test Performance: No buckling; stress on glass; sealant failure; excess stress on framing, anchors, and fasteners; or reduction of performance when tested according to AAMA 501.5.
  - a. Test High Exterior Ambient-Air Temperature: That which produces an exterior metal-surface temperature of **180 deg F (82 deg C)**.
  - b. Test Low Exterior Ambient-Air Temperature: **0 deg F (minus 18 deg C)**.
  - c. Test Interior Ambient-Air Temperature: **75 deg F (24 deg C)**.

F. Air Infiltration: Provide aluminum-framed systems with maximum air leakage through fixed glazing and framing areas of **0.06 cfm/sq. ft. (0.03 L/s per sq. m)** of fixed wall area when tested according to ASTM E 283 at a minimum static-air-pressure difference of **1.57 lbf/sq. ft. (75 Pa)**.

G. Water Penetration Under Static Pressure: Provide aluminum-framed systems that do not evidence water penetration through fixed glazing and framing areas when tested according to ASTM E 331 at a minimum static-air-pressure difference of 20 percent of positive wind-load design pressure, but not less than **6.24 lbf/sq. ft. (300 Pa)**.

H. Condensation Resistance: Provide aluminum-framed systems with fixed glazing and framing areas having condensation-resistance factor (CRF) of not less than 53 when tested according to AAMA 1503.

I. Average Thermal Conductance: Provide aluminum-framed systems with fixed glazing and framing areas having average U-factor of not more than **0.69 Btu/sq. ft. x h x deg F (3.92 W/sq. m x K)** when tested according to AAMA 1503.

#### 1.4 SUBMITTALS

- A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of product indicated.
- B. Shop Drawings: For aluminum-framed systems. Include plans, elevations, sections, details, and attachments to other work.
  - 1. Include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
  - 2. Include details of provisions for system expansion and contraction and for draining moisture occurring within the system to the exterior.
  - 3. For entrances, include hardware schedule and indicate operating hardware types, functions, quantities, and locations.
- C. Samples for Initial Selection: For units with factory-applied color finishes.
- D. Samples for Verification: For each type of exposed finish required, in manufacturer's standard sizes.
- E. Fabrication Sample: Of each vertical-to-horizontal intersection of systems, made from **12-inch (300-mm)** lengths of full-size components and showing details of the following:
  - 1. Joinery.
  - 2. Anchorage.
  - 3. Expansion provisions.
  - 4. Glazing.
  - 5. Flashing and drainage.
- F. Welding certificates.
- G. Qualification Data: For Installer.
- H. Preconstruction Sealant Test Reports: For structural-sealant-glazed systems, compatibility and adhesion test reports from sealant manufacturer indicating that materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with sealants. Include sealant manufacturer's interpretation of test results for sealant performance and recommendations for primers and substrate preparation needed to obtain adhesion.
- I. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for aluminum-framed systems.
- J. Field quality-control test and inspection reports.
- K. Maintenance Data: For aluminum-framed systems to include in maintenance manuals.
- L. Warranties: Special warranties specified in this Section.

## 1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Capable of assuming engineering responsibility and performing work of this Section and who is acceptable to manufacturer.
  - 1. Engineering Responsibility: Preparation of data for aluminum-framed systems including Shop Drawings based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project and submission of reports of tests performed on manufacturer's standard assemblies.
- B. Product Options: Information on Drawings and in Specifications establishes requirements for systems' aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods including preconstruction testing, field testing, and in-service performance.
  - 1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.
- C. Accessible Entrances: Comply with the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG)," ICC/ANSI A117.1, and FED-STD-795, "Uniform Federal Accessibility Standards."
  - 1. In the event of a conflict between or among requirements of the above standards, the more conservative or more restrictive shall apply in each situation.
- D. Welding: Qualify procedures and personnel according to AWS D1.2, "Structural Welding Code--Aluminum."

## 1.6 PROJECT CONDITIONS

- A. Field Measurements: Verify actual locations of structural supports for aluminum-framed systems by field measurements before fabrication and indicate measurements on Shop Drawings.
  - 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating aluminum-framed systems without field measurements. Coordinate construction to ensure that actual dimensions correspond to established dimensions.

## 1.7 WARRANTY

- A. Special Assembly Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of aluminum-framed systems that do not comply with requirements or that deteriorate as defined in this Section within specified warranty period.
  - 1. Failures include, but are not limited to, the following:

- a. Structural failures including, but not limited to, excessive deflection.
- b. Noise or vibration caused by thermal movements.
- c. Deterioration of metals, and other materials beyond normal weathering.
- d. Adhesive or cohesive sealant failures.
- e. Water leakage through fixed glazing and framing areas.
- f. Failure of operating components to function properly.

2. Warranty Period: Five years from date of Substantial Completion.

B. Special Finish Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components on which finishes fail within specified warranty period. Warranty does not include normal weathering.

1. Warranty Period: 20 years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

A. Basis-of-Design Product: The design for aluminum-framed systems is based on EFCO Corporation 2" Thermal Storefront Framing system and 2" Durastile entrance doors.

### 2.2 MATERIALS

A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.

1. Sheet and Plate: **ASTM B 209 (ASTM B 209M)**.
2. Extruded Bars, Rods, Profiles, and Tubes: **ASTM B 221 (ASTM B 221M)**.
3. Extruded Structural Pipe and Tubes: ASTM B 429.
4. Structural Profiles: ASTM B 308/B 308M.
5. Welding Rods and Bare Electrodes: AWS A5.10/A5.10M.

B. Steel Reinforcement: With manufacturer's standard corrosion-resistant primer complying with SSPC-PS Guide No. 12.00 applied immediately after surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM and prepare surfaces according to applicable SSPC standard.

1. Structural Shapes, Plates, and Bars: ASTM A 36/A 36M.
2. Cold-Rolled Sheet and Strip: ASTM A 1008/A 1008M.
3. Hot-Rolled Sheet and Strip: ASTM A 1011/A 1011M.

### 2.3 FRAMING SYSTEMS

A. Framing Members: Manufacturer's standard extruded-aluminum framing members of thickness required and reinforced as required to support imposed loads.

1. Construction: Framing members are composite assemblies of two separate extruded-aluminum components permanently bonded by an elastomeric material of low thermal conductance.

- B. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.
- C. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.
  - 1. Where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration, use self-locking devices.
  - 2. Reinforce members as required to receive fastener threads.
  - 3. Use exposed fasteners with countersunk Phillips screw heads, fabricated from stainless steel.
- D. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts complying with ASTM A 123/A 123M or ASTM A 153/A 153M requirements.
- E. Flashing: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials. Form exposed flashing from sheet aluminum finished to match framing and of sufficient thickness to maintain a flat appearance without visible deflection.
- F. Framing System Gaskets and Sealants: Manufacturer's standard recommended by manufacturer for joint type.

## 2.4 GLAZING SYSTEMS

- A. Glass
  - 1. Insulated glass shall be 1" thick with a center of glass U-Factor of 0.24 constructed as follows:
    - a. Exterior lite –  $\frac{1}{4}$  inch thick.
    - b. Air space -  $\frac{1}{2}$  inch, argon filled.
    - c. Interior lite –  $\frac{1}{4}$  inch thick.
  - 2. Basis of Design: Solarban 60 clear low-E glass as manufactured by PPG Industries with argon filled air space.
- A. Glazing Gaskets: Manufacturer's standard compression types, replaceable, molded or extruded, that maintain uniform pressure and watertight seal.
- B. Spacers and Setting Blocks: Manufacturer's standard elastomeric types.
- C. Bond-Breaker Tape: Manufacturer's standard TFE-fluorocarbon or polyethylene material to which sealants will not develop adhesion.

## 2.5 DOORS

- A. Doors: Manufacturer's heavy duty glazed doors, for manual swing operation.
  - 1. Door Construction: **2-inch** overall thickness, with minimum **0.188-inch-** thick, extruded-aluminum tubular rail and stile members. Mechanically fasten corners with reinforcing brackets that are deep penetration and fillet welded or that incorporate concealed tie rods.

- a. Thermal Construction: High-performance plastic connectors separate aluminum members exposed to the exterior from members exposed to the interior.
2. Door Design: Medium stile; **3-1/2-inch (88.9-mm)** nominal width, with 16-inch (40 mm) bottom rail.
  - a. Accessible Doors: Smooth surfaced for width of door in area within **16 inches (255 mm)** above floor or ground plane.
3. Glazing Stops and Gaskets: Beveled, snap-on, extruded-aluminum stops and preformed gaskets.
  - a. Provide nonremovable glazing stops on outside of door.

## 2.6 DOOR HARDWARE

- A. General: Provide heavy-duty units in sizes and types recommended by entrance system and hardware manufacturers for entrances and uses indicated.
  1. Opening-Force Requirements:
    - a. Egress Doors: Not more than **30 lbf (133 N)** required to set door in motion and not more than **15 lbf (67 N)** required to open door to minimum required width.
    - b. Accessible Interior Doors: Not more than **5 lbf (22.2 N)**.
- B. Scheduled Door Hardware: Provide door hardware according to the Section 08710 and as follows:
  1. Named Manufacturer's Products: Product designation and hardware manufacturer are listed in the Door Hardware Schedule in Section 08710 to establish minimum requirements for design, grade, function, finish, size, and other distinctive qualities of each type of door hardware.
    - a. Named products are basis-of-design products. Provide named hardware manufacturer's products or comparable products that are equivalent in function and quality and that are recommended and supplied by entrance system manufacturer.
  2. References to BHMA Standards: Provide products complying with standards referenced in this Article and with requirements for description, quality, type, and function listed in the Door Hardware Schedule in Section 08710.
- C. Pivot Hinges:
  1. Standard: BHMA A156.4, Grade 1.
  2. Offset-Pivot Hinges: Provide top, bottom, and intermediate offset pivots at each door leaf.
- D. Ball-Bearing Butts:
  1. Standard: BHMA A156.1, Grade 1, radius corner.
  2. Provide nonremovable pins at hinges exposed to outside of door.

3. Provide nonferrous hinges where hinges are exposed to weather.
4. Quantities:
  - a. For doors with heights up to **87** inches **2210 mm**, provide 3 hinges per leaf.
  - b. For doors with heights of greater than **87** and up to **120** inches (**2210** and up to **3048 mm**), provide 4 hinges per leaf.

E. Continuous-Gear Hinges: Manufacturer's standard with stainless-steel bearings between knuckles; fabricated to full height of door and frame.

F. Locking Devices, General: Do not require use of key, tool, or special knowledge for operation.

1. Opening-Force Requirements:
  - a. Latches and Exit Devices: Not more than 15 lbf (67 N) required to release latch.

G. Automatic and Self-Latching Flush Bolts: BHMA A156.3, Grade 1.

H. Panic Exit Devices: Listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for panic protection, based on testing according to UL 305.

1. Standard: BHMA A156.3, Grade 1.

I. Cylinders: BHMA A156.5, Grade 1.

1. Keying: Master key system. Permanently inscribe each key with a visual key control number and include notation "DO NOT DUPLICATE".

J. Strikes: Provide strike with black-plastic dust box for each latch or lock bolt; fabricated for aluminum framing.

K. Electric Strikes:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. Adams Rite Manufacturing Co. (ARM).
  - b. Folger Adam Security, Inc. (FAS).
  - c. Locknetics Security Engineering, a Harrow Company (LSE).
  - d. Von Duprin, Inc.; an Ingersoll-Rand Company (VD).
2. Standard: BHMA A156.5, Grade 1

L. Operating Trim: BHMA A156.6.

M. Closers: With accessories required for a complete installation, sized as required by door size, exposure to weather, and anticipated frequency of use, and adjustable to meet field conditions and requirements for opening force.

1. Standard: BHMA A156.4, Grade 1.

N. Concealed Overhead Holders: BHMA A156.8, Grade 1.

- O. Surface-Mounted Holders: BHMA A156.16, Grade 1.
- P. Door Stops: BHMA A156.16, Grade 1, floor or wall mounted, as appropriate for door location indicated, with integral rubber bumper.
- Q. Weather Stripping: Manufacturer's standard replaceable components.
  - 1. Compression Type: Made of ASTM D 2000, molded neoprene, or ASTM D 2287, molded PVC.
  - 2. Sliding Type: AAMA 701, made of wool, polypropylene, or nylon woven pile with nylon-fabric or aluminum-strip backing.
- R. Weather Sweeps: Manufacturer's standard exterior-door bottom sweep with concealed fasteners on mounting strip.
- S. Thresholds: Raised thresholds beveled with a slope of not more than 1:2, with maximum height of 1/2 inch (13 mm).
  - 1. Standard: BHMA A156.21.

## 2.7 ACCESSORY MATERIALS

- A. Insulating Materials: As specified in Division 7 Section "Building Insulation."
- B. Joint Sealants: For installation at perimeter of aluminum-framed systems, as specified in Division 7 Section "Joint Sealants."
- C. Bituminous Paint: Cold-applied asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos, formulated for **30-mil (0.762-mm)** thickness per coat.

## 2.8 FABRICATION

- A. Form aluminum shapes before finishing.
- B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.
- C. Framing Members, General: Fabricate components that, when assembled, have the following characteristics:
  - 1. Profiles that are sharp, straight, and free of defects or deformations.
  - 2. Accurately fitted joints with ends coped or mitered.
  - 3. Means to drain water passing joints, condensation occurring within framing members, and moisture migrating within the system to exterior.
  - 4. Physical and thermal isolation of glazing from framing members.
  - 5. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
  - 6. Provisions for field replacement of glazing from interior.

7. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.

D. Mechanically Glazed Framing Members: Fabricate for flush glazing (without projecting stops).

E. Door Frames: Reinforce as required to support loads imposed by door operation and for installing hardware.

1. At exterior doors, provide compression weather stripping at fixed stops.
2. At interior doors, provide silencers at stops to prevent metal-to-metal contact. Install three silencers on strike jamb of single-door frames and two silencers on head of frames for pairs of doors.

F. Doors: Reinforce doors as required for installing hardware.

1. At pairs of exterior doors, provide sliding weather stripping retained in adjustable strip mortised into door edge.
2. At exterior doors, provide weather sweeps applied to door bottoms.

G. Hardware Installation: Factory install hardware to the greatest extent possible. Cut, drill, and tap for factory-installed hardware before applying finishes.

H. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

**2.9 ALUMINUM FINISHES**

A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.

C. Anodic Finish

1. Finish all exposed areas of aluminum windows and components with electrolytically deposited color in accordance with Aluminum Association Designation AA-M10-C22-A44. Color shall be dark bronze.

**PART 3 - EXECUTION****3.1 EXAMINATION**

A. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.

1. Proceed with installation only after unsatisfactory conditions have been corrected.

**3.2 INSTALLATION**

## A. General:

1. Comply with manufacturer's written instructions.
2. Do not install damaged components.
3. Fit joints to produce hairline joints free of burrs and distortion.
4. Rigidly secure nonmovement joints.
5. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration.
6. Seal joints watertight, unless otherwise indicated.

## B. Metal Protection:

1. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape or installing nonconductive spacers as recommended by manufacturer for this purpose.
2. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

C. Install components to drain water passing joints, condensation occurring within framing members, and moisture migrating within the system to exterior.

D. Set continuous sill members and flashing in full sealant bed as specified in Division 7 Section "Joint Sealants" and to produce weathertight installation.

E. Install components plumb and true in alignment with established lines and grades, without warp or rack.

F. Install glazing as specified in Division 8 Section "Glazing."

G. Entrances: Install to produce smooth operation and tight fit at contact points.

1. Exterior Entrances: Install to produce tight fit at weather stripping and weathertight closure.
2. Field-Installed Hardware: Install surface-mounted hardware according to hardware manufacturers' written instructions using concealed fasteners to greatest extent possible.

H. Install insulation materials as specified in Division 7 Section "Building Insulation."

I. Install perimeter joint sealants as specified in Division 7 Section "Joint Sealants" and to produce weathertight installation.

J. Erection Tolerances: Install aluminum-framed systems to comply with the following maximum tolerances:

1. Location and Plane: Limit variation from true location and plane to **1/8 inch in 12 feet (3 mm in 3.7 m); 1/4 inch (6 mm)** over total length.
2. Alignment:
  - a. Where surfaces abut in line, limit offset from true alignment to **1/16 inch (1.5 mm)**.
  - b. Where surfaces meet at corners, limit offset from true alignment to **1/32 inch (0.8 mm)**.

3. Diagonal Measurements: Limit difference between diagonal measurement to **1/8 inch (3 mm)**.

### 3.3 ADJUSTING

- A. Entrances: Adjust operating hardware for smooth operation according to hardware manufacturers' written instructions.
  1. For doors accessible to people with disabilities, adjust closers to provide a 3-second closer sweep period for doors to move from a 70-degree open position to **3 inches (75 mm)** from the latch measured to the leading door edge.

PRIVATE tbl1

PRIVATE tbl1

END OF SECTION 084113

## SECTION 084413 - GLAZED ALUMINUM CURTAIN WALLS

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

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

## 1.2 SUMMARY

1. This Section includes conventionally glazed aluminum curtain walls, installed as stick systems.
2. Related Sections include the following:
  1. Division 7 Section "Joint Sealants" for installation of joint sealants installed with glazed aluminum curtain-wall systems and for sealants to the extent not specified in this Section.
  2. Division 8 Section "Aluminum Windows" for windows installed with glazed aluminum curtain-wall systems.

## 1.3 PERFORMANCE REQUIREMENTS

1. General: Provide glazed aluminum curtain-wall systems, including anchorage, capable of withstanding, without failure, the effects of the following:
  1. Structural loads.
  2. Movements of supporting structure indicated on Drawings including, but not limited to, story drift, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.
  3. Dimensional tolerances of building frame and other adjacent construction.
  4. Failure includes the following:
    - a. Deflection exceeding specified limits.
    - b. Thermal stresses transferred to building structure.
    - c. Framing members transferring stresses, including those caused by thermal and structural movements, to glazing.
    - d. Noise or vibration created by wind and thermal and structural movements.
    - e. Loosening or weakening of fasteners, attachments, and other components.
    - f. Sealant failure.
2. Structural Loads:
  1. Wind Loads: 110 mph.
3. Structural-Test Performance: Provide glazed aluminum curtain-wall systems, including anchorage, capable of withstanding test pressure indicated without material and deflection failures and permanent deformation of structural members exceeding 0.2 percent of span when tested according to ASTM E 330.

1. Submit reports of tests performed on manufacturer's standard assemblies.
2. Test Pressure: 150 percent of positive and negative wind-load design pressures.
3. Test Duration: As required by design wind velocity but not less than 60 seconds.
4. Deflection of Framing Members:
  1. Deflection Normal to Wall Plane: Limited to 1/175 of clear span or **3/4 inch (19 mm)**, whichever is smaller.
  2. Deflection Parallel to Glazing Plane: Limited to amount not exceeding that which reduces glazing bite to less than 75 percent of design dimension and which reduces edge clearance between framing members and glazing or other fixed components to less than **1/8 inch (3.2 mm)**.
    - a. Operable Units: Provide a minimum **1/16-inch (1.6-mm)** clearance between framing members and operable units.
  3. Cantilever Deflection: Where framing members overhang an anchor point, limited to 2 times the length of cantilevered member, divided by 175.
5. Story Drift: Provide glazed aluminum curtain-wall systems that accommodate design displacement of adjacent stories indicated.
  1. Design Displacement: As indicated on Drawings.
  2. Test Performance: No glass breakage, anchor failures, or structural damage when tested according to AAMA 501.4.
6. Thermal Movements: Provide glazed aluminum curtain-wall systems that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
  1. Temperature Change (Range): **120 deg F (67 deg C)**, ambient; **180 deg F (100 deg C)**, material surfaces.
  2. Test Performance: No buckling, stress on glass, glazing-edge seal failure, sealant failure, excess stress on curtain-wall framing, anchors and fasteners, or reduction of performance when tested according to AAMA 501.5.
    - a. Test Ambient Temperature Range: **0 to 180 deg F (minus 18 to plus 100 deg C)**.
7. Air Infiltration: Provide glazed aluminum curtain-wall systems with maximum air leakage of **0.06 cfm/sq. ft. (0.03 L/s per sq. m)** of fixed wall area when tested according to ASTM E 283 at a minimum static-air-pressure differential of **6.24 lbf/sq. ft. (300 Pa)**.
8. Water Penetration Under Static Pressure: Provide aluminum glazed curtain-wall systems that do not evidence water penetration when tested according to ASTM E 331 at a minimum differential static pressure of 20 percent of positive design wind load, but not less than **10 lbf/sq. ft. (479 Pa)**.
9. Water Penetration Under Dynamic Pressure: Provide glazed aluminum curtain-wall systems that do not evidence water leakage when tested according to AAMA 501.1 under dynamic

pressure equal to 20 percent of positive design wind load, but not less than **10 lbf/sq. ft. (479 Pa)**.

1. Maximum Water Leakage: According to AAMA 501.1. Water controlled by flashing and gutters that is drained to exterior and cannot damage adjacent materials or finishes is not considered water leakage.
10. Condensation Resistance: Provide glazed aluminum curtain-wall systems with condensation-resistance factor (CRF) of not less than 55 for glass and 70 for frame, when tested according to AAMA 1503.
11. Average Thermal Conductance: Provide glazed aluminum curtain-wall systems with average U-factor of not more than **0.66 Btu/sq. ft. x h x deg F (3.75 W/sq. m x K)** when tested according to AAMA 1503.

#### 1.4 SUBMITTALS

1. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of product indicated.
2. Shop Drawings: Prepared by or under the supervision of a qualified professional engineer detailing fabrication and assembly of glazed aluminum curtain-wall systems.
  1. Include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
3. Samples for Verification: For each type of exposed finish required, in manufacturer's standard sizes.
4. Fabrication Sample: Of each vertical-to-horizontal intersection of systems, made from **12-inch (300-mm)** lengths of full-size components and showing details of the following:
  1. Joinery.
  2. Anchorage.
  3. Expansion provisions.
  4. Glazing.
  5. Flashing and drainage.
5. Welding certificates.
6. Qualification Data: For Installer.
7. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for glazed aluminum curtain-wall systems.
8. Field quality-control test reports.
9. Warranties: Special warranties specified in this Section.

## 1.5 QUALITY ASSURANCE

1. Installer Qualifications: Capable of assuming engineering responsibility and performing Work of this Section and who is acceptable to manufacturer.
  1. Engineering Responsibility: Preparation of data for glazed aluminum curtain-wall systems including the following:
    - a. Shop Drawings based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.
    - b. Shop Drawings, preconstruction-testing program development, and comprehensive engineering analysis by a qualified professional engineer licensed in the state of Connecticut.
2. Testing Agency Qualifications: An independent agency qualified according to ASTM E 699 for testing indicated.
3. Product Options: Information on Drawings and in Specifications establishes requirements for systems' aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods including preconstruction testing, field testing, and in-service performance.
  1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.
4. Welding: Qualify procedures and personnel according to AWS D1.2, "Structural Welding Code--Aluminum."
5. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination." Review methods and procedures related to glazed aluminum curtain-wall systems including, but not limited to, the following:
  1. Review structural load limitations.
  2. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
  3. Review required testing, inspecting, and certifying procedures.

## 1.6 PROJECT CONDITIONS

1. Field Measurements: Verify actual locations of structural supports for glazed aluminum curtain-wall systems by field measurements before fabrication and indicate measurements on Shop Drawings.
  1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating glazed aluminum curtain-

wall systems without field measurements. Coordinate construction to ensure that actual dimensions correspond to established dimensions.

## 1.7 WARRANTY

1. Special Assembly Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of glazed aluminum curtain-wall systems that do not comply with requirements or that deteriorate as defined in this Section within specified warranty period.
  1. Failures include, but are not limited to, the following:
    - a. Structural failures including, but not limited to, excessive deflection.
    - b. Noise or vibration caused by thermal movements.
    - c. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
    - d. Water leakage.
    - e. Failure of operating components to function normally.
  2. Warranty Period: Five years from date of Substantial Completion.
2. Special Finish Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components on which finishes fail within specified warranty period. Warranty does not include normal weathering.
  1. Warranty Period: 20 years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

1. Basis-of-Design Product: The design for glazed aluminum curtain-wall systems is based on the following systems:
  - a. Conventionally glazed aluminum curtain walls installed as stick assemblies. The design for glazed aluminum curtain-wall systems is based on EFCO Corp. Outside Glazed 2-1/4" wide Curtain Wall System, Series 5600 with Duracast Fiberglass Pressure Plate.

### 2.2 FRAMING SYSTEMS

1. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
  1. Sheet and Plate: **ASTM B 209 (ASTM B 209M)**.
  2. Extruded Bars, Rods, Shapes, and Tubes: **ASTM B 221 (ASTM B 221M)**.
  3. Extruded Structural Pipe and Tubes: ASTM B 429.
  4. Welding Rods and Bare Electrodes: AWS A5.10/A5.10M.

2. Steel Reinforcement: With manufacturer's standard corrosion-resistant primer complying with SSPC-PS Guide No. 12.00 applied immediately after surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM and prepare surfaces according to applicable SSPC standard.
  1. Structural Shapes, Plates, and Bars: ASTM A 36/A 36M.
  2. Cold-Rolled Sheet and Strip: ASTM A 611.
  3. Hot-Rolled Sheet and Strip: ASTM A 570/A 570M.
3. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.
4. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.
  1. Where fasteners are subject to loosening or turn out from thermal and structural movements, wind loads, or vibration, use self-locking devices.
  2. Reinforce members as required to receive fastener threads.
  3. Use exposed fasteners with countersunk Phillips screw heads.
  4. Finish exposed portions to match framing system.
  5. At movement joints, use slip-joint linings, spacers, and sleeves of material and type recommended by manufacturer.
5. Anchors: Three-way adjustable anchors that accommodate fabrication and installation tolerances in material and finish compatible with adjoining materials and recommended by manufacturer.
  1. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts complying with ASTM A 123/A 123M or ASTM A 153/A 153M requirements.
6. Concealed Flashing: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials.
7. Duracast® Pressure Plate
  1. Material shall be a fiberglass composite with a Flexural strength of no less than 82 ksi (565 Mpa) along the lineal's major axis.
  2. Material thermal conductivity shall be no more than 2 BTU·in/hr·ft²·°F (0.289 W/m²·K)
8. Framing Gaskets: As recommended by manufacturer for joint type.
9. Framing Sealants: As recommended by manufacturer for joint type.

## 2.3 GLAZING SYSTEMS

1. Glazing: Insulated glass shall be 1" thick with a center of glass U-Factor of 0.24 constructed as follows:
  - a. Exterior lite –  $\frac{1}{4}$  inch thick.
  - b. Air space -  $\frac{1}{2}$  inch, argon filled.
  - c. Interior lite –  $\frac{1}{4}$  inch thick.
  - d. Basis of Design: Solarban 60 clear low-E glass as manufactured by PPG Industries with

argon filled air space.

2. Glazing Gaskets: Manufacturer's standard sealed-corner pressure-glazing system of black, resilient elastomeric glazing gaskets, setting blocks, and shims or spacers.
3. Glazing Installations: Some glazing pieces will require interior glazing, and some will require exterior glazing. Care shall be exercised during the fabrication and installation of the framing and glazing systems to recognize the locations requiring a specific glazing approach. The sequencing of the adjacent construction may also determine if the frame is glazed from the exterior or interior. Verify the glazing approach in shop drawings, and prior to installation.

#### 2.4 FABRICATION

1. Form aluminum shapes before finishing.
2. Fabricate components that, when assembled, have the following characteristics:
  1. Sharp profiles, straight and free of defects or deformations.
  2. Accurately fitted joints with ends coped or mitered.
  3. Internal guttering systems or other means to drain water passing joints, condensation occurring within framing members, and moisture migrating within the system to exterior.
  4. Physical and thermal isolation of glazing from framing members.
  5. Accommodations for thermal and mechanical movements of glazing and framing to prevent glazing-to-glazing contact and to maintain required glazing edge clearances.
  6. Provisions for reglazing from exterior.
3. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.
4. Factory-Assembled Frame Units:
  1. Rigidly secure nonmovement joints.
  2. Seal joints watertight, unless otherwise indicated.
  3. Pressure equalize system at its interior face.
5. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

#### 2.5 ALUMINUM FINISHES

1. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
2. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.

3. Class I, Clear Anodic Finish: AA-M12C22A41 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, clear coating 0.018 mm or thicker) complying with AAMA 611.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

1. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.
  1. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

#### 1. General:

1. Comply with manufacturer's written instructions.
2. Do not install damaged components.
3. Fit joints to produce hairline joints free of burrs and distortion.
4. Rigidly secure nonmovement joints.
5. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.
6. Weld components in concealed locations to minimize distortion or discoloration of finish. Protect glazing surfaces from welding.
7. Seal joints watertight, unless otherwise indicated.

#### 2. Metal Protection:

1. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape or installing nonconductive spacers as recommended by manufacturer for this purpose.
2. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.
3. Install components to drain water passing joints, condensation occurring within framing members, and moisture migrating within the system to exterior.
4. Install components plumb and true in alignment with established lines and grades.
5. Install operable units level and plumb, securely anchored, and without distortion. Adjust weather-stripping contact and hardware movement to produce proper operation.
6. Install sealants as specified in Division 7 Section "Joint Sealants."
7. Erection Tolerances: Install glazed aluminum curtain-wall systems to comply with the following maximum tolerances:
  1. Plumb: **1/8 inch in 10 feet (3 mm in 3 m); 1/4 inch in 40 feet (6 mm in 12 m).**
  2. Level: **1/8 inch in 20 feet (3 mm in 6 m); 1/4 inch in 40 feet (6 mm in 12 m).**

## 3. Alignment:

- a. Where surfaces abut in line or are separated by reveal or protruding element up to **1/2 inch (13 mm)** wide, limit offset from true alignment to **1/16 inch (1.6 mm)**.
- b. Where surfaces are separated by reveal or protruding element from **1/2 to 1 inch (13 to 25 mm)** wide, limit offset from true alignment to **1/8 inch (3.2 mm)**.
- c. Where surfaces are separated by reveal or protruding element of **1 inch (25 mm)** wide or greater, limit offset from true alignment to **1/4 inch (6 mm)**.

4. Location: Limit variation from plane to **1/8 inch in 12 feet (3 mm in 3.7 m); 1/2 inch (12.7 mm)** over total length.

## 3.3 ADJUSTING AND CLEANING

1. Clean aluminum surfaces promptly after installation, exercising care to avoid damage to protective coating and finishes.
2. Submit to Architect, with copy to Owner, manufacturer's written recommendations for maintenance and protection of curtain wall system..

END OF SECTION 084413

## SECTION 084500 – TRANSLUCENT WALL PANEL UNIT SYSTEM

## PART 1 - GENERAL

## 1.1 SUMMARY

A. Section includes the insulated translucent sandwich panel system and accessories, factory unitized, as shown and specified. Work includes providing and installing:

1. Flat factory prefabricated structural insulated translucent sandwich panels
2. Aluminum installation system
3. Aluminum sill flashing
4. Thermal break windows

B. Related Sections:

1. Sealants: Section 079200

## 1.2 SUBMITTALS

A. Submit manufacturer's product data. Include construction details, material descriptions, profiles and finishes of components.

B. Submit shop drawings. Include elevations and details.

C. Submit manufacturer's color charts showing the full range of colors available for factory-finished aluminum.

1. When requested, submit samples for each exposed finish required, in same thickness and material indicated for the work and in size indicated below. If finishes involve normal color variations, include sample sets consisting of two or more units showing the full range of variations expected.

- a. Sandwich panels: 14" x 28" units
- b. Factory finished aluminum: 5" long sections

D. Submit Installer Certificate, signed by installer, certifying compliance with project qualification requirements.

E. Submit product reports from a qualified independent testing agency indicating each type and class of panel system complies with the project performance requirements, based on comprehensive testing of current products. Previously completed reports will be acceptable if for current manufacturer and indicative of products used on this project.

1. Reports required are:

- a. International Building Code Evaluation Report
- b. Flame Spread and Smoke Developed (UL 723) – Submit UL Card
- c. Burn Extent (ASTM D 635)
- d. Color Difference (ASTM D 2244)
- e. Impact Strength (UL 972)
- f. Bond Tensile Strength (ASTM C 297 after aging by ASTM D 1037)

- g. Bond Shear Strength (ASTM D 1002)
- h. Beam Bending Strength (ASTM E 72)
- i. Insulation U-Factor (NFRC 100)
- j. NFRC System U-Factor Certification (NFRC 700)
- k. Solar Heat Gain Coefficient (NFRC or Calculations)
- l. Condensation Resistance Factor (AAMA 1503)
- m. Air Leakage (ASTM E 283)
- n. Structural Performance (ASTM E 330)
- o. Water Penetration (ASTM E 331)
- p. 1200°F Fire Resistance (SWRI)
- q. Performance for Windows (AAMA/WDMA/CSA-101/I.S.2/A440-05)

### 1.3 QUALITY ASSURANCE

#### A. Manufacturer's Qualifications

- 1. Material and products shall be manufactured by a company continuously and regularly employed in the manufacture of specified materials for a period of at least ten consecutive years and which can show evidence of those materials being satisfactorily used on at least six projects of similar size, scope and location. At least three of the projects shall have been in successful use for ten years or longer.
- 2. Panel system must be listed by an ANSI accredited Evaluation Service, which requires quality control inspections and fire, structural and water infiltration testing of sandwich panel systems by an accredited agency.
- 3. Quality control inspections shall be conducted at least once each year and shall include manufacturing facilities, sandwich panel components and production sandwich panels for conformance with AC177 "Translucent Fiberglass Reinforced Plastic (FRP) Faced Panel Wall, Roof and Skylight Systems" as issued by the ICC-ES.

B. Installer's Qualifications: Installation shall be by an experienced installer, which has been in the business of installing specified panel systems for at least two consecutive years and can show evidence of satisfactory completion of projects of similar size, scope and type.

### 1.4 PERFORMANCE REQUIREMENTS

- A. The manufacturer shall be responsible for the configuration and fabrication of the complete unitized panel system.
  - 1. When requested, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
  - 2. Standard panel system shall have less than 0.01 cfm/ft<sup>2</sup> air leakage by ASTM E 283 at 6.24 PSF (50 mph) and no water penetration by ASTM E 331 at 15 PSF; and structural testing by ASTM E 330.
  - 3. Structural Loads; Provide system capable of handling the following loads:
    - a. Wind Speed: 110 MPH

### 1.5 DELIVERY STORAGE AND HANDLING

- A. Deliver panel system, components and materials in manufacturer's standard protective packaging.
- B. Store panels on the long edge; several inches above the ground, blocked and under cover in accordance with manufacturer's storage and handling instructions.

### 1.6 WARRANTY

- A. Submit manufacturer's and installer's written warranty agreeing to repair or replace panel system work, which fails in materials or workmanship within one year of the date of delivery. Failure of materials or workmanship shall include leakage, excessive deflection, and deterioration of finish on metal in excess of normal weathering and defects in accessories, insulated translucent sandwich panels and other components of the work.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURER

- A. The basis for this specification is for products manufactured by Kalwall Corporation. Other manufacturers may bid this project provided they comply with all of the performance requirements of this specification and submit evidence thereof. Listing other manufacturers' names in this specification does not constitute approval of their products or relieve them of compliance with all the performance requirements contained herein.
- B. Kalwall Corporation, Tel: (800) 258-9777 X 4905 – Fax: (603) 627-7905 – Email: [info@kalwall.com](mailto:info@kalwall.com)

### 2.2 PANEL COMPONENTS

#### A. Face Sheets

1. Translucent faces: Manufactured from glass fiber reinforced thermoset resins, formulated specifically for architectural use.
  - a. Thermoplastic (e.g. polycarbonate, acrylic) faces are not acceptable.
  - b. Face sheets shall not deform, deflect or drip when subjected to fire or flame.
2. Interior face sheets:
  - a. Flame spread: Underwriters Laboratories (UL) listed, which requires periodic unannounced retesting, with flame spread rating no greater than 50 and smoke developed no greater than 250 when tested in accordance with UL 723.
  - b. Burn extent by ASTM D 635 shall be no greater than 1".
3. Exterior face sheets:
  - a. Color stability: Full thickness of the exterior face sheet shall not change color more than 3 CIE Units DELTA E by ASTM D 2244 after 5 years outdoor South Florida weathering at 5° facing south, determined by the average of at least three white samples with and without a protective film or coating to ensure long-term color stability. Color stability shall be unaffected by abrasion or scratching.
  - b. Strength: Exterior face sheet shall be uniform in strength, impenetrable by hand held pencil and repel an impact minimum of 70ft. lbs. without fracture or tear when impacted by a 3-1/4" diameter, 5 lb. free-falling ball per UL 972.
4. Appearance:
  - a. Exterior face sheets: Smooth .070" thick and crystal in color.
  - b. Interior face sheets: Smooth .045" thick and white in color.
  - c. Face sheets shall not vary more than ± 10% in thickness and be uniform in color.

**B. Grid Core**

1. Thermally broken I-beam grid core shall be of 6063-T6 or 6005-T5 alloy and temper with provisions for mechanical interlocking of muntin-mullion and perimeter. Width of I-beam shall be no less than 7/16".
2. I-beam Thermal break: Minimum 1", thermoset fiberglass composite.

**C. Laminate Adhesive**

1. Heat and pressure resin type adhesive engineered for structural sandwich panel use, with minimum 25-years field use. Adhesive shall pass testing requirements specified by the International Code Council "Acceptance Criteria for Sandwich Panel Adhesives".
2. Minimum tensile strength of 750 PSI when the panel assembly is tested by ASTM C 297 after two exposures to six cycles each of the aging conditions prescribed by ASTM D 1037.
3. Minimum shear strength of the panel adhesive by ASTM D 1002 after exposure to four separate conditions:
  - a. 50% Relative Humidity at 68° F: 540 PSI
  - b. 182° F: 100 PSI
  - c. Accelerated Aging by ASTM D 1037 at room temperature: 800 PSI
  - d. Accelerated Aging by ASTM D 1037 at 182° F: 250 PSI

**2.3 PANEL CONSTRUCTION**

- A. Provide sandwich panels of flat fiberglass reinforced translucent face sheets laminated to a grid core of mechanically interlocking I-beams. The adhesive bonding line shall be straight, cover the entire width of the I-beam and have a neat, sharp edge.
  1. Thickness: 2-3/4"
  2. Light transmission: 20%
  3. Solar heat gain coefficient .28.
  4. Panel U-factor by NFRC certified laboratory: 2-3/4" thermally broken grid .23.
  5. Complete insulated panel system shall have NFRC certified U-factor of .30.
  6. Grid pattern: Nominal size 8" x 20"; pattern Shoji.
- B. Standard panels shall deflect no more than 1.9" at 30 PSF in 10' 0" span without a supporting frame by ASTM E 72.
- C. Standard panels shall withstand 1200° F fire for minimum one hour without collapse or exterior flaming.
- D. Thermally broken panels: Minimum Condensation Resistance Factor of 80 by AAMA 1503 measured on the bond line.

**2.4 BATTENS AND PERIMETER CLOSURE SYSTEM**

- A. Closure system: Thermally broken extruded aluminum 6063-T6 and 6063-T5 alloy and temper clamp-tite screw type closure system.
- B. Sealing tape: Manufacturer's standard, pre-applied to closure system at the factory under controlled conditions.

- C. Fasteners: 300 series stainless steel screws for aluminum closures, excluding final fasteners to the building.
- D. Finish:
  - 1. Manufacturer's factory applied finish, which meets the performance requirements of AAMA 2604. Color to be selected from manufacturer's standards.

## 2.5 WINDOWS

- A. Windows shall be designed specifically for inclusion in the translucent panel unit wall system and factory unitized to panels.
  - 1. Units shall be of the following type:
    - a. Project-in top
- B. Performance: Windows shall pass or exceed requirements of AAMA/WDMA/CSA-101/I.S.2/A440-05.
  - 1. HC-2000 projected windows: PI-AW50, PO-HC55; shall pass requirements at 75 psf uniform structural load with air infiltration <.01 CFM/FT<sup>2</sup> at 6.24 psf and no water penetration at 10 psf (PI) and 8 psf (PO)
- C. Construction: All window frame members shall be of heavy gauge 6063-T5 extruded aluminum with a thermal break. Frame sections shall be coped and joined by stainless steel screws at each corner. All joints exposed to the weather shall be sealed with an elastic compound. All openings shall be double weather stripped using T-slot bulb gaskets to insure minimum air infiltration.
  - 1. Operating sash shall be hollow extruded design, mitered and joined with heavy reinforcing corners.
  - 2. Both operable and fixed lites shall be inside glazed with an expanded EPDM closed cell sponge gasket to exterior, with aluminum glazing bead and a driven EPDM wedge gasket to the interior for rapid removal and replacement.
- D. Hardware:
  - 1. Hinges on operating windows shall be four bar stainless steel with adjustable friction blocks.
  - 2. Locking hardware shall be of cam lever design and shall be made of cast white bronze.
- E. Glazing:
  - 1. Heavy commercial (HC2000) windows shall be glazed with:
    - a. 1" translucent panels with U-factor and faces to match 2-3/4" translucent panels.
- F. Finish is to be coordinated with closure system.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Installer shall examine substrates, supporting structure and installation conditions.
- B. Do not proceed with panel installation until unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Metal Protection:
  1. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose.
  2. Where aluminum will contact concrete, masonry or pressure treated wood, protect against corrosion by painting contact surfaces with bituminous paint or method recommended by manufacturer.

### 3.3 INSTALLATION

- A. Install the panel system in accordance with the manufacturer's installation recommendations and approved shop drawings.
  1. Anchor component parts securely in place by permanent mechanical attachment system.
  2. Accommodate thermal and mechanical movements.
  3. Set perimeter framing in a full bed of sealant compound, or with joint fillers or gaskets to provide weather-tight construction.
- B. Install joint sealants at perimeter joints and within the panel system in accordance with manufacturer's installation instructions.

### 3.4 CLEANING

- A. Clean the panel system inside and outside, immediately after installation.
- B. Refer to manufacturer's written recommendations.

END OF SECTION 084500

## SECTION 085113 – ALUMINUM WINDOWS

## PART 1 - GENERAL

## 1.00 RELATED DOCUMENTS

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

## 1.01 WORK INCLUDED

- A. Furnish and install aluminum architectural windows complete with hardware and related components as shown on drawings and specified in this section.
- B. Glass and Glazing
  - 1. All units shall be factory glazed.
- C. Single Source Requirement
  - 1. All products listed in Section 1.02 shall be by the same manufacturer.

## 1.02 RELATED WORK

- A. Section 084413 – Glazed Aluminum Curtain Walls

## 1.03 LABORATORY TESTING AND PERFORMANCE REQUIREMENTS

- A. Test Units
  - 1. Air, water, and structural test unit shall conform to requirements set forth in AAMA/WDMA/CSA 101/I.S.2/A440 – 08 and manufacturer's standard locking/operating hardware and insulated glazing configuration.
  - 2. Thermal test unit sizes shall be 72" x 48". Unit shall consist of a single horizontal sliding window.
- B. Test Procedures and Performances
  - 1. Windows shall conform to all AAMA/WDMA/CSA 101/I.S.2/A440–08 requirements for the window type referenced in 1.01.B. In addition, the following specific performance requirements shall be met.
  - 2. Life Cycle Testing
    - a. Test in accordance with AAMA 910. There shall be no damage to fasteners, hardware parts, support arms, activating mechanisms, or any other damage that would cause the window to be inoperable. Air infiltration and water resistance tests shall not exceed specified requirements.
  - 3. Air Infiltration Test
    - a. With ventilators closed and locked, test unit in accordance with ASTM E 283 at a static air pressure difference of 6.24 psf.

- b. Air infiltration shall not exceed .10 cfm/SF of unit.
- 4. Water Resistance Test
  - a. With ventilators closed and locked, test unit in accordance with ASTM E 331/ASTM E 547 at a static air pressure difference of 15.0 psf.
  - b. There shall be no uncontrolled water leakage.
- 5. Uniform Load Deflection Test
  - a. With ventilators closed and locked, test unit in accordance with ASTM E 330 at a static air pressure difference of 70 psf, positive and negative pressure.
  - b. No member shall deflect over L/175 of its span.
- 6. Uniform Load Structural Test
  - a. With ventilators closed and locked, test unit in accordance with ASTM E 330 at a static air pressure difference of 105.0 psf, both positive and negative.
  - b. At conclusion of test there shall be no glass breakage, permanent damage to fasteners, hardware parts, support arms or actuating mechanisms, nor any other damage that would cause the window to be inoperable.
- 7. Forced Entry Resistance
  - a. Windows shall be tested in accordance to ASTM F 588 or AAMA 1302.5 and meet the requirements of performance level 40.
- 8. Condensation Resistance Test (CRF)
  - a. Test unit in accordance with AAMA 1503.1.
  - b. Condensation Resistance Factor (CRF) shall not be less than 77 (frame) when glazed with 0.24 center of glass U-Factor.
- 9. Condensation Resistance (CR)
  - a. With ventilators closed and locked, test unit in accordance with NFRC 500-2010.
  - b. Condensation Resistance (CR) shall not be less than 60 when glazed with 0.24 center of glass U-Factor.
- 10. Thermal Transmittance Test (Conductive U-Factor)
  - a. With ventilators closed and locked, test unit in accordance with NFRC 100-2010.
  - b. Conductive thermal transmittance (U-Factor) shall not be more than 0.41 BTU/hr•ft<sup>2</sup>•°F when glazed with 0.24 center of glass U-Factor.

### C. Project Wind Loads

- 1. The system shall be designed to withstand 110 mph winds loads.

## 1.04 QUALITY ASSURANCE

- A. Provide test reports from AAMA accredited laboratories certifying the performance as specified in 1.05.
- B. Test reports shall be accompanied by the window manufacturer's letter of certification, stating the tested window meets or exceeds the referenced criteria for the appropriate window type listed.

## 1.05 SUBMITTALS

- A. Contractor shall submit shop drawings; finish samples, test reports, and warranties.
  - 1. Samples of materials as may be requested without cost to owner, i.e., metal, glass, fasteners, anchors, frame sections, mullion section, corner section, etc.
- B. An NFRC Component Modeling Approach (CMA) generated label certificate shall be provided by the manufacturer. The label certificate shall be project specific and will contain the thermal

performance ratings of the manufacturer's framing combined with the specified glass, and the glass spacer used in the fabrication of the glass, at NFRC standard test size as defined in table 4-3 in NFRC 100-2010.

## 1.06 WARRANTIES

### A. Total Window Installation

1. The responsible contractor shall assume full responsibility and warrant for one year the satisfactory performance of the total window installation which includes that of the windows, hardware, glass (including insulated units), glazing, anchorage and setting system, sealing, flashing, etc., as it relates to air, water, and structural adequacy as called for in the specifications and approved shop drawings.
2. Any deficiencies due to such elements not meeting the specifications shall be corrected by the responsible contractor at their expense during the warranty period.

### B. Window Material and Workmanship

1. Provide written guarantee against defects in material and workmanship for 10 (ten) years from the date of substantial completion.

### C. Glass

1. Provide written warranty for insulated glass units that they will be free from obstruction of vision as a result of dust or film formation on the internal glass surfaces caused by failure of the hermetic seal due to defects in material and workmanship.
2. Warranty period shall be for 10 (ten) years from date of substantial completion.

### D. Finish

1. Warranty period shall be for 10 (ten) years from the date of substantial completion.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

D. Basis of Design Products: The design for the projected windows is based on EFCO Corporation Series 2700 Thermal AW-PG110-AP Grade Project-in Windows and EFCO Corporation Series 510 Thermal AW-PG95-AP Project-in Windows. Subject to compliance with requirements, provide the named products or comparable products. Other manufacturers requesting approval to bid their product as an equal must submit the following information within 10 calendar days prior to the bid due date.

1. A sample window, 36" x 24" single unit.
2. Test reports documenting compliance with requirements of Section 1.05.

### 2.02 MATERIALS

#### A. Aluminum

1. Extruded aluminum shall be 6063-T6 alloy and tempered.

#### B. Hardware

1. Locking handles shall be cam type and manufactured from a white bronze alloy with a US25D brushed finish.
2. Operating hardware shall be 4-bar stainless steel arms or equal.

## C. Weather-Strip

1. All weather-strip shall be Santoprene® or equal.

## D. Glass

1. Insulated glass shall be 1" thick with a center of glass U-Factor of 0.24 constructed as follows:
  - a. Exterior lite –  $\frac{1}{4}$  inch thick.
  - b. Air space -  $\frac{1}{2}$  inch, argon filled.
  - c. Interior lite –  $\frac{1}{4}$  inch thick.
2. Basis of Design: Solarban 60 clear low-E glass as manufactured by PPG Industries with argon filled air space.

## E. Thermal Barrier

1. All exterior aluminum shall be separated from interior aluminum by a rigid, structural thermal barrier. For purposes of this specification, a structural thermal barrier is defined as a system that shall transfer shear during bending and, therefore, promote composite action between the exterior and interior extrusions.
2. Barrier material shall be poured-in-place, two-part polyurethane. A nonstructural thermal barrier is unacceptable.

## 2.03 FABRICATION

## A. General

1. All aluminum frame and ventilator extrusions shall have a minimum wall thickness of .125" (3 mm). Frame sill members shall have a minimum wall thickness of .094" (2.3 mm).
2. Depth of frame and vents shall not be less than 2" (50 mm) for 2700 Series windows and not be less than 2 7/16" (61 mm) for 510 Series windows.
3. Mechanical fasteners, welded components, and hardware items shall not bridge thermal barriers. Thermal barriers shall align at all frame and vent corners.
4. All frame and ventilator members shall be able to accommodate separate interior and exterior finishes and colors.

## B. Frame

1. Frame components shall be mortise and tenon. Other means of mechanically fastening, i.e., screws shall not be permitted.

## C. Ventilators

1. All vent extrusions shall be tubular.
2. Each corner shall be mitered, reinforced with an extruded corner key, hydraulically crimped, and "cold welded" with epoxy adhesive.
3. Each vent shall utilize two rows of weather stripping installed in specifically designed dovetail grooves in the extrusion. The exterior gasket will be omitted at the vent bottom rail for project-out vents and at the vent top rail for project-in vents, allowing air to pressure equalize the void between the vents and frame.

**D. Screens**

1. Screen frames shall be extruded.
2. Screen mounting holes in the window frame shall be factory drilled.
3. Screen mesh shall be aluminum or fiberglass.

**E. Glazing**

1. All units shall be glazed with the manufacturer's standard sealant process provided the glass is held in place by a removable, extruded aluminum, glazing bead. The glazing bead must be isolated from the glazing material by a gasket.
2. All units shall be glazed with a minimum of 1/2" glass bit.

**F. Finish**

1. Anodic
  - a. Finish all exposed areas of aluminum windows and components with electrolytically deposited color in accordance with Aluminum Association Designation AA-M10-C22-A44. Color shall be dark bronze.

**PART 3 EXECUTION****3.01 INSPECTION****A. Job Conditions**

1. Verify that openings are dimensionally within allowable tolerances, plumb, level, clean, provide a solid anchoring surface, and are in accordance with approved shop drawings.
2. Provide for manufacturer representation to conduct pre-installation site meeting.

**3.02 INSTALLATION**

- A. Use only skilled tradesmen with work done in accordance with approved shop drawings and specifications.
- B. Plumb and align window faces in a single plane for each wall plane, and erect windows and materials square and true. Adequately anchor to maintain positions permanently when subjected to normal thermal movement, specified building movement, and specified wind loads.
- C. Adjust windows for proper operation after installation.
- D. Furnish and apply sealants to provide a weather tight installation at all joints and intersections and at opening perimeters. Wipe off excess material and leave all exposed surfaces and joints clean and smooth.

**3.03 ANCHORAGE**

- A. Adequately anchor to maintain positions permanently when subjected to normal thermal movement, specified building movement, and specified wind loads.

## 3.04 PROTECTION AND CLEANING

- A. After completion of window installation, windows shall be inspected, adjusted, put into working order and left clean, free of labels, dirt, etc. Protection from this point shall be the responsibility of the general contractor.

END OF SECTION 085113

## SECTION 087111 – DOOR HARDWARE

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

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

## 1.2 SUMMARY

## A. Section Includes

1. Furnishing and installation of all mechanical finish hardware necessary for all doors, and hardware as specified herein and as enumerated in hardware sets and as indicated and required by actual conditions at the building. The hardware shall include the furnishing of all necessary screws, bolts, expansion shields, drop plates, and all other devices necessary for the proper application of the hardware.

## B. Related Sections

1. Division 6 Section - Finish Carpentry
2. Division 8 Section - Hollow Metal Doors and Frames
3. Division 8 Section - Aluminum Framed Entrances and Storefronts
4. Division 8 Section - Glazing

## C. Specific Omissions: Hardware for the following is specified or indicated elsewhere, unless specifically listed in the hardware sets:

1. Windows
2. Cabinets of all kinds, including open wall shelving and locks.
3. Signage, except as noted.
4. Complete toilet accessories including coat hooks, unless note otherwise.
5. Overhead doors, unless noted otherwise.

## 1.3 REFERENCES

## A. Applicable state and local building codes and standards.

## B. FIRE/LIFE SAFETY

## 1. NFPA - National Fire Protection Association

- a. NFPA 70 – National Electric Code
- b. NFPA 80 - Standard for Fire Doors and Fire Windows
- c. NFPA 101 - Life Safety Code
- d. NFPA 105 - Smoke and Draft Control Door Assemblies

## 2. State Fire Safety Code and Amendments to CT Supplement

## C. UL - Underwriters Laboratories

1. UL 10B - Fire Test of Door Assemblies
2. UL 10C - Positive Pressure Test of Fire Door Assemblies
3. UL 1784 - Air Leakage Tests of Door Assemblies
4. UL 305 - Panic Hardware

## D. Accessibility

1. ADA - Americans with Disabilities Act
2. ICC (CABO) / ANSI A117.1 - Accessible and Usable Buildings and Facilities

## E. DHI - Door and Hardware Institute

1. Sequence and Format for the Hardware Schedule
2. Recommended Locations for Builders Hardware

## F. ANSI - American National Standards Institute

1. ANSI/BHMA A156.1 - A156.29, and ANSI A156.31 - Standards for Hardware and Specialties

## 1.4 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 requirements. Advise architect within the submittal package of incompatibility or issues.
- B. Catalog Cuts: Product data including manufacturers' technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.
- C. Final Hardware Schedule Content: Submit schedule with hardware sets in vertical format as illustrated by the Sequence of Format for the Hardware Schedule as published by the Door and Hardware Institute. Indicate complete designations of each item required for each door or opening, Include the following information:
  1. Door Index; include door number, heading number, and Architects hardware set number.
  2. Opening Lock Function Spreadsheet; list locking device and function for each opening.
  3. Type, style, function, size, and finish of each hardware item.
  4. Name and manufacturer of each item.
  5. Fastenings and other pertinent information.
  6. Location of each hardware set cross-referenced to indications on Drawings.
  7. Explanation of all abbreviations, symbols, and codes contained in schedule.
  8. Mounting locations for hardware.
  9. Door and frame sizes and materials.
  10. Name and phone number for the local manufacturer's representative for each product.
- D. Key Schedule: After a keying meeting between representatives of the Owner, Architect, hardware supplier, and, if requested, the representative for the lock manufacturer, provide a keying schedule, listing the levels of keying, as well as an explanation of the key system's function, the key symbols used, and the door numbers controlled. Utilize ANSI A156.28

“Recommended Practices for Keying Systems” as a guideline for nomenclature, definitions, and approach for selecting the optimal keying system.

- E. Samples: If requested by the Architect, submit production sample or sample installations as requested of each type of exposed hardware unit in the finish indicated, and tagged with a full description for coordination with the schedule.
  - 1. Samples will be returned to the supplier in like-new condition. Units that are acceptable to the Architect may, after final check of operations, be incorporated into the Work, within limitations of key coordination requirements.
- F. Templates: After final approval of the hardware schedule, provide templates for doors, frames, and other work specified to be factory prepared for the installation of door hardware.
- G. Operations and Maintenance Data: Provide in accordance with Division 1 and include the following:
  - 1. Complete information on care, maintenance, and adjustment; data on repair and replacement parts, and information on preservation of finishes.
  - 2. Catalog pages for each product.
  - 3. Name, address, and phone number of local representative for each manufacturer.
  - 4. Parts list for each product.
  - 5. Copy of final approved hardware schedule, edited to reflect “As installed.”
  - 6. Copy of final keying schedule.
  - 7. One (1) complete set of special tools required for maintenance and adjustment of hardware, including changing of cylinders.
  - 8. Copy of warranties including appropriate reference numbers for manufacturers to identify the project.

- H. Certificates of Compliance: Upon request of Architect or Authority Having Jurisdiction certificates of compliance for fire-rated hardware and installation instructions shall be made available.

## 1.5 QUALITY ASSURANCE

- A. Substitutions: Products are to be those specified to ensure a uniform basis of acceptable materials. Requests for substitutions must be made in accordance with Division 1 requirements. If proposing a substitute product, submit product data for the proposed item with product data for the specified item and indicate basis for substitution and savings to be made. Provide sample if requested. Certain products have been selected for their unique characteristics and particular project suitability.
  - 1. Items specified as "no substitute" shall be provided exactly as listed.
  - 2. Items listed with no substitute manufacturers listed have been requested by the Owner or Architect to match existing for continuity and/or future performance and maintenance standards or because there is no known equal product.
  - 3. If no other products are listed in a category, then "no substitute" is implied.
- B. Supplier Qualifications: A recognized architectural hardware supplier, with warehousing facilities in the Project's vicinity, that has a record of successful in-service performance for supplying door hardware similar in quantity, type, and quality to that indicated for this Project

and that provides a certified Architectural Hardware Consultant (AHC) available to the Owner, Architect, and Contractor, at reasonable times during the course of the Work for consultation.

C. Single Source Responsibility: Obtain each type of hardware (latch and locksets, hinges, exit devices, closers, etc.) from a single manufacturer.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Tag each item or package separately with identification related to the final hardware schedule, and include installation instructions with each item or package.
- B. Each article of hardware shall be individually packaged in manufacturer's original packaging.
- C. Contractor will provide secure lock-up for door hardware delivered to the Project, but not yet installed. Control handling and installation of hardware items so that completion of Work will not be delayed by hardware losses both before and after installation.
- D. Items damaged in shipment shall be replaced promptly and with proper material and paid for by whomever did the damage or caused the damage to occur.
- E. Hardware shall be handled in a manner to avoid damage, marring, or scratching. Irregularities that occur to the hardware after it has been delivered to the Project shall be corrected, replaced, or repaired by the Contractor. Hardware shall be protected against malfunction due to paint, solvent, cleanser, or any chemical agent.
- F. No direct shipments will be allowed unless approved by the Contractor.

#### 1.7 WARRANTY

- A. Provide manufacturer's warranties as specified in Division 1 and as follows:
  1. Closers: 10 years.
  2. Exit Devices: 3 years.
  3. Locksets: 3 years.
  4. Continuous Hinges: Lifetime warranty.
  5. Other hardware: 1 year.
- B. No liability is to be assumed where damage or faulty operation is due to improper installation, improper use, or abuse.
- C. Products judged to be defective during the warranty period shall be replaced or repaired in accordance with the manufacturer's warranty, at no additional cost to the Owner.

#### 1.8 MAINTENANCE

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

### PART 2 - PRODUCTS

## 2.1 MANUFACTURERS

- A. Approval of manufacturers other than those listed shall be in accordance with paragraph 1.05.A.
- B. Note that even though an acceptable substitute manufacturer may be listed, the product must provide all the functions and features of the specified product or it will not be approved.

Item	Scheduled Manufacturer	Acceptable Substitute
Continuous Hinges	Ives (IVE)	Roton, Select
Locksets	Schlage (SCH)	Best, Sargent
Exit Devices & Mullions	Von Duprin (VON)	Precision, Sargent
Door Closers	LCN (LCN)	Sargent
Thresholds & Weatherstrip	National Guard Products (NGP)	Pemko, Zero
Cylinders & Keying	Match Existing	

- C. Hand of Door: Drawings show direction of slide, swing, or hand of each door leaf. Furnish each item of hardware for proper installation and operation of door movement as shown.
- D. Where the hardware specified is not adaptable to the finished shape or size of the members requiring hardware, furnish suitable types having the same operation and quality as the type specified, subject to the Architect's approval.

## 2.2 MATERIALS

### A. Fasteners

1. Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation.
2. Furnish screws for installation with each hardware item. Finish exposed (exposed under any condition) screws to match hardware finish, or, if exposed in surfaces of other work, to match finish of this other work as closely as possible including "prepared for paint" surfaces to receive painted finish.
3. Provide concealed fasteners for hardware units that are exposed when door is closed except to the extent that no standard units of type specified are available with concealed fasteners. Do not use thru-bolts for installation where bolt head or nut on opposite face is exposed in other work unless their use is the only means of reinforcing the work adequately to fasten the hardware securely. Review door specification and advise Architect if thru-bolts are required.
4. Hardware shall be installed with the fasteners provided by the hardware manufacturer.

### B. Continuous Hinges

1. Provide aluminum geared continuous hinges conforming to ANSI A156.25, Grade 2.
2. Provide aluminum geared continuous hinges, where specified in the hardware sets, fabricated from 6063-T6 aluminum, with .25 inch diameter Teflon coated stainless steel hinge pin.
3. Provide split nylon bearings at each hinge knuckle for quiet, smooth, self-lubricating operation.
4. Hinges shall be capable of supporting door weights up to 450 pounds, and shall be successfully tested for 1,500,000 cycles.

5. On fire-rated doors, provide aluminum geared continuous hinges that are classified for use on rated doors by a testing agency acceptable to the authority having jurisdiction.
6. Install hinges with fasteners supplied by manufacturer. Hole pattern shall be symmetrically patterned.
7. Acceptable manufacturers and/or products: Ives, Roton, Stanley.

#### C. Mortise Locks

1. Provide mortise locks certified as ANSI A156.13, Grade 1 Operational, Grade 1 Security, and manufactured from heavy gauge steel, containing components of steel with a zinc dichromate plating for corrosion resistance. Lock case shall be multi-function and field reversible for handing without opening the case. Cylinders: Refer to 2.04 KEYING.
2. Provide locks with a standard 2-3/4 inches backset with a full 3/4 inch throw stainless steel mechanical anti-friction latchbolt. Deadbolt shall be a full 1 inch throw, constructed of stainless steel.
3. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim.
4. Provide electrical options as scheduled. Provide electrified locksets with micro switch (RX) option that monitors the retractor crank, and is actuated when rotation of the inside or outside lever rotates the retractor hub. Provide normally closed contacts or normally open contacts as required by security system.
5. Lever trim shall be solid brass, bronze, or stainless steel, cast or forged in the design specified, with wrought roses and external lever spring cages. Levers shall be thru-bolted to assure proper alignment, and shall have a 2-piece spindle.
  - a. Lever design shall be Schlage 06A.
  - b. Lever trim on the secure side of doors serving rooms considered by the authority having jurisdiction to be hazardous shall have a tactile warning.
6. Acceptable manufacturers and/or products: Schlage L9000 series, Best 45H series, Sargent 8200 series.

#### D. Exit Devices

1. Provide exit devices tested to ANSI/BHMA A156.3 Grade 1, and UL listed for Panic Exit and/or Fire Exit Hardware. Cylinders: Refer to 2.04 KEYING.
2. Exit devices shall be touchpad type, fabricated of brass, bronze, stainless steel, or aluminum, plated to the standard architectural finishes to match the balance of the door hardware.
3. Touchpad shall extend a minimum of one half of the door width. Touch-pad finish shall be compatible to exit device finish. Compression springs will be used in devices, latches, and outside trims or controls, tension springs also acceptable.
4. Devices to incorporate a deadlatching feature for security and/or for future addition of alarm kits and/or other electrical requirements.
5. Provide manufacturer's standard strikes.
6. Provide exit devices cut to door width and height. Locate exit devices at a height recommended by the exit device manufacturer, allowable by governing building codes, and approved by the Architect.
7. Mechanism case shall sit flush on the face of all flush doors, or spacers shall be furnished to fill gaps behind devices. Where glass trim or molding projects off the face of the door, provide glass bead kits.

8. Acceptable manufacturers and/or products: Von Duprin 98 series, Precision Apex series, Sargent 80 series with deadlatching.

#### E. Door Closers

1. Provide door closers certified to ANSI/BHMA A156.4 Grade 1 requirements by a BHMA certified independent testing laboratory. Closers shall be ISO 9000 certified. Units shall be stamped with date of manufacture code.
2. Door closers shall have fully hydraulic, full rack and pinion action with a high strength cast iron cylinder and metal cover, and shall utilize full complement bearings at shaft. Cylinder body shall be 1-1/2 inch diameter, and double heat-treated pinion shall be 11/16 inch diameter.
3. Provide hydraulic fluid requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F. Fluid shall be fireproof and shall pass the requirements of the UL10C "positive pressure" fire test.
4. Spring power shall be continuously adjustable over the full range of closer sizes, and allow for reduced opening force as required by accessibility codes and standards. Hydraulic regulation shall be by tamper-proof, non-critical valves. Closers shall have separate adjustment for latch speed, general speed, and backcheck.
5. Provide closers with a solid forged steel main arms and factory assembled heavy-duty forged forearms for parallel arm closers.
6. Closers shall not incorporate Pressure Relief Valve (PRV) technology.
7. Closer cylinders, arms, adapter plates, and metal covers shall have a powder coating finish which has been certified to exceed 100 hours salt spray testing as described in ANSI Standard A156.4 and ASTM B117, or shall have special rust inhibitor (SRI).
8. Provide special templates, drop plates, mounting brackets, or adapters for arms as required for details, overhead stops, and other finish hardware items interfering with closer mounting.
9. Mount closers on room side of corridor doors, inside of exterior doors, and stair side of stairway doors from corridors. Closers shall not be visible in corridors, lobbies and other public spaces unless approved by Architect.
10. Door closers meeting this specification: LCN 4000 series, Sargent 281/281P10 series factory assembled (without PRV).

#### F. Thresholds, Seals, Door Sweeps, Automatic Door Bottoms, and Gasketing

1. Provide thresholds, weatherstripping (including door sweeps, seals, astragals) and gasketing systems (including smoke, sound, and light) as specified and per architectural details. Match finish of other items as closely as possible. Size of thresholds shall be as follows:
  - a. Saddle Thresholds – 1/2 inch high x jamb width x door width
2. Provide door sweeps, seals, astragals, and auto door bottoms only of type where resilient or flexible seal strip is easily replaceable and readily available.
3. Acceptable manufacturers and/or products: NGP, Pemko, Zero.

#### G. Silencers

1. Provide "Push-in" type silencers for each hollow metal or wood frame. Provide three for each single frame and two for each pair frame. Omit where gasketing is specified or required by code.

2. Acceptable manufacturers and/or products: Ives, Burns, Rockwood.

## 2.3 FINISHES

A. Finish of all hardware shall be US26D (BHMA 626/652) with the exceptions as follows:

1. Continuous Hinges: US28 (BHMA 689).
2. Door Closers: Powder Coat to Match.
3. Weatherstripping: Clear Anodized Aluminum.
4. Thresholds: Mill Finish Aluminum.

## 2.4 KEYING

A. Furnish keyed cylinders to match owner's existing system per their instructions.

# PART 3 - EXECUTION

## 3.1 EXAMINATION

A. Prior to installation of any hardware, examine all doors, frames, walls and related items for conditions that would prevent proper installation of finish hardware. Correct all defects prior to proceeding with installation.

## 3.2 INSTALLATION

A. Coordination:

1. Prior to installation of hardware, schedule and hold a meeting for the purpose of instructing installers on proper installation and adjustment of finish hardware. Representatives of locks, exit devices, closers, automatic operators, and electrified hardware shall conduct training; provide at least 10 days notice to representatives. After training a letter of compliance, indicating when the training was held and who was in attendance, shall be sent to the Architect.
- B. Hardware will be installed by qualified tradesmen, skilled in the application of commercial grade hardware. For technical assistance if necessary, installers may contact the manufacturer's rep for the item in question, as listed in the hardware schedule.
- C. Mount hardware units at heights indicated in "Recommended Locations for Builders Hardware for Standard Steel Doors and Frames" by the Door and Hardware Institute.
- D. Install each hardware item in compliance with the manufacturer's instructions and recommendations, using only the fasteners provided by the manufacturer.
- E. Do not install surface mounted items until finishes have been completed on the substrate. Protect all installed hardware during painting.
- F. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.
- G. Operating parts shall move freely and smoothly without binding, sticking, or excessive clearance.

### 3.3 ADJUSTING, CLEANING, AND DEMONSTRATING

- A. Adjust and check each operating item of hardware and each door, to insure proper operation or function of every unit. Replace units which cannot be adjusted to operate freely and smoothly.
- B. Where door hardware is installed more than one month prior to acceptance or occupancy of a space or area, return to the installation during the week prior to acceptance or occupancy and make a final check and adjustment of all hardware items in such space or area. Clean operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilating equipment.
- C. Clean adjacent surfaces soiled by hardware installation.
- D. Instruct Owner's personnel in the proper adjustment, lubrication, and maintenance of door hardware and hardware finishes.

### 3.4 FIELD QUALITY CONTROL

- A. Prior to Substantial Completion, the installer, as instructed by the manufacturers of locks, exit devices, closer, and any electrified hardware, shall perform the following work:
  - 1. Examine and re-adjust each item of door hardware as necessary to restore function of doors and hardware to comply with specified requirements.
  - 2. Consult with and instruct Owner's personnel in recommended additions to the maintenance procedures.
  - 3. Replace hardware items that have deteriorated or failed due to faulty design, materials, or installation of hardware units.
  - 4. Prepare a written report of current and predictable problems of substantial nature in the performance of the hardware.
  - 5. At completion of project, a qualified factory representative for the manufacturers of locksets, closer, exit devices, and access control products shall arrange and hold a training session to instruct the Owner's personnel on the proper maintenance, adjustment, and/or operation of their respective products. After training a letter of compliance, indicating when the training was held and who was in attendance, shall be sent to the Architect.

### 3.5 PROTECTION

- A. Provide for the proper protection of complete items of hardware until the Owner accepts the project as complete. Damaged or disfigured hardware shall be replaced or repaired by the responsible party.

### 3.6 HARDWARE SCHEDULE

- A. Provide hardware for each door to comply with requirements of Section "Finish Hardware," hardware set numbers indicated in door schedule, and in the following schedule of hardware sets.
- B. It is intended that the following schedule includes complete items of finish hardware necessary to complete the work. If a discrepancy is found in the schedule, such as a missing item, improper hardware for a frame, door or fire codes, the preamble will be the deciding document.

C. Locksets, exit devices, and other hardware items are referenced in the Hardware Sets for series, type, and function. Refer to the preamble for special features, options, cylinders/keying, and other requirements.

D. Hardware Sets

HARDWARE SET: 01 - (BOILER ROOM EXIT)

1	EA	CONT. HINGE	112HD	628	IVE
1	EA	STOREROOM LOCK	L9080 806A 06A	626	SCH
1	EA	SURFACE CLOSER	4111 SCUSH	689	LCN
1	EA	DOOR SWEEP	C627A	CL	NGP
1	EA	THRESHOLD	425E	AL	NGP
1			SEALS BY DOOR SUPPLIER		

VERIFY KEYING REQUIREMENTS WITH OWNER.

VERIFY WHETHER HINGE IS FURNISHED WITH FRP DOOR.

HARDWARE SET: 02 - (CLASSROOM EXIT)

1	EA	CONT. HINGE	112HD	628	IVE
1	EA	PANIC HARDWARE	LD-98-EO	626	VON
1	EA	SURFACE CLOSER	4111 SCUSH	689	LCN
1	EA	DOOR SWEEP	C627A	CL	NGP
1	EA	THRESHOLD	425E	AL	NGP
1			SEALS BY DOOR SUPPLIER		

VERIFY WHETHER HINGE IS FURNISHED WITH FRP DOOR.

**END OF SECTION**

## DOOR SCHEDULE

CREC MP-TP MAGNET SCHOOL - NEW BRITAIN, CONNECTICUT