

# PROJECT MANUAL

PEEKSKILL CITY SCHOOL DISTRICT

HDG PROJECT NO. 201, 202, 203,204  
CONSTRUCTION DOCUMENTS



OAKSIDE ELEMENTARY, RECONSTRUCTION  
SED 66-15-00-01-0-005-020

URIAH HILL SCHOOL, RECONSTRUCTION  
SED 66-15-00-01-0-007-014

WOODSIDE ELEMENTARY, RECONSTRUCTION  
SED 66-15-00-01-7-008-017

PEEKSKILL MIDDLE SCHOOL, RECONSTRUCTION  
SED 66-15-00-01-0-014-005



**OFFICE**

915 Broadway, Suite 101A  
Albany, NY 12207

**PHONE**

518-724-5159

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518-320-8633

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[www.HamlinDesignGroup.com](http://www.HamlinDesignGroup.com)

FEBRUARY 2021

## PROJECT MANUAL

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DOCUMENT 000101 - PROJECT TITLE PAGE

## PROJECT MANUAL

FOR THE

### The City School District of Peekskill

PRJ 201 Oakside Elementary  
PRJ 202 Uriah Hill School  
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Owner :



**City School District of Peekskill**  
1072 Elm Street Peekskill, NY 10566



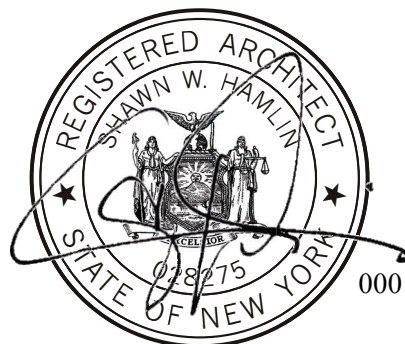
Architect:  
**Hamlin Design Group**  
915 Broadway, Suite 101A  
Albany, New York 12207  
Phone: 518-724-5159  
Fax: 518-320-8633  
Web Site: hamlindesigngroup.com  
Issued: November 22, 2019  
Architect Project No. PRJ 200.0

ADDRESS ALL COMMUNICATIONS REGARDING THIS PROJECT TO THE ARCHITECT AT THE ABOVE ADDRESS

To the best of my knowledge, information and belief, the plans and specifications are in accordance with applicable requirements of the Building Code of New York State, the State Energy Conservation Construction Code, and State Education Department Building Standards. No new asbestos- containing materials (ACBM) or lead materials (LM) shall be used in construction for the above referenced buildings. Work will involve known or suspected (ACBM/LM) as evidenced by bulk or destruct testing, and will be REMOVED in accordance with Industrial Code Rule #56 and/or HUD guidelines and OSHA.

A handwritten signature in black ink, appearing to be "S. Hamlin", written over a horizontal line.

Architect



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**ACCESS OUR BID DOCUMENTS ONLINE**

**GO TO Hamlin Design Group PROJECT WEBSITE AT**

**[www.hamlindesigngroup.com](http://www.hamlindesigngroup.com)**

**REGISTER FOR A FREE ACCOUNT &  
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**TO VIEW BID DOCUMENTS**

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## PROJECT MANUAL FOR THE

### The City School District of Peekskill

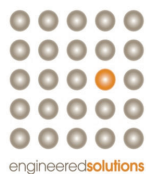
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Owner :



**City School District of Peekskill**  
1072 Elm Street Peekskill, NY 10566



Mechanical Electrical & Plumbing Engineer:

#### **Engineered Solutions**

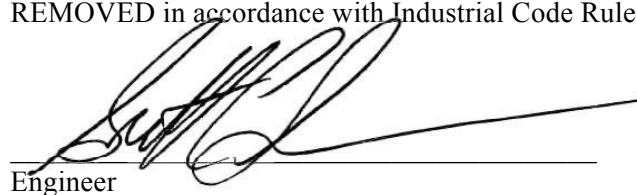
646 Plank Road #104

Clifton Park, New York 12065

Phone: 518.280.2410

Web Site: [engineered-solutions.net](http://engineered-solutions.net)

To the best of my knowledge, information and belief, the plans and specifications are in accordance with applicable requirements of the Building Code of New York State, the State Energy Conservation Construction Code, and State Education Department Building Standards. No new asbestos- containing materials (ACBM) or lead materials (LM) shall be used in construction for the above referenced buildings. Work will involve known or suspected (ACBM/LM) as evidenced by bulk or destruct testing, and will be REMOVED in accordance with Industrial Code Rule #56 and/or HUD guidelines and OSHA.

  
\_\_\_\_\_  
Engineer



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## DOCUMENT 000115 - LIST OF DRAWING SHEETS

### 1.1 LIST OF DRAWINGS

- A. Drawings: Drawings consist of the Contract Drawings and other drawings listed on the Table of Contents page of the separately bound drawing set titled “Peekskill Reconstruction, Oakside Elementary, Woodside Elementary, Uriah Hill School, Middle School ”; dated February, 2021, as modified by subsequent Addenda and Contract modifications.
- B. List of Drawings: Drawings consist of the following Contract Drawings and other drawings of type indicated:

### DRAWING LIST

A.000.00 COVER SHEET

#### ARCHITECTURAL

A.001.00 GENERAL NOTES SYMBOLS & DIAGRAMS

A.101.00 CONCESSION PAVILLION FLOOR PLAN, SCHEDULES AND NOTES

#### MECHANICAL

M.001.00 NOTES AND SYMBOLS

M.701.00 TEMPERATURE CONTROLS

M.702.00 TEMPERTURE CONTROL

#### OAKSIDE ELEMENTARY

#### ARCHITECTURAL

O-A.100.00 LOWER LEVEL FLOOR PLAN

O-A.101.00 MAIN LEVEL FLOOR PLAN

O-A.500.00 DETAILS

#### HAZARDOUS MATERIAL

O-H.100.00 EXISTING MAIN LEVEL HAZARDOUS MATERIAL PLAN

#### ELECTRICAL

O-E.001.00 LEGEND, GENERAL NOTES, SCHEDULES AND DETAILS

O-E.201.00 LOWER LEVEL REMOVAL PLAN

O-E.202.00 MAIN LEVEL REMOVAL PLANS

O-E.401.00 LOWER LEVEL POWER PLAN

O-E.402.00 MAIN LEVEL POWER PLANS



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#### MECHANICAL

O-M.002.00 HVAC SCHEDULES  
O-M.201.00 REMOVAL PLAN  
O-M.401.00 HVAC PLAN  
O-M.601.00 DETAILS AND DIAGRAMS

#### PLUMBING

O-P.001.00 SYMBOLS, ABBREVIATIONS & NOTES  
O-P.301.00 REMOVAL & NEW PLUMBING PLAN

#### **URIAH HILL SCHOOL – (Alternate No.1)**

#### ARCHITECTURAL

U-A.100.00 BASEMENT FLOOR PLAN AND DETAILS – (Alternate No.1)

#### HAZARDOUS MATERIAL

U-H.100.00 EXISTING MAIN LEVEL HAZARDOUS MATERIAL PLAN - (Alternate No.1)

#### ELECTRICAL

U-E.001.00 LEGEND, GENERAL NOTES, BASEMENT POWER PLAN - (Alternate No.1)

#### MECHANICAL

U-M.301.00 BASEMENT REMOVAL AND HVAC PLAN - (Alternate No.1)

#### **WOODSIDE ELEMENTARY**

#### ARCHITECTURAL

W-A.100.00 BASEMENT FLOOR PLAN  
W-A.101.00 PARTIAL FIRST FLOOR PLAN  
W-A.102.00 PARTIAL FIRST FLOOR PLAN  
W-A.103.00 PARTIAL FIRST FLOOR PLAN  
W-A.500.00 DETAILS

#### HAZARDOUS MATERIAL

W-H.101.00 EXISTING FIRST FLOOR HAZARDOUS MATERIAL PLAN  
W-H.102.00 EXISTING FIRST FLOOR HAZARDOUS MATERIAL PLAN

#### ELECTRICAL

W-E.001.00 LEGEND, GENERAL NOTES, SCHEDULES AND DETAILS  
W-E.201.00 FIRST FLOOR REMOVAL PLAN  
W-E.202.00 FIRST FLOOR REMOVAL PLANS  
W-E.401.00 FIRST FLOOR POWER PLAN

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## W-E.402.00 FIRST FLOOR POWER PLAN & PANEL BOARD SCHEDULE

### MECHANICAL

W-M.002.00 HVAC SCHEDULE  
W-M.201.00 REMOVAL PLAN – AREA A  
W-M.202.00 REMOVAL PLAN – AREA B  
W-M.203.00 REMOVAL PLAN – AREA C  
W-M.401.00 BASEMENT HVAC PLAN – AREA A  
W-M.402.00 BASEMENT HVAC PLAN – AREA B  
W-M.403.00 FIRST FLOOR HVAC PLAN – AREA A  
W-M.404.00 FIRST FLOOR HVAC PLAN – AREA B  
W-M.405.00 FIRST FLOOR HVAC PLAN – AREA C  
W-M.601.00 DETAILS AND DIAGRAMS  
W-M.602.00 DETAILS AND DIAGRAMS

### PLUMBING

W-P.001.00 SYMBOLS, ABBREVIATIONS & NOTES  
W-P.301.00 REMOVAL & NEW PLUMBING PLAN  
W-P.302.00 REMOVAL & NEW PLUMBING PLAN

### MIDDLE SCHOOL

#### ARCHITECTURAL

M-A.101.00 PARTIAL FIRST FLOOR PLAN

#### ELECTRICAL

M-E.001.00 LEGEND GENERAL NOTES AND REMOVAL PLAN

### PLUMBING

M-P.001.00 SYMBOLS, ABBREVIATIONS & NOTES  
M-P.301.00 REMOVAL & NEW PLUMBING PLAN

END OF DOCUMENT 000115

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## DOCUMENT 001116 – NOTICE TO BIDDERS

NOTICE TO BIDDERS – HDG PRJ 200.5 – February 12, 2021

### NOTICE TO BIDDERS

The Board of Education of the City School District of Peekskill invites the submission of Separate Sealed Bid Proposals to furnish materials and labor in by a single contractor to complete the general construction, mechanical, plumbing and associated hazardous material abatement, and electrical work at Oakside Elementary, Uriah Hill, Woodside, and Middle School project all in accordance with all drawing plans and specifications.

Sealed Bid Proposals will be received until **11:00 am** prevailing time on **March 9, 2021** at the City of Peekskill District Offices, 1031 Elm Street, Peekskill, NY 10566 at which time and place the bids will be publicly opened and read aloud. Due to COVID-19 and public mitigation efforts the bid opening will only be able to be attended by video conference, via Google Hangouts Meet, web address: (<https://meet.google.com/syd-xfxu-hap>) or Join by Phone: (+1 323-905-2830 PIN: 857613131).

Bids can be dropped at the Peekskill City School District, Central Administration, 1031 Elm Street, Peekskill, NY 10566.

On Thursday, March 8th from the hours of 10:00AM to 2:00PM and March 9th from 10:00AM to 11:00AM. Please ring the buzzer and you will be met by a greeter who will stamp and give you receipt of your bid.

Please call 914 760 4147 if you there is no response at that door.

Any bid may be withdrawn without prejudice prior to the official bid opening time or any publicized postponement thereof.

Any bid received after the time and date stated above will be returned to the bidder unopened.

The bidding documents may be examined, free of charge, at the office of Hamlin Design Group, 915 Broadway, Suite 101A, Albany, New York 12207, telephone (518) 724-5159.

Digital Bidding Documents: Complete digital sets of Bidding Documents may be obtained online as a download for a forty-nine (\$49.00) non-refundable deposit at Hamlin Design Group website: <http://www.hamlindesigngroup.com> under 'Current Projects.'

Hardcopy Bidding Documents: One (1) complete set of hardcopy Bidding Documents may be obtained from REVPlans thru Hamlin Design Group website <http://www.hamlindesigngroup.com>, 330 Route 17A, Suite #2, Goshen, New York 10924; Tel: (845) 978-4736, upon deposit of One Hundred Dollars (\$100.00) for each combined set of documents. Checks or money orders shall be made payable to Schenectady City School District. Any bidder requiring documents to be shipped shall make arrangements with REV and pay for all packaging and shipping costs. The deposit will be refunded ONLY to those bidders who submit a bona fide bid proposal in accordance with the terms in the

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“Information for Bidders” and who return a complete set of Bidding Documents in COMPLETE, UNMARKED, and NOT TORN condition to REV within thirty (30) days after the award of contract(s) covered by such Bidding Documents, or the rejection of such bid(s). Non-bidders, including material-men and subcontractors, as well as plan holders who do not submit bid proposals, WILL NOT be eligible for a refund.

Addenda: All bid addenda will be transmitted to registered plan holders via email and will also be available at <http://www.hamlindesigngroup.com>. Plan holders who have paid for hard copies of the bidding documents will need to make the determination if hard copies of the addenda are required for their use, and coordinate directly with REV for hard copies of addenda to be issued. There will be no charge for registered plan holders to obtain hard copies of the bid addenda.

Each Bidder shall prepare their bid proposal, along with a bid security, in accordance with the terms and subject to the conditions set forth in the “Information for Bidders”.

Attention of bidders is particularly called to the requirements as to conditions of employment to be observed and the minimum wage rates to be paid under the contracts.

No bidder may withdraw his bid within 45 days after the date of the actual bid opening.

The Board of Education reserves the right to reject any or all bids and to waive any informalities or defects in such bid either before or after the bid opening.

By Order of Board of Education City School District of Peekskill

#### PROCEDURE FOR ACCESS TO BUILDING TO EXAMINE SITE OF WORK

Building and site may be inspected by bidders at pre-arranged times during normal school hours for the following days, February 25<sup>th</sup> and March 1st. To make arrangements for inspection, call: Carmine Crisci, Director of Facilities @ 914-737-3300 ext 3802.

All interested bidders are requested to attend this pre-bid conference to discuss the project scope, completion schedule.

PRE-BID CONFERENCE MEETING DATE: March 2, 2021 @ 2:00 pm LOCATION: Video Conference: Ring Central,  
Web address: (<https://meetings.ringcentral.com/j/1482103225>)  
Meeting ID: 148 210 3225 Tel No.: +1(646)357-3664,,1482103225#

All pre-bid correspondence shall be directed to: Timothy Garafalo  
Email: [Timothyg@hamlindesigngroup.com](mailto:Timothyg@hamlindesigngroup.com) Hamlin Design Group

## DOCUMENT 001117 – INFORMATION FOR BIDDERS

### 1.1 SUBMISSION OF BIDS:

- A. The Owner reserves the right to consider informal any bid not prepared and submitted in accordance with the provisions of this information for Bidders and the General Conditions and to waive any informalities in or to reject any or all bids either before or after the bid opening. No bidder may withdraw a bid within forty- five (45) days after the actual date of the bid opening.

### 1.2 PREPARATION OF PROPOSAL:

- A. Bidders shall prepare their bids on the "Bid" sheets furnished by the Architect and available at the Architect's Office. All blank spaces pertinent to the contract category proposal must be filled in, in both words and figures for the lump sum for which the proposal is made.
- B. All bids, together with bid security, must be submitted in sealed envelopes bearing on the outside of the envelope the name of the bidder, his address, the name of the project and the category of work covered by the bid. If forwarded by mail, the sealed envelope containing the proposal, marked as above, must be enclosed in another envelope addressed to the Owner. Each bidder shall assume the risk of any delay in the mail or in handling of mail by employees of the Owner or others.
- C. IMPORTANT: In the event that a prospective bidder, after securing drawings and specifications, decides not to present a proposal for the work, it is requested that the Architect be so notified at the earliest possible moment prior to the date of receipt of bids. All drawings and specifications shall be returned to the Architect's Office.

### 1.3 BID PROPOSALS AND BIDDERS:

- A. The Owner reserves the right to reject any or all bid proposals and to waive any informalities or defects in such proposals either before or after the time of opening of bids.
- B. Bidders may not withdraw proposals within forty-five (45) days following date of opening of bids.
- C. All costs in connection with preparation and submission of bid proposals shall be borne by the bidders.
- D. Bidders shall submit promptly, upon request of the Owner or Architect, documentary evidence as to financial, technical, and practical ability to carry out the work.

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#### 1.4 INSTRUCTIONS TO BIDDERS:

- A. The bidder must have the financial capability to produce and execute the project within the required time periods.
- B. The bidder must possess a minimum of five (5) years continuous experience as a firm doing business under the same name, engaged principally as a contractor of the work proposed or other equitable experience, as determined by the Architect and Owner.
- C. The bidder must have completed at least five (5) similar projects, (listing type and scope of work, names and addresses of owners and dates of contract completion) or provide proof of other equivalent experience as determined by the Architect and Owner. The Owner has the right to verify the documentation as well as examine the other aspects of the Bidder's work record.
- D. The bidder must provide a tabulation of equipment and facilities at its disposal to do the required work.
- E. The bidder must have a current bonding capacity to accommodate the proposed work.
- F. The bidder must have the experienced staff and technical organization for the project.
- G. The bidder must not currently be involved in bankruptcy proceedings.
- H. The bidder must be licensed to perform the work they are bidding on in the jurisdiction in which the work will take place.

#### 1.5 BID SECURITY:

- A. Each bid must be accompanied by cash, by certified check of the bidder or by a bid bond prepared on a standard approved form, duly executed by the bidder as principal, and having as surety thereon a surety company authorized to do business within the State of New York. Bid security shall be in an amount not less than 10% of the base bid and alternates or not less than 10% of the sum of base bids and alternates where such base bids may be considered cumulative. Such cash or checks will be returned to all, except the three lowest formal bidders, within three working days after the formal opening of bids and the remaining cash or checks will be returned to the three lowest bidders within 48 hours after the Owner and the accepted bidder have executed a contract. If no contract has been so executed within 45 days after the opening of bids, bid security will be returned upon demand of the bidder at any time thereafter so long as he has not been notified of the acceptance of his bid.

#### 1.6 EXECUTION OF CONTRACT:

- A. The successful bidder shall execute and deliver the contract and bond within seven (7) days after receipt of notice of the acceptance of his bid. Regardless of whether the successful bidder delivers the executed contract, the bid is an offer to contract and the Owner's award of the bid

shall constitute an acceptance of the bidder's offer, thereby creating a binding agreement between the Owner and the successful bidder."

1.7 CONDITIONS OF WORK:

- A. Each bidder must inform himself fully of the conditions relating to the construction and labor under which the work is now being or will be performed. Failure to do so will not relieve a successful bidder of his obligations to furnish all material and labor necessary to carry out the provisions of the contract documents and to complete the contemplated work for the consideration set forth in his bid.
- B. Insofar as possible, the Contractor in the carrying out of his work must employ such methods or means as will not cause an interruption of or interference with the work of any other contractor.

1.8 ADDENDA AND INTERPRETATIONS:

- A. No interpretations of the meaning of the plans, specifications or other contract documents will be made to any bidder orally. Every question for such interpretations shall be in writing, addressed to Hamlin Design Group.
- B. Any and all such interpretations and any supplemental instruction will be in the form of Addenda.
- C. All bid addenda will be transmitted from REVplans to registered plan holders via email and will also be available at <http://www.revplans.com>. Plan holders who have paid for hard copies of the bidding documents will need to make the determination if hard copies of the addenda are required for their use, and coordinate directly with REVplans for hard copies of addenda to be issued. There will be no charge for registered plan holders to obtain hard copies of the bid addenda.

1.9 SECURITY FOR FAITHFUL PERFORMANCE:

- A. Simultaneously with his delivery of the executed contract, the successful bidder must deliver to the Owner three (3) copies of an executed bond in the amount of 100% of the accepted bid as security for the faithful performance of the contract and for the payment of all persons performing labor or furnishing materials in connection therewith, prepared in the standard form of Performance Bond, Labor and Materials Payment Bond, AIA Form A-312 and having as surety thereon such surety company or companies are A. M. Best rated at "A/XII or better, appear on the Treasury Department's list of "Approved Sureties", are authorized to transact business in New York State, and are acceptable to and approved by the Owner. This requirement will not apply in the case of contracts for supplies only and involving no labor on the site.

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1.10 POWER OF ATTORNEY:

- A. Attorneys-in-fact who sign bid bonds or contract bonds must file with each bond, a certified copy of their power of attorney to sign said bonds.

1.11 STATE LAWS AND REGULATIONS:

- A. The Contractor and each and every subcontractor performing the work at the site of the project to which this contract relates shall comply with the applicable provisions of the "Labor Law", as amended, of the State of New York, and all other applicable laws and regulations governing such activities.

1.12 OBLIGATION OF BIDDER:

- A. At the time of the opening of bids, each bidder will be presumed to have read and to be thoroughly familiar with the drawings and contract documents including all addenda. The failure or omission of any bidder to receive or examine any form, instrument, or document shall in no way relieve any bidder from any obligation in respect to his bid.
- B. Bidders shall be presumed to have visited the site prior to submission of proposals and to have familiarized themselves with surface and subsurface conditions, existing structures and any and all conditions that may in any way affect the work. Failure to have so acted shall in no way relieve bidders from any obligations in respect to their bids.
- C. If the bidder, prior to the submission of his bid, fails to notify the Architect in writing of the existence of any condition, ambiguity, inconsistency or error in any of the contract documents, or of a conflict between provisions in a contract document and provisions of a State Law or any applicable code, his bid will be conclusively presumed to have been based upon the interpretation of such ambiguity or inconsistency, or the directions correcting such error or conflict which may subsequently be given by the Architect.

1.13 EXEMPTION FROM SALES AND COMPENSATING USE TAXES:

- A. The Owner is exempt from payment of sales and compensation use taxes of the State of New York and of cities, counties and other subdivisions of the State, for materials sold to it pursuant to the provisions of this contract. These taxes are not to be included in bids.
- B. Contractor's purchases of tangible personal property which does not become an integral component part of the exempt organization's real property, and are consumed by the Contractor as well as purchases of taxable services, are subject to tax.



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1.14 TIME OF COMPLETION:

- A. Bidders are advised that time of completion is of the essence and shall be taken into account by the bidders in the preparation of the proposals.
- B. See spec section 011000 – Summary / Special Conditions, Item 1.10 Time of Completion and Sequence of Operation.

1.15 POST BID INFORMATION (PBI):

- A. Within 96 hours of the bid opening, the apparent low bidder shall furnish in writing, the following information to the Architect:
  - 1. Statement that the project can be completed within established time;
  - 2. Preliminary progress schedule showing dates for major elements of construction and dates by which major sub-contracts will be awarded.
  - 3. List of proposed major subcontractors and
  - 4. List of MAJOR manufacturers and products.

1.16 EQUIVALENTS:

- A. In the specifications, named kinds, types, brands or manufacturers of materials are used for establishing a standard by which any other product proposed by the contractor will be judged by the Architect. When the specifications detail performance criteria establishing required standards of quality for manufactured items and/or materials, this criteria will be used by the Architect to evaluate products or materials proposed by the low bidder. As a condition of award, and within 96 hours of bid opening, the low bidder must submit in writing and with all supporting data, what kind, type, brand or manufacturer is included in the bid for all Major specified items. Where the bid material differs from that specified, bidder must also submit in writing, information describing in specific detail how the bid material differs from the quality or performance required by the specifications. The risk of whether bid equivalents will be accepted by the Architect is borne by the bidder.

1.17 SUBCONTRACTORS:

- A. Subcontractors must be persons or firms that perform work with persons either in their direct employ or over whom they have personal and direct supervision.
- B. Requests for approval of major subcontractors, and other subcontractors as may be designated by the Architect, shall include a written statement by the proposed subcontractor that delivery and installation of materials and equipment can and will be performed in accordance with the approved progress schedule.

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1.18 MINIMUM WAGE RATE SCHEDULE:

- A. Wage Rates: In accordance with Section 220, Subdivision 3, and 220-D of the New York State Labor Law, there shall be paid each employee engaged in work on the project under this contract in the trades or occupations on the following list, not less than the prevailing rate set for the trade or occupation in which he is engaged.
- B. Unlisted Wage Rates: In the event that Contractor wishes to employ occupations other than listed, he shall request the establishment of a rate for that occupation and he shall pay the rate so established. This payment shall be retroactive if applicable.
- C. Wage Rate Re-determination: New Wage Rates may be re-determined during the course of work under this contract by the New York State Department of Labor; Contractors shall use the re-determined Wage Rates when applicable and shall compensate for this increase in their bid proposal. The contract will not be changed nor will the Owner pay for any Wage Rate increases after the agreements have been signed.
  - 1. In any event, EACH BIDDER shall comply with and shall use the current Wage Rate Schedule for wages to be paid to workers.
- D. Requested Wage Rate Schedules: Wage Rate Schedule has been requested of New York State - Department of Labor, and a full copy of the Schedule can be obtained online from the Department of Labor Website at:  
<http://wpp.labor.state.ny.us/wpp/showFindProject.do?method=showIt> by entering the PRC Number listed on the Prevailing Wage Schedule cover sheet on the next page. Hard copies of the Prevailing Wage Schedule will be provided to all contractors after award, if not included in these specifications.

1.19 EXAMINATION OF BUILDING:

- A. See NOTICE TO BIDDERS 001116.

New York State Department of Labor  
Prevailing Wage[Unemployment  
Benefits](#)[Career  
Services](#)[Business  
Services](#)[Worker  
Protection](#)[Forms and  
Publications](#)[Home](#)[· Wage Schedule](#) · [Submit Notice Of Award](#) · [Submit Notice Of Project Completion](#)

PRC#: 2019016044

Type of Contracting Agency: Local School District

Acceptance Status: Accepted Article 8

## Contracting Agency

## Send Reply To

Peekskill City School District  
Robin Zimmerman  
Assist Superintendent Business  
1031 Elm Street  
915 Broadway Suite 101A  
Peekskill NY 10566  
  
(914) 737-3300 Ext: 1543  
(914) 737- 2615 Fax  
rzimmerman@peekskillschools.org

Shawn Hamlin  
  
915 Broadway Suite 101A  
Albany NY 12207  
  
(518) 724 -5159 Ext: 11  
shawnh@hamlindesigngroup.com

## Project Information

**Project Title** Peekskill Reconstruction  
**Description of Work** Mechanical and plumbing improvements at Oakside, Woodside, Uriah Hill and Middle School  
**Contract Id No.** 201,202,203,204  
**Project Location(s)** Oakside, Woodside, Uriah, MS  
**Route No / Street Address** 1031 Elm Street  
**Village / City** Peekskill  
**Town**  
**State / Zip** NY 10566  
**Nature of Project** Other Reconstruction, Maintenance, Repair or Alteration  
**Approximate Bid Date** 05/01/2020  
**Checked Occupation(s)** Construction (Building, Heavy & Highway, Sewer, Water, Tunnel)

## Applicable Counties

Westchester

Hamlin Design Group  
PRJ 201 Oakside Elementary  
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PRJ 204 Middle School

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DOCUMENT 001120 – BID FORM

PROJECT TITLE:  
Peekskill Reconstruction

ARCHITECT'S PROJECT NO.: 201, 202, 203, 204

BID TO: BOARD OF EDUCATION CITY SCHOOL DISTRICT OF PEEKSKILL

**BIDDER:** \_\_\_\_\_

Address: \_\_\_\_\_

Federal ID. \_\_\_\_\_

Telephone: \_\_\_\_\_

Facsimile: \_\_\_\_\_

e-mail: \_\_\_\_\_

PRIME CONTRACT: \_\_\_\_\_

NOTE: Show amount of BASE BID or ALTERNATES in both words and figures; in case of discrepancy between words and figures shown, the amount shown in words will govern.

BASE BID NO. 1

The bidder (identified above) hereby certifies that he has examined and fully understands the requirements and intent of the BIDDING AND CONTRACT DOCUMENTS, including Drawings, Project manual , and Addenda; and proposes to furnish all labor, material, and equipment necessary to complete the Work on, or before, the dates specified in the Contract Documents for the BASE BID sum of:

\_\_\_\_\_ (\$ \_\_\_\_\_)

(words)

(figures)

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#### PAYMENT OF PREVAILING WAGES

Has the bidder engaged in a violation of the New York State Labor Law concerning the payment of prevailing wages and supplements or any provision of New York State Labor Law within the past five (5) years? Yes No If yes, please state the date and nature of the violation(s).

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#### ALTERNATES

Indicate in the spaces provided below the amount to be **ADDED TO** or the amount to be **DEDUCTED FROM** (as applicable) in the BASE BID if the following alternates are accepted by the Owner. Include in the amount of the ALTERNATES, all labor, materials, overhead and profit, modification of Work specified in Contract Documents that may be required by acceptance of the ALTERNATE.

ALTERNATE NO. 1 – This Alternate shall indicate the amount to be **ADDED to** Base Bid for all Construction work associated with work at Uriah Hill School. As indicated on Drawings U-A.100.00, U-H.100, U-E.001.00, and U-M.301.00 and related specifications. This Alternate shall indicate the amount to be **ADDED to** Base Bid for

\_\_\_\_\_ (\$ \_\_\_\_\_ )  
(words) (figures)

#### BIDDER'S CERTIFICATION

ATTACHED HERETO is Bid Security in the form of (circle correct form) Bid Bond, Certified Check, Cash in the amount of :

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If written notice of the acceptance of this bid is mailed, faxed or delivered to the undersigned within 45 days after the date of the opening of the bids, or any time thereafter before this Bid is withdrawn, the undersigned will, within 5 days after date of such mailing, telegraphing or delivering of such notice, execute and deliver a contract in the form of contract (set forth in the Contract Documents).

THE UNDERSIGNED AGREES to comply with the requirements as to the conditions of employment, wage rates, etc., set forth in the Contract Documents.

THIS BID may be withdrawn at any time prior to the scheduled time for the opening of Bids or any authorized postponement thereof.

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NON-COLLUSIVE BIDDING CERTIFICATION:

By submission of this bid, each bidder and each person signing on behalf of any bidder certifies, and in the case of a joint bid each party thereto certifies as to its own organization, under penalty of perjury, that to the best of knowledge and belief:

- 1) The prices in this bid have been arrived at independently without collusion, consultation, communication, or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other bidder or with any competitor;
- 2) Unless otherwise required by law, the prices which have been quoted in this bid have not been knowingly disclosed by the bidder and will not knowingly be disclosed by the bidder prior to opening, directly or indirectly, to any other bidder or to any competitor; and
- 3) No attempt has been made or will be made by the bidder to induce any other person, partnership or corporation to submit or not to submit a bid for the purpose of restricting competition.

The person signing this Bid or Proposal certifies that he has fully informed himself regarding the accuracy of the statements contained in this certification and under the penalties of perjury, affirms the truth thereof, such penalties being applicable to the Bidder as well as to the person signing in its behalf.

The person signing this Bid or Proposal certifies that all applicable allowances have been included in the bid proposal as specified in the contract documents.

RECEIPT OF ADDENDA NO. (S) \_\_\_\_\_

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

Title: \_\_\_\_\_

\*\*Business Name \_\_\_\_\_

\*\*Insert Bidder's correct legal name. If a corporation, give the State of incorporation, using the phrase: "A corporation organized under the laws of the State of \_\_\_\_." If a partnership, give names of partners, using also the phrase: "Co-Partners, trading and doing business under the firm name and style of \_\_\_\_." If an individual using a trade name, give individual name, using also the phrase: "An individual doing business under the firm name and style of \_\_\_\_."

## QUALIFICATIONS OF BIDDERS

**Experience and Qualifications of the Bidder:** Each bidder is required to submit the following documentation to demonstrate its experience and qualifications for the work of the Project for which a bid is submitted:

- a. A description of its experience with projects of comparative size, complexity, and cost, together with documentary evidence showing that said projects were completed to the Owner's satisfaction and were completed in a timely fashion;
- b. Documentation from each of the projects it has performed capital work in the last five (5) years concerning the bidder's:
  - (i) timeliness of performance of the work of the project
  - (ii) evidence that the project was completed to the Owner's satisfaction;
  - (iii) whether or not any extensions of time were requested by the contractor and whether or not such requests were granted;
  - (iv) whether litigation and/or arbitration was commenced by either the Owner or the bidder as a result of the work of the project performed by the bidder;
  - (v) whether any liens were filed on the project by subcontractors or material suppliers of the bidder;
  - (vi) whether the bidder was defaulted on the project by the owner;
  - (vii) whether the bidder made any claims for extra work on the project, including whether said claim resulted in a change order;
- c. Documentation evidencing the bidder's financial responsibility, including a certified financial statement prepared by a certified public accountant.
- d. Documentation evidencing the bidder's existence under the same name for the last five (5) years.
- e. Documentation evidencing the bidder's Worker's Compensation Experience Modification.

## **STATEMENT OF BIDDER'S QUALIFICATIONS**

**IMPORTANT: BIDDERS ARE REQUIRED TO FURNISH A COMPLETE ANSWER TO ALL OF THE QUESTIONS IN THIS STATEMENT. IN THE EVENT A COMPLETE ANSWER IS NOT PROVIDED, THE BID WILL BE REJECTED.**

1. Name of Bidder

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2. Type of Business Entity

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3. If the bidder is a corporation, state the date and place of incorporation of the corporation.

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4. For how many years has the bidder done business under its present name?

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5. List the persons who are directors, officers, owners, managerial employees or partners in the bidder's business.

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6a. Have any of the persons listed in Number 5 owned/operated/been shareholders in any other companies? If so, please state name of owned/operated/been shareholders and names of other companies:

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6b. If the answer to number 6a is in the affirmative, list said persons and the names of their previous affiliations.

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7. Has any director, officer, owner or managerial employee had any professional license suspended or revoked? If the answer to this question is yes, list the name of the individual, the professional license he/she formerly held, whether said license was revoked or suspended and the date of the revocation or suspension.

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8. Has the bidder been found guilty of any OSHA Violations? If the answer to this question is yes, describe the nature of the OSHA violation, an explanation of remediation or other steps taken regarding such violation(s).

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9. Has the bidder been charged with any claims pertaining to unlawful intimidation or discrimination against any employee by reason of race, creed, color, disability, sex or natural origin and/or violations of an employee's civil rights or equal employment opportunities? If the answer to this question is yes, list the persons making such claim against the bidder, a description of the claim, the status of the claim, and what disposition (if any) has been made regarding such claim.

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10. Has the bidder been named as a party in any lawsuit arising from performance of work related to any project in which it has been engaged? If the answer to this question is yes, list all such lawsuits, the index number associated with said suit and the status of the lawsuit at the time of the submission of this bid.

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11. Has the bidder been the subject of an investigation and/or proceedings before the Department of Labor for alleged violations of the Labor Law as it relates to the payment of prevailing wages and/or supplemental payment requirements? If the answer to this question is yes, please list each such instance of the commencement of a Department of Labor proceeding, for which project such proceeding was commenced, and the status of the proceeding at the time of the submission of this bid.

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12. Has the bidder been the subject of an investigation and/or proceeding before any law enforcement agency, including, but not limited to any District Attorney's Office? If the answer to this question is yes, please list each such instance, the law enforcement agency, the nature of the proceeding, the project for which such proceeding was commenced, if applicable to a project, and the status of the proceeding at the time of the submission of this bid.

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13. Has the bidder been the subject of proceedings involving allegations that it violated the Workers' Compensation Law including but not limited to the failure to provide proof of worker's compensation or disability coverage and/or any lapses thereof. If the answer to this question is yes, list each such instance of violation and the status of the claimed violation at the time of the submissions of this bid.

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14. Has the bidder, its officers, directors, owner and/or managerial employees been convicted of a crime or been the subject of a criminal indictment? If the answer to this question is yes, list the name of the individual convicted or indicted, the charge against the individual and the date of disposition of the charge.

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15. Has the bidder been charged with and/or found guilty of any violations of federal, state, or municipal environmental and/or health laws, codes, rules and/or regulations? If the answer to this question is yes, list the nature of the charge against the bidder, the date of the charge, and the status of the charge at the time of the submission of this bid.

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16. Has the bidder bid on any projects for the period September 1, 2012 to present? If the answer to this question is yes, list the projects bid on, whether said bid was awarded to the bidder and the expected date of commencement of the work for said project. For those projects listed, if the bidder was not awarded the contract, state whether the bidder was the lowest monetary bidder.

**IMPORTANT: BIDDERS ARE REQUIRED TO FURNISH A COMPLETE LIST OF PROJECTS AS REQUIRED BY THIS QUESTION #16 WITH ITS BID. IN THE EVENT THE LIST REQUESTED IS NOT SUBMITTED WITH THE BIDDER'S BID, THE BID WILL BE REJECTED.**

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17. Does the bidder have any projects ongoing at the time of the submission of this bid? If the answer to this question is yes, list the projects on which the bidder is currently working, the percentage complete, and the expected date of completion of said project.

**IMPORTANT: BIDDERS ARE REQUIRED TO FURNISH A COMPLETE LIST OF PROJECTS AS REQUIRED BY THIS QUESTION #17 WITH ITS BID. IN THE EVENT THE LIST REQUESTED IS NOT SUBMITTED WITH THE BIDDER'S BID, THE BID WILL BE REJECTED.**

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18. Has the bidder ever been terminated from a Project by the Owner? If the answer to this question is yes, list the projects on which the bidder was terminated, the nature of the termination (convenience, suspension, for cause), and the date of said termination.

**IMPORTANT: BIDDERS ARE REQUIRED TO FURNISH A COMPLETE LIST OF PROJECTS AS REQUIRED BY THIS QUESTION #18 WITH ITS BID. IN THE EVENT THE LIST REQUESTED IS NOT SUBMITTED WITH THE BIDDER'S BID, THE BID WILL BE REJECTED.**

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19. Has the bidder's surety ever been contacted to provide supervisory services in connection with an on-going project. If the answer to this question is yes, list the project(s) for which the surety provided supervisory services.

**IMPORTANT: BIDDERS ARE REQUIRED TO FURNISH A COMPLETE LIST OF PROJECTS AS REQUIRED BY THIS QUESTION #19 WITH ITS BID. IN THE EVENT THE LIST REQUESTED IS NOT SUBMITTED WITH THE BIDDER'S BID, THE BID WILL BE REJECTED.**

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20. Bidder's Worker's Compensation Experience Modifier: \_\_\_\_\_

Dated:

By: \_\_\_\_\_  
(Signature)

\_\_\_\_\_  
(Print Name and Title)

Sworn to before me this  
\_\_\_\_\_ day of \_\_\_\_\_, 20\_\_.

\_\_\_\_\_  
Notary Public

**NON-COLLUSIVE FORM**  
**BID PROPOSAL CERTIFICATIONS**

Firm Name \_\_\_\_\_

Business Address \_\_\_\_\_

Telephone Number \_\_\_\_\_ Date of Bid \_\_\_\_\_

**I. General Bid Certification**

The bidder certifies that he will furnish, at the prices quoted, the materials, equipment and/or services as proposed on this Bid.

**II. Non-Collusive Bidding Certification**

The following statement is made pursuant to Section 103-D of the General Municipal Law, as amended by Chapter 675 of the Laws of 1966, and Section 139-D of the State Finance Law, as amended by Chapter 675 of the Laws of 1966, and Section 2604 of the Public Authorities Law, as amended by Chapter 675 of the Laws of 1966.

By submission of this bid proposal, the bidder certifies that he/she is complying with Section 103-d of the General Municipal Law as follows:

Statement of non-collusion in bids and proposals to political subdivision of the state. Every bid or proposal hereafter made to a political subdivision of the state or any public department, agency or official thereof where competitive bidding is required by statute, rule, regulation, or local law, for work or services performed or to be performed or goods sold or to be sold, shall contain the following statement subscribed by the bidder and affirmed by such bidder as true under the penalties of perjury:

Non-collusive bidding certification.

A(a) By submission of this bid, each bidder and each person signing on behalf of any bidder certifies, and in the case of a joint bid each party thereto certifies as to its own organization, under penalty of perjury, that to the best of its knowledge and belief:

1. The prices in this bid have been arrived at independently without collusion, consultation, communication, or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other bidder or with any competitor;

2. Unless otherwise required by law, the prices which have been quoted in this bid have not been knowingly disclosed by the bidder and will not knowingly be disclosed by the bidder prior to opening, directly or indirectly, to any other bidder or to any competitor; and,

3. No attempt has been made or will be made by the bidder to induce any other person, partnership or corporation to submit or not to submit a bid for the purpose of restricting competition.

- (b) A bid shall not be considered for award nor shall any award be made where (a) (1) (2) and (3) above have not been complied with; provided, however, that if in any case the bidder cannot make the foregoing certification, the bidder shall so state and shall furnish with the reasons therefor. Where (a) (1) (2) and (3) above have not been complied with, the bid shall not be considered for award nor shall any award be made unless the head of the purchasing unit of the political subdivision, public department agency or official thereof to which the bid is made or his designee, determines that such disclosure was not made for the purpose of restricting competition.

The fact that a bidder (a) has published price lists, rates, or tariffs covering items being procured, (b) has informed prospective customers of proposed or pending publication of new or revised price lists for such items, or (c) has sold the same items to other customers at the same prices being bid, does not constitute, without more, a disclosure within the meaning of subparagraph one (a).

Any bid hereafter made to any political subdivision of the state or any public department, agency or official thereof by a corporate bidder for work or services performed or to be performed or goods sold or to be sold, where competitive bidding is required by statute, rule, regulation, or local law, and where such bid contains the certifications referred to in subdivision II of this section, shall be deemed to have been authorized by the board of directors of the bidder, and such authorization shall be deemed to include the signing, and submission of the bid and the inclusion therein of the certificate as to non-collusion as the act and deed of corporation.

**The bidder affirms the above statement as true under the penalties of perjury.**

Signature of Bidder: \_\_\_\_\_  
(Signature of bidder or authorized representative of a corporation)

Title: \_\_\_\_\_

Sworn to before me this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_

\_\_\_\_\_



**CERTIFICATION OF COMPLIANCE WITH THE IRAN DIVESTMENT ACT**

As a result of the Iran Divestment Act of 2012 (the "Act"), Chapter 1 of the 2012 Laws of New York, a new provision has been added to State Finance Law (SFL) § 165-a and New York General Municipal Law § 103-g, both effective April 12, 2012. Under the Act, the Commissioner of the Office of General Services (OGS) will be developing a list of "persons" who are engaged in "investment activities in Iran" (both are defined terms in the law) (the "Prohibited Entities List"). Pursuant to SFL § 165-a(3)(b), the initial list is expected to be issued no later than 120 days after the Act's effective date at which time it will be posted on the OGS website.

By submitting a bid in response to this solicitation or by assuming the responsibility of a Contract awarded hereunder, each Bidder/Contractor, any person signing on behalf of any Bidder/Contractor and any assignee or subcontractor and, in the case of a joint bid, each party thereto, certifies, under penalty of perjury, that once the Prohibited Entities List is posted on the OGS website, that to the best of its knowledge and belief, that each Bidder/Contractor and any subcontractor or assignee is not identified on the Prohibited Entities List created pursuant to SFL § 165-a(3)(b).

Additionally, Bidder/Contractor is advised that once the Prohibited Entities List is posted on the OGS Website, any Bidder/Contractor seeking to renew or extend a Contract or assume the responsibility of a Contract awarded in response to this solicitation must certify at the time the Contract is renewed, extended or assigned that it is not included on the Prohibited Entities List.

During the term of the Contract, should the School District receive information that a Bidder/Contractor is in violation of the above-referenced certification, the School District will offer the person or entity an opportunity to respond. If the person or entity fails to demonstrate that he/she/it has ceased engagement in the investment which is in violation of the Act within 90 days after the determination of such violation, then the School District shall take such action as may be appropriate including, but not limited to, imposing sanctions, seeking compliance, recovering damages or declaring the Bidder/Contractor in default. The School District reserves the right to reject any bid or request for assignment for a Bidder/Contractor that appears on the Prohibited Entities List prior to the award of a contract and to pursue a responsibility review with respect to any Bidder/Contractor that is awarded a contract and subsequently appears on the Prohibited Entities List.

I, \_\_\_\_\_, being duly sworn, deposes and says that he/she is the  
\_\_\_\_\_ of the \_\_\_\_\_ Corporation and that neither the  
Bidder/ Contractor nor any proposed subcontractor is identified on the Prohibited Entities List.

\_\_\_\_\_  
SIGNED

SWORN to before me this

\_\_\_\_\_ day of \_\_\_\_\_

201\_\_\_\_

Notary Public: \_\_\_\_\_

## **Sexual Harassment Prevention Certification Form**

By submission of this bid, the person signing on behalf of the bidder certifies, under penalty of perjury, that the bidder has and has implemented a written policy addressing sexual harassment prevention in the workplace and provides annual sexual harassment prevention training to all of its employees. Such policy shall, at a minimum, meet the requirements of Section 201-g of the Labor Law.

Bidder Name: \_\_\_\_\_

Bidder Address: \_\_\_\_\_

Signature: \_\_\_\_\_

Print Name and Title: \_\_\_\_\_

Date: \_\_\_\_\_

STATE OF NEW YORK                    )  
  s.s.:  
COUNTY OF \_\_\_\_\_ )

\_\_\_\_\_ (name), President/CEO/Owner/Managing Member of  
\_\_\_\_\_ (bidder), hereby deposes and says that the bidder currently  
has, or immediately upon being awarded the contract, will obtain insurance coverage, from an insurer  
licensed and admitted to do business in New York, that meets the following requirements:

1. Workers' Compensation and Disability:

Coverage	Statutory
Extensions	Voluntary compensation
	All states coverage employers
	Employer's liability - unlimited

2. Commercial General and Umbrella Liability

Coverage	Occurrence using ISO occurrence Form CG 00 01 07 98 or later form
Limits per project	General Aggregate - \$2,000,000.00 on a per project basis
	Products - Completed/Operations - \$2,000,000.00
	Personal & Advertising Injury - \$1,000,000.00
	Fire Damage (any one fire) - \$100,000.00
	Medical Expenses (any one person) - \$10,000.00
	Owners and Contractors Protective Liability Insurance:

- a. \$2,000,000 per occurrence, \$4,000,000 general aggregate for contracts greater than \$1,000,000, or any contracts involving scaffolds or work above a height of one story.
- b. \$1,000,000 per occurrence, \$2,000,000 general aggregate for contracts less than or equal to \$1,000,000 that do not involve scaffolds or work above a height of one story.

Excess Liability (excess coverage shall be on a follow-form basis):

- a. \$10,000,000 for contracts greater than \$1,000,000, or any contracts involving scaffolds or work above a height of one story.
- b. \$5,000,000 for contracts less than or equal to \$1,000,000 that do not involve scaffolds or work above a height of one story.

3. Automobile Liability (all vehicles hired or non-hired): \$1,000,000.00 per accident
4. If this project requires the removal of asbestos and/or hazardous materials, Contractors shall provide hazardous material liability insurance as follows:

\$2,000,000 per occurrence/\$2,000,000 aggregate, including products and completed operations. Such insurance shall include coverage for the Contractor's operations including, but not limited to, removal, replacement enclosure, encapsulation and/or disposal of asbestos, or any other hazardous material, along with any related pollution events, including coverage for third-party liability claims for bodily injury, property damage and clean-up costs. If a retroactive date is used, it shall pre-date the inception of the Contract. If motor vehicles are used for transporting hazardous materials, the Contractor shall provide pollution liability broadened coverage (ISO endorsement CA 9948), as well as proof of MCS 90. Coverage shall fulfill all requirements of this Article 10 and shall extend for a period of three (3) years following acceptance by the District of the Certificate of Completion.

5. Testing Company Errors and Omission Insurance:

\$1,000,000 per occurrence/\$2,000,000 aggregate for the testing and other professional acts of the Contractor performed under the Contract with the Owner.

If written on a "claims-made" basis, the retroactive date must pre-date the inception of the Contract or agreement. Coverage shall remain in effect for two years following the completion of work. The testing company shall also provide proof of Workers' Compensation and NY State Disability Benefits Insurance, Commercial General Liability and Excess Liability with limits of \$2,000,000 each occurrence and in the aggregate.

Print Name: \_\_\_\_\_

Signature: \_\_\_\_\_

Sworn to before me this \_\_\_\_\_

day of \_\_\_\_\_, 20\_\_\_\_

\_\_\_\_\_  
Notary Public

**HOLD HARMLESS AGREEMENT**

In accordance with Article 12 of the General Conditions, Indemnification, the Contractor will be required to sign the following "Hold Harmless" Agreement with the BOARD OF EDUCATION. Compliance with the foregoing requirements for insurance shall not relieve the Contractor from liability set forth under the Indemnity Agreement.

The undersigned hereby agrees to defend, indemnify, and save harmless the BOARD OF EDUCATION, its officers and employees from and against any and all liability, loss, damages, claims for bodily injury and/or property damages, cost and expense, including counsel fees, to the extent permissible by law, that may occur or that may be alleged to have occurred in the course of the performance of this agreement by the contractor, whether such claims shall be made by an employee of the contractor or by a third party, the contractor covenants and agrees that he will pay all costs and expenses arising therefrom and in connection therewith, and if any judgment shall be rendered against the Owner and Architect/Engineer in any such litigation, the Contractor shall at his own expense satisfy and discharge the same.

By: \_\_\_\_\_  
(Signature of Authorized Representative of Corporation)

\_\_\_\_\_  
(Print Name and Title)

\_\_\_\_\_  
(Date)

AGREEMENT made as of the                      day of                      in the year of Two Thousand Twenty.

BETWEEN the Owner  
(Name and address)

and the Contractor:  
(Name and address)

The Project is:  
(Name and location)

The Architect is:  
(Name and address)

The Owner and Contractor agree as set forth below.

**ARTICLE 1**  
**THE CONTRACT DOCUMENTS**

The Contract Documents consist of this Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, specifications, Addenda issued prior to execution of this Agreement, other documents listed in Article 9 of this Agreement and Modifications issued after execution of this Agreement; these form the Contract, and are a part of the Contract as if attached to this Agreement or repeated herein. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. An enumeration of the Contract Documents, other than Modifications, appears in Article 9.

**ARTICLE 2**  
**THE WORK OF THIS CONTRACT**

The Contractor shall execute the entire Work described in the Contract Documents or reasonably inferable by the Contractor as necessary to produce the results intended by the Contract Documents, except to the extent specifically indicated in the Contract Documents to be the responsibility of others.

**ARTICLE 3**  
**DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION**

**3.1** The date of commencement of the work and substantial completion of the work of this contract shall be in accordance with the schedule set forth in the Project Manual.

**3.2** Time is of the essence respecting the contract documents and all obligations thereunder.

**3.3** Upon the execution of this Agreement, the Contractor shall provide the Owner with copies of all contracts entered into between the Contractor and subcontractors or material suppliers. The Contractor's obligation to provide the Owner with said contracts shall continue for the duration of the Project.

**ARTICLE 4**  
**CONTRACT SUM**

**4.1** The Owner shall pay the Contractor in current funds for the Contractor's performance of the Contract the Contract Sum of \_\_\_\_\_, subject to additions and deductions as provided in the Contract Documents.

**4.2** The Contract Sum is based upon the following alternates, if any, which are described in the Bid Proposal Form (attached hereto) and are hereby accepted by the Owner:

**4.3** Unit prices are as set forth in Exhibit A hereto.

## **ARTICLE 5**

### **PROGRESS PAYMENTS**

**5.1** Based upon Applications for Payment submitted to the Architect by the Contractor and Certificates for Payment issued by the Architect, the Owner shall make progress payments on account of the Contract Sum to the Contractor as provided below and elsewhere in the Contract Documents.

**5.2** The period covered by each Application for Payment shall be one calendar month ending on the last day of the month, or as follows:

All progress payments shall be based upon an estimate and a certificate, made by the Architect, of the materials furnished, installed and suitably stored at the site and the work done by the Contractor, and payment shall be made in installments of ninety-five percent (95%) of the amount certified as earned so that, at the completion of the work, there will be a retainage of five percent (5%) of the Total Contract Sum. Retainage shall be paid to the Contractor upon final completion of the work of this contract. All progress payments made previous to the last and final payment shall be based on estimates and the right is hereby reserved by the Architect for the Owner to make all due and proper corrections in any payment for any previous error.

The Contractor shall submit with each application for payment the following:

1. A current Sworn Statement from the Contractor setting forth all subcontractors and materialmen with whom the Contractor has subcontracted, the amount of such subcontract, the amount requested for any subcontractor or materialman in the application for payment and the amount to be paid to the Contractor from such progress payment;

2. Commencing with the second (2nd) Application for Payment submitted by the Contractor, duly executed so-called "after the fact" waivers of mechanics' and materialmen's liens from all subcontractors, materialmen and, when appropriate, from lower tier subcontractors, establishing receipt of payment or satisfaction of payment of all amounts requested on behalf of such entities and disbursed prior to submittal by the Contractor of the current Application for Payment, plus sworn statements from all subcontractors, materialmen and, where appropriate, from lower tier subcontractors, covering all amounts described in this Paragraph 5.2;

3. Such other information, documentation and materials as the Owner or the Architect may require.

**5.3** Payment shall not be released to the Contractor until the Owner receives the following documentation:



1. Certified payroll for employees and employees of subcontractors performing work on the Project.

2. Copies of invoices submitted to the Contractor by its subcontractors and/or material suppliers.

## **ARTICLE 6**

### **FINAL PAYMENT**

Final payment, constituting the entire unpaid balance of the Contract Sum, shall be made by the Owner to the Contractor when (1) the Contract has been fully performed including compliance with all provisions of the Contract Documents except for the Contractor's responsibility to correct nonconforming Work under Article 15(B) of the General Conditions and to satisfy other requirements, if any, which necessarily survive final payment; and (2) a final Certificate for Payment has been issued by the Architect; such final payment shall be made by the Owner not more than 30 days after the issuance of the Architect's final Certificate for Payment, or as follows or as soon thereafter as is practicable.

## **ARTICLE 7**

### **MISCELLANEOUS PROVISIONS**

**7.1** Where reference is made in this Agreement to a provision of the General Conditions or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.

**7.2** The Contractor represents and warrants the following to the Owner (in addition to any other representations and warranties contained in the Contract Documents) as an inducement to the Owner to execute this Agreement, which representations and warranties shall survive the execution and delivery of this Agreement, any termination of this Agreement and the final completion of the Work:

1. that it and its Subcontractors are financially solvent, able to pay all debts as they mature and possessed of sufficient working capital to complete the Work and perform all obligations hereunder;

2. that it is able to furnish the plant, tools, materials, supplies, equipment and labor required to complete the Work and perform its obligations hereunder;

3. that it is authorized to do business in the State of New York and the United States and properly licensed by all necessary governmental and public and quasi-public authorities having jurisdiction over it and over the Work and the Project;

4. that its execution of this Agreement and its performance thereof is within its duly authorized powers;

5. that its duly authorized representative has visited the site of the Project, is familiar with the local and special conditions under which the Work is to be performed and has correlated on-site observations with the requirements of the Contract Documents; and

6. that it possesses a high level of experience and expertise in the business administration, construction, construction management and superintendence of projects of the size, complexity and nature of the particular Project, and that it will perform the Work with the care, skill and diligence of such a contractor.

The foregoing warranties are in addition to, and not in lieu of, any and all other liability imposed upon the Contractor by law with respect to the Contractor's duties, obligations and performance hereunder. The Contractor's liability hereunder shall survive the Owner's final acceptance of and payment for the Work. All representations and warranties set forth in this Agreement, including without limitation, this Paragraph 7.2, shall survive the final completion of the Work or the earlier termination of this Agreement. The Contractor acknowledges that the Owner is relying upon the Contractor's skill and experience in connection with the Work called for hereunder.

## **ARTICLE 8**

### **TERMINATION OR SUSPENSION**

**8.1** The Contract may be terminated by the Owner as provided in the General Conditions.

**8.2** The Work may be suspended by the Owner as provided in the General Conditions.

## **ARTICLE 9**

### **ENUMERATION OF CONTRACT DOCUMENTS**

**9.1** The Contract Documents, except for Modifications issued after execution of this Agreement, are enumerated as follows:

**9.1.1** The Agreement is this executed Agreement between Owner and Contractor.

**9.1.2** The General Conditions are the General Conditions of the Contract for Construction as set forth in the Project Manual and attached hereto.

**9.1.3** The Specifications are as set forth in the Project Manual and indexed in Exhibit "B" hereto.

**9.1.4** The Drawings are those as indexed in Exhibit "C" hereto.

**9.1.5** The Addenda, if any, are as follows:

Addendum No.	Date	Number of Pages
--------------	------	-----------------

**This Agreement is entered into as of the day and year first written above and is executed in at least three original copies of which one is to be delivered to the Contractor, one to the Architect for use in the administration of the Contract, and the remainder to the Owner.**

OWNER

CONTRACTOR

By: \_\_\_\_\_

By: \_\_\_\_\_

\_\_\_\_\_  
(Printed name and title)

\_\_\_\_\_  
(Printed name and title)

***GENERAL CONDITIONS***  
***of the***  
***CONTRACT for CONSTRUCTION***

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## **GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION**

The within document includes detailed provisions concerning the capital improvement work to be performed by the Contractors engaged by the School District. This document contains provisions which relate particularly to capital improvement projects in the school district setting in New York State. The document is incorporated by reference into all contracts to be awarded and should be reviewed carefully by the Contractor to whom the award of contract is made. Consultation with an attorney and insurance representative is advised.

### **ARTICLE 1 DEFINITIONS**

- A. "Addendum" or "Addenda" refers to revised drawings and/or written requirements for the capital improvement work issued by the Architect prior to the time indicated for submission of a bid by a contractor.
- B. The "Architect" is the design professional engaged by the School District to perform design related functions respecting the capital improvement projects to be performed in the School District.
- C. "Board of Education" refers to the Board of Education of the School District.
- D. "Central Administration" refers to the Superintendent of Schools, his/her Assistant Superintendents, and Director of Plant & Facilities.
- F. The "Contractor" refers to the entity engaged by the School District to perform all or a part of the capital improvement project on its behalf.
- G. The "Drawings" are the plans, elevations, sections, details, schedules and diagrams developed by the Architect for the capital improvement projects to be performed in accordance with the project manual of which these General Conditions of the Contract for Construction form a part.
- H. The "Project" refers to the entire capital improvement project to be performed in accordance with the project manual and may include work by the Owner.
- I. The "Project Manual" is the bound document which is issued simultaneously with the project Drawings and includes the Notice to Bidders, Information to Bidders, Bid Proposal Form, Prevailing Wage Rate schedule and the written requirements for labor, materials, equipment, construction systems and the like necessary for the Contractor to complete the capital improvement work for which it has been engaged.
- J. The "Owner" refers to the School District, the Board of Education, its officers, agents and employees.

K. A "Subcontractor" is a person or entity who has a direct contract with the Contractor to provide material and/or labor for the project on or off the site, or to otherwise furnish labor, material or other services with respect to a portion of the Contractor's work. A "Sub-subcontractor" is a person or entity who has a direct or indirect contract with a Subcontractor engaged by the Contractor to perform a portion of the Subcontractor's work at the site, or to otherwise furnish labor, material or other services with respect to a portion of the Subcontractor's work.

L. The term "Specialist" or "Specialty Contractor" as used in these specifications shall mean an individual or firm of established reputation, or, if newly organized, whose personnel have previously established a reputation in the same field, which is regularly engaged in, and which maintains a regular force of workers skilled in either manufacturing or fabricating items required by the Contract, installing items required by the Contract, or otherwise performing work required by the Contract.

M. "Accepted", "directed" "permitted," "requested," "required," and "selected" mean, unless otherwise explained, "accepted by the Architect and/or Owner" "directed by the Architect and/or Owner," "permitted by the Architect and/or Owner," "requested by the Architect and/or Owner," "required by the Architect and/or Owner," and "selected by the Architect and/or Owner." However, no such implied meaning will be interpreted to extend the Architect's responsibility into the Contractor's area of construction supervision.

N. "As accepted" "or acceptable substitute", and "for review" mean the Architect is the sole judge of the quality and suitability of the proposed substitutions. Where used in conjunction with the Architect's response to submittals, requests, applications, inquiries, reports, and claims by the Contractor, the meaning will be held to the limitations of the Architect's responsibilities and duties as stated in the General Conditions. In no case will "accepted by the Architect" be interpreted as an assurance to the Contractor that the requirements of the Contract Documents have been fulfilled.

O. "Furnish" means supply and deliver to the Project site or other designated location, ready for unloading, unpacking, storing, assembly, installation, application, erection, or other form of incorporation into the Project, and maintained ready for use. Supply and deliver products requiring additional or supplemental fitting, assembly, fabrication, or incorporation into other elements of the Project directly to the fabricator, installer or manufacturer as required.

P. "Install" means unload, unpack, use, fit, attach, assemble, apply, place, anchor, erect, finish, cure, protect, clean, and similar operations required to properly incorporate work into the Project.

Q. "Provide" means furnish and install.

R. “Replace” means remove designated, damaged, rejected, defective, unacceptable, or non-conforming work from the Project and provide new work meeting the requirements of the Contract Documents in place thereof.

S. The word “include”, in any form other than “inclusive”, is non-limiting and is not intended to mean all-inclusive.

## **ARTICLE 2 CONTRACTOR’S REPRESENTATIONS**

A. Upon submission of its bid to the Owner, the Contractor expressly represents:

1. The Contractor represents and warrants that it performed a detailed investigation of the site(s) and that such investigation was sufficient to disclose the conditions of the site(s) at which work is to be performed by it and all improvements thereon, and the conditions under which the work is to be performed, including, but not limited to (a) the location, condition, layout and nature of the project site and surrounding areas; (b) the cost of labor, materials and equipment necessary to perform the work, the availability; (c) the areas of the work which will cause a disruption to the necessary and proper operation of the facilities by the Owner; and (d) other pertinent limitations on the performance of its work.

2. The Contractor represents and warrants that it has carefully studied and compared the drawings and pertinent provisions of the project manual and that any errors, omissions, ambiguities, discrepancies or conflicts found in said documents have been brought to the attention of the Architect for clarification prior to the Contractor’s submission of its bid. If, in the interpretation of Contract Documents, requirements within the Drawings and Specifications conflict, or it appears that the Drawings and Specifications are not in agreement, the requirement to be followed shall be decided by the Architect. Where there is a discrepancy in quantity, the Contractor shall provide the greater quantity; where there is a discrepancy in quality, the Contractor shall provide the superior quality. Addenda supersede the provisions that they amend.

3. Each contractor certifies that it is experienced and familiar with the requirements and conditions imposed during the construction of similar work in the area. This includes, but is not limited to, “out of sequence” or “come back” work for the removal of plant, equipment, temporary wiring or plumbing, etc. This “out of sequence” work may also include phasing of construction activities to accommodate the installation of the work at various locations and orderly fashion and the completion of work at various locations and/or levels at various times. This “phasing”, “out of sequence”, or “come back” work shall be done at no cost to other contractors, the Owner or Architect.

B. The Contractor warrants to the Owner that (1) the materials and equipment furnished under its contract will be of good quality and new, and of recent manufacture, unless otherwise required or permitted by the Contract Documents, (2) that its work will be free from defects not inherent in the quality required or permitted, and (3) that its work will conform with the terms and conditions of its agreement with the Owner. Work not conforming to these requirements,



including substitutions not properly approved and authorized, shall be considered defective and shall be removed and replaced at the Contractor's cost and expense. If required by the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

C. Except as to any reported errors, inconsistencies or omissions, and to concealed or unknown conditions, by executing the Agreement, the Contractor represents the following:

1. The drawings and accompanying specifications found in the project manual issued simultaneously with said drawings are sufficiently complete and detailed for the Contractor to (a) perform the work required to produce the results intended by the Owner and (b) comply with all the requirements of its contract with the Owner.

2. The work required to be performed by the Contractor including, without limitation, all construction details, construction means, methods, procedures and techniques necessary to perform its work, use of materials, selection of equipment and requirements of product manufacturers are consistent with: (a) good and prevailing and accepted industry standards applicable to its work; (b) requirements of any warranties applicable to its work; and (c) all laws, ordinances, regulations, rules and orders which bear upon the Contractor's performance of its work.

3. The Drawings and Specifications for the Contract have been prepared with care and are intended to show as clearly as is practicable the work required to be done. Work under all items in the Contract must be carried out to meet field conditions to the satisfaction of the Architect and Owner and in accordance with his instructions and the Contract Drawings and Specifications.

4. All dimensions shown on the Drawings are for bidding purposes only. It is the responsibility of the Contractor to verify all dimensions in the field to insure proper and accurate fit of materials and items to be installed.

D. The representations set forth herein shall survive expiration and/or termination of the Contractor's agreement with the Owner.

### **ARTICLE 3 CONTRACTOR'S CONSTRUCTION PROCEDURES**

A. 1. The Contractor shall be solely responsible for and have control over construction means, methods, techniques, sequences and procedures required for the proper execution of its work on the project. Where the drawings and/or project manual make reference to particular construction means, methods, techniques, sequences or procedures or indicate or imply that such are to be used in connection with the Contractor's work, such reference is intended only to indicate that the Contractor's work is to produce at least the quality of the work implied by the operations described, but the actual determination as to whether or not the described operations may be safely or suitably employed in the performance of the Contractor's work shall be the sole

responsibility of the Contractor. All loss, damage, liability, or cost of correcting defective work arising from the employment of a specific construction means, method, technique, sequence or procedure shall be borne solely by the Contractor.

2. Neither the Architect nor the Owner will have control over or charge of and will not be responsible for construction means, methods, techniques, sequences or procedures, or for safety precautions and programs in connection with the Work, since these are solely the Contractor's responsibility as provided herein.

3. The Contractor shall provide and pay for all labor, materials, equipment, tools, construction equipment and machinery, rigging, water, heat, utilities, light, transportation, and other facilities and services necessary for proper execution and completion of its work, whether temporary or permanent and whether or not incorporated or to be incorporated in its work.

B. The Contractor shall be responsible for coordinating the work of its own forces and the work of subcontractors engaged by it to perform the work of the project on its behalf. The Contractor shall supply to its own work forces, and subcontractors engaged by it to perform portions of its work, copies of the drawings and project manuals for the work to be performed by such individuals/entities on its behalf. The Contractor shall review any specified or installation procedure with its employees and/or subcontractors, including those recommended by any product manufacturer, prior to the commencement of the relevant portion of the work to be performed. The Contractor shall be responsible to the Owner for the acts and/or omissions of the Contractor's employees, the Contractor's Subcontractors, the Contractor's material suppliers, and/or their respective agents and employees, and any other persons performing portions of the work on behalf of the Contractor.

C. The Contractor shall be responsible for the inspection of portions of the project performed by its own work force and/or subcontractors engaged by it for the purpose of determining that said work is in proper condition to receive subsequent work.

D. The Contractor shall perform its work in accordance with the standards of the construction industry applicable to work in the locale in which work is to be performed.

E. The Contractor shall only employ labor on the project or in connection with its work capable of working harmoniously with all trades, crafts and any other individuals associated with the capital improvement work to be performed. There shall be no strikes, picketing, work stoppages, slowdowns or other disruptive activity at the project for any reason by anyone employed or engaged by the Contractor to perform its portion of the work. There shall be no lockout at the project by the Contractor. The Contractor shall be responsible for providing the manpower required to proceed with the work under any circumstance. Should it become necessary to create a separate entrance for a contractor involved in a labor dispute, all costs associated with creating that entrance shall be borne by the contractor involved in the dispute. Such costs shall include, but not be limited to, signage, fencing, temporary roads and security personnel as deemed necessary by the Owner for the safety of the occupants of the site.

F. 1. If the Contractor has engaged the services of workers and/or subcontractors who are members of trade unions, the Contractor shall make all necessary arrangements to reconcile, without delay, damage or cost to the Owner and without recourse to the Architect or the Owner, any conflict between its agreement with the Owner and any agreements or regulations of any kind at any time in force among members or councils which regulate or distinguish what activities shall not be included in the work of any particular trade.

2. In case the progress of the capital improvement work to be performed by the Contractor is effected by any undue delay in furnishing or installing any items or materials or equipment required pursuant to its agreement with the Owner because of a conflict involving any such labor agreement or regulation, the Owner may require that other material or equipment of equal kind and quality be provided pursuant to a Change Order or Construction Change Directive but in no case shall the amount of such change be charged by the Contractor to the Owner as an additional cost to perform the capital improvement work pursuant to its contract.

3. The Contractor shall ensure that its work continues uninterrupted during the pendency of a labor dispute.

4. The Contractor shall be liable to the Owner for all damages suffered by the Owner occurring as a result of work stoppages, slowdowns, disputes or strikes.

G. The Contractor shall enforce strict discipline and good order among the Contractor's employees and its Subcontractors' work forces and other persons carrying out the performance of its work. The Contractor shall not permit employment of unfit persons or persons not skilled in tasks assigned to them. The Owner reserves the right to object to any person to be hired or who is employed by the Contractor. Upon the request of the Owner, said person shall be removed from the Project and not again be assigned to perform the Contractor's work without the written permission of the Owner.

H. Within one (1) week after a Notice to Proceed is received, the Contractor shall employ a competent, full-time Project Manager and On Site Superintendent to be approved by the Owner or its representative, and such necessary assistants who shall be in attendance at each project site whenever and wherever work is in progress to provide for the expeditious completion of the work. Said Project Manager and On Site Superintendent shall be employed until punchlist and closeout of the Project. To the extent work is being performed contemporaneously at different facilities within the School District, the Contractor shall assign different superintendents for each facility at which work is being performed. The Project Manager and On Site Superintendent assigned by the Contractor shall not be changed except with the consent of Owner, unless the Project Manager or On Site superintendent or such assistant proves to be unsatisfactory to the Contractor and/or ceases to be in its employ. The Project Manager and On Site Superintendent shall represent the Contractor, and communications given to the Project Manager or On Site Superintendent, whether verbal or written, shall be as binding as if given to the Contractor. Oral communications to the superintendent(s) or his/her assistant(s) and/or project manager shall be confirmed in writing by the Owner or Architect. The Contractor shall forward to the Owner a copy of the resumes for each of its superintendents, project managers and their assistants. The

Owner or the Architect shall have the right to have any supervisory or management staff removed from the project with or without cause.

I. Each Contractor shall provide, or otherwise see that, the project manager, or on site superintendent site managers, and/or responsible workers of each Contractor and major subcontractor are equipped with cellular phones and radios. Each Contractor shall provide the Owner and the Architect with the number for each phone and worker.

J. The Contractor's supervisory personnel, including superintendents and their assistants, shall be versed in the English language. In the event the Contractor's supervisory personnel, superintendents and/or their assistants are not versed in the English language, the Contractor shall employ the services of a full-time on-site interpreter to facilitate communications with such supervisory personnel, superintendents and/or assistants.

K. Prior to the commencement of work, the Contractor shall provide the Architect with:

1. a written list of the names, addresses and telephone numbers of the members of its organization who can be contacted in the event of an off-hours emergency at the building site, including cellular telephone numbers and personal/home telephone numbers.
2. a written list of subcontractors, sub-subcontractors, suppliers and vendors with names, addresses, telephone numbers, and descriptions of the work they shall perform or furnish.
3. The name, address and telephone number of the bonding company, banking and insurance company for the Prime Contractor employed by the Prime Contractor including the name, address and telephone number of each bonding company's primary contact representative for this project.
4. Detailed subcontractor schedules indicating the approximate quantity of shop drawings, sequence, timing and man loading.
5. A cash flow projection for the life of the project, including a schedule and graph showing the amount of work projected to be completed each month or billing period and a dollar value for the anticipated billings each month or billing period. This shall be completed after an agreed upon schedule of values has been approved by the Owner or Architect.

L. 1. Tests, inspections and approvals of portions of the Contractor's work required by the drawings and/or specifications shall be made at an appropriate time. Unless otherwise provided, the Contractor shall consult with the Architect concerning the need for testing and/or inspection of its work pursuant to the Contract Documents and, after consulting with the Architect, the Architect shall advise the Owner to make arrangements for such tests, inspections and approvals with an independent testing laboratory or entity acceptable to the Owner, or with

the appropriate public authority. The Owner shall bear all costs associated with the tests, inspections or approvals required by the drawings and/or specifications except as set forth in subparagraph 3 hereof.

2. Tests, inspections and approval of portions of the Contractor's work required by laws, ordinances, rules, regulations or orders of public authorities or governmental agency having jurisdiction shall be made at an appropriate time. The Contractor shall consult with the Architect concerning the need for testing and/or inspection of its work pursuant to law, ordinance, regulation or orders of public authorities or governmental agencies and shall advise the Owner in writing that it has made arrangements for such tests, inspections and approvals with the appropriate public authority or governmental agency. The Contractor shall be solely responsible for making timely notice of the need for a test, inspection and/or approval with the relevant public authority or governmental agencies and shall bear all costs associated with such testing, inspection or approval required by such public authority or governmental agency.

3. If the Architect, the Owner, or public authorities or governmental agencies having jurisdiction determine that portions of the Contractor's work require additional testing, inspection or approval due to the Contractor's failure to perform its work in accordance with the requirements of the Contract Documents and/or laws, ordinances, rules, regulations or orders of public authorities or governmental agencies having jurisdiction, the Architect will advise the Owner of the need for such additional inspections or tests and the Owner shall make arrangements for such additional testing, inspection or approval by an entity acceptable to the Owner. The Contractor shall bear the costs of such additional testing as provided in Article 14.

M. The Contractor shall, if required by ordinances, laws, codes, rules and/or regulations of the governing agencies having jurisdiction over this project, retain a licensed professional engineer to supervise the construction of this project including, but not limited to, foundations, structural work, soils, welding, reinforced masonry and the like.

N. The Contractor recognizes and acknowledges that the within project is governed by and subject to the provisions of New York State General Municipal Law, section 101, governing the award of contracts on public improvement projects. As such, the Contractor recognizes and acknowledges that other contractors will be performing work on the project in conjunction with it. As such the Contractor agrees to cooperate with such other contractors performing work on the project and shall perform its work as follows:

1. The Contractor shall not interfere with the erection, installation or storage upon the premises of any work, materials, supplies or equipment which is to be performed and furnished by other contractors, and the Contractor shall properly connect and coordinate its work therewith.

2. The Contractor shall not commit or permit any act which will interfere with the performance of the work of any other contractor performing work on the project. If the Contractor sustains any damage through any act or omission of other contractors having a contract with the Owner for the performance of work upon the site or of work which may be

necessary to be performed for the proper execution of the work to be performed hereunder, or through any act or omission of a subcontractor of such contractor, the Contractor shall promptly notify the Owner of such damage.

3. The Contractor agrees to defend and indemnify Owner, Architect, its Consultants and Sub-consultants, from all claims made against any of them arising out of Contractor's acts or omissions or the acts or omissions of any subcontractor of the Contractor which have caused damage to the Owner, Architect, or other contractor(s) on the project. The Owner's right to indemnification hereunder shall in no way be diminished, waived or discharged, or by the exercise of any other remedy provided for by the contract or by law. Further, the Owner shall withhold from an offending contractor's contract sum an amount sufficient to cover such damage and all expenses and costs associated with the damage sustained.

4. When the work of the Contractor or its subcontractors overlap or dovetail with that of other Contractors, materials shall be delivered and operations conducted to carry on the work continuously, in an efficient, workmanlike manner.

5. In case of interference between the operations of different Contractors, the Owner will be the sole judge of the rights of each Contractor and shall have the authority to decide in what manner the work may proceed, and in all cases its decision shall be final. Any decision as to the method and times of conducting the work or the use of space as required in this paragraph shall not be basis of any claim for delay or damages by the Contractor.

6. The Contractor, including its subcontractors, shall keep itself informed of the progress of other contractors and shall notify the Architect immediately in writing of lack of progress on the part of other contractors where such delay will interfere with its own operations. Failure of the Contractor to keep informed of the work progressing on the project and failure to give notice of lack of progress by others shall be construed as acceptance by the Contractor of the status of the work as being satisfactory for proper coordination with the Contractor's own work.

7. Delays or oversights on the part of any contractor or subcontractor in getting any or all of their work done in the proper way, thereby causing cutting, removing and replacing work already in place, shall not be the basis for a claim for extra compensation.

8. If part of the Contractor's work depends for proper execution or results upon construction or operations by the Owner or another contractor, the Contractor shall, prior to proceeding with that portion of its work, promptly report to the Architect and Owner apparent discrepancies or defects in such other construction that would render it unsuitable for such proper execution and results. Failure of the Contractor so to report shall constitute an acknowledgment that the Owner's or other contractor's completed or partially completed construction is fit and proper to receive the Contractor's work.

9. The Contractor shall promptly correct discrepancies or defects in its work which have been identified by other contractors as affecting proper execution and results of the work of such other Contractor.



O. 1. The Contractor shall comply with and give notices required by laws, ordinances, rules, regulations and lawful orders of public authorities or governmental agencies bearing on performance of the Work. If the Contractor fails to give such notices, it shall be liable for and shall indemnify and hold harmless (a) the Owner, its consultants, employees, officers and agents, and/or (b) the Architect and its consultants, employees, officers and agents against any resulting fines, penalties, judgments, or damages, including reasonable attorney's fees, imposed on or incurred by the parties indemnified hereunder.

2. The Contractor shall pay any costs or fees incurred in such compliance and any fines or penalties imposed for violation thereof and any costs or fees incurred by the Owner due to such violation. If the Contractor observes that portions of the Contract Documents are at variance therewith, the Contractor shall promptly notify the Architect and Owner in writing, and necessary changes shall be accomplished by appropriate modification to the drawings and/or specifications.

3. If the Contractor performs Work knowing it to be contrary to laws, statutes, ordinances, building codes, and rules and regulations without such notice to the Architect and the Owner, the Contractor shall assume full responsibility for such Work and shall bear the attributable costs and shall bear the total cost for correction of same.

4. If the Contractor fails to give such notices, it shall be liable for and shall indemnify and hold harmless (1) the Owner, its consultants, employees, officers and agents, and (2) the Architect and its consultants, employees, officers and agents, its consultants, employees, officers and agents, against any resulting fines, penalties, judgments, or damages, including reasonable attorney's fees, imposed on or incurred by the parties indemnified hereunder. The Contractor shall pay any costs or fees incurred in such compliance and any fines or penalties imposed for violation thereof and any costs or fees incurred by the Owner due to such violation.

P. The Contractor recognizes and acknowledges that job meetings will be held at the job site weekly unless otherwise designated by the Owner or the Architect. The Contractor shall have responsible representation at the MANDATORY weekly job meetings held at the Architect's job office. These meetings will be held to arrange for satisfactory coordination of all trades on the project so as not to impede job progress. Contractors or subcontractors failing to attend job meetings shall be responsible for delays and/or expenses incurred due to coordination difficulty.

Q. The Contractor shall provide copies of its daily construction reports to the Architect's Field Superintendent. These reports shall be submitted no later than 10:00 am the following workday. The daily reports shall provide detailed information concerning the Contractor's activities and operations, including work activities on site and manpower. A "Daily Construction" form is included in these specifications and shall be used for reporting these activities. In addition, the Contractors are to submit a Two Week Look Ahead schedule for up coming work. A "Two Week Look Ahead" form is included in these specifications for the Contractor's use.

## **ARTICLE 4**

### **CONTRACTOR'S USE OF SITE**

A. The Contractor shall confine operations at the site to the areas at which construction is to be performed and to such areas permitted by law, ordinances, permits and as set forth in detail in the project manual and drawings forming a part of its contract with the Owner.

B. Five (5) days after receipt of the Notice to Proceed, the Contractor shall provide two (2) copies of a video taped recording of all existing conditions to the Owner. This taping shall provide a record of all existing buildings, grounds, exterior conditions and interior conditions. The Contractor shall schedule a representative of the Owner to be present at this taping. In the absence of this record, the Contractor shall be responsible for paying the costs associated with any and all repairs in an area where the Contractor is working or has worked, as may be deemed necessary by the Owner.

C. The occupied portion of any school building shall always comply with the minimum requirements necessary to maintain a certificate of occupancy.

D. General Safety and Security Standards for Construction Projects:

1. All construction materials shall be stored in a safe and secure manner.
2. Fences around construction supplies or debris shall be maintained.
3. Gates shall always be locked unless a worker is in attendance to prevent unauthorized entry.
4. During exterior renovation work, overhead protection shall be provided for any sidewalks or areas immediately beneath the work site or such areas shall be fenced off and provided with warning signs to prevent entry.
5. The Contractor shall exert utmost care and diligence when working in or near any existing buildings or sitework. The absence of protection around such items shall not excuse the Contractor from its liability to provide protection. Any damage to existing buildings, sitework or facilities shall be repaired and charged to the Contractor responsible for the damage.
6. The Contractor shall be responsible for the removal and replacement of existing ceiling tiles and grid in areas of the existing building where its work is required and new ceilings are not scheduled for installation. In the event that the existing ceilings are damaged and cannot be replaced to the satisfaction of the Owner, the responsible contractor shall be liable for the costs of replacing in kind, the existing ceilings with new tile and grid.
7. All disconnect and/or tie-in work involving any utilities that would interfere with the ongoing operations of the Owner shall be completed after hours when the facility is not in use. The performance of this work shall be projected on all schedules required to be prepared by



the Contractor. Additionally, the Contractor shall give the the Owner at least forty-eight (48) hours advance notice of its intention to perform this type of work. All overtime and standby personnel necessary to complete these tie-ins shall be the responsibility of the Contractor performing the work.

E. 1. Separation of construction areas from occupied spaces: Construction areas which are under the control of a contractor and therefore not occupied by district staff or students shall be separated from occupied areas. Provisions shall be made to prevent the passage of dust and contaminants into occupied parts of the building. Periodic inspection and repairs of the containment barriers must be made to prevent exposure to dust or contaminants. Gypsum board must be used in exit ways or other areas that require fire rated separation. Heavy duty plastic sheeting may be used only for a vapor, fine dust or air infiltration barrier, and shall not be used to separate occupied spaces from construction areas. Methods of dust and fume control shall include, but not be limited to:

- a. Adequate ventilation;
- b. Wetting down;
- c. Keeping bags of insulating materials, cement, etc., closed.
- d. Controlled mixing of materials under field conditions;
- e. Special attention should be utilized in sawing of insulation and certain acoustical materials and storage of materials.
- f. Job housekeeping must be maintained;
- g. Advising all personnel of hazardous conditions, including supervisors and workers;

Each contractor is responsible for instituting the above policies to insure minimal impact to surrounding occupied areas.

2. A specific stairwell and/or elevator should be assigned for construction worker use during work hours. In general, workers may not use corridors, stairs or elevators designated for students or school staff.

3. Large amounts of debris must be removed by using enclosed chutes or a similar sealed system. There shall be no movement of debris through halls of occupied spaces of the building. No material shall be dropped or thrown outside the walls of the building.

4. All occupied parts of the building affected by renovation activity shall be cleaned at the close of each workday. School buildings occupied during a construction project shall

maintain required health, safety and educational capabilities at all times that classes are in session.

F. 1. Storage space will be allotted to the Contractor by the Owner to the extent such space, in the sole discretion of the Owner, is available. The Contractor shall be responsible for securing appropriate space for its material with the Owner or Architect prior to delivery. If insufficient space is available on the site, the Contractor shall provide local off-site storage, storage containers, etc. at its own cost and expense. Should any of the material stored on-site obstruct the progress of any portion of the work or the project, this material shall be removed by the Contractor without reimbursement of cost, from place to place or from the premises, as the Owner or Architect may direct.

2. The Contractor shall schedule delivery of materials and equipment to minimize long term storage at the Project, to prevent overcrowding of construction spaces, and to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft and other losses.

3. The Contractor shall deliver materials and equipment to the Project 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 installation. The Contractor shall inspect materials and equipment upon delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected. The Contractor shall store products to allow for inspection and measurement of quantity or counting of units. The Contractor shall store materials in a manner that will not endanger the Project structure. The Contractor shall store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation. The Contractor shall comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.

4. The Contractor shall not unreasonably encumber the site with materials or equipment during the performance of its work. Only materials and equipment which are to be used directly in the performance of the Contractor's work shall be brought to and stored on the premises of the School District. After equipment is no longer required for its work, the Contractor shall promptly remove such equipment from the premises of the School District. The Contractor shall be solely responsible for the protection of construction materials and equipment stored on the premises from weather, theft, damage and all other adversity. The Contractor shall at all times provide the proper housekeeping to minimize potential fire hazards, and shall provide approved spark arresters on all steam engines, internal combustion engines and flues.

5. A construction entrance will be designated for deliveries. A separate entrance will be established for entering and exiting the site only. All deliveries shall be scheduled and coordinated with the Owner's Security department. Unexpected or uncoordinated deliveries may be turned away by the Owner at the discretion or necessity of the Owner. The Owner's enforcement of this provision shall not be construed by any contractor or subcontractor as the

basis for a claim of delay in time or monetary damages alleged to have been incurred as a result of refusal of delivery.

6. The Contractor for General Construction shall provide necessary and required security measures to adequately safeguard the construction site from vandalism and intrusion of unauthorized persons. The Contractor for General Construction shall submit its means and methods of security to the Owner for review and comment. The project site(s) must be secured 24 hours a day, 7 days a week including holidays. The General Construction Contractor's failure to secure the site as required by this paragraph will result in the Owner engaging the services of such necessary personnel so as to provide such security. No notice will be given the Contractor for General Construction of the Owner's intention to engage such security services and all costs and expenses associated with the Owner's security of the site in this regard will be back charged to the Contractor for General Construction. While the Owner may have security guards patrolling the project areas, the function of such security guards is not for the purpose of specifically guarding the Contractor's property or operations of work.

G. The Contractor's right to entry and use of the School District premises arises solely from the permission granted by the Owner pursuant to the agreement between the Contractor and the Owner. This permission shall be deemed to be withdrawn upon the termination of the Contractor's agreement with the Owner.

H. 1. The Contractor shall be required to perform its work with no interruption to the School District's operations, including its administrative and business operations. Any work which will interfere with the School District's operations and/or which is to be performed when the School District's facilities are in operation shall be performed on evenings and weekends. Additionally, the Contractor shall conduct its work in compliance with federal, state, county or local ordinances. All costs incurred by the Owner to make the facilities available during evening and weekends shall be borne by the Contractor. The Owner reserves the right to determine what work will "interfere" with its operations and said determination shall be final.

2. The Contractor may request access to the site during times beyond the work hours permitted. Approval is solely at the discretion of the Owner. If approval is given, the Contractor is responsible for paying all additional costs incurred by the Owner and the Architect for providing the site to the Contractor during the additional time periods.

3. In the event the Contractor fails to complete all work under this contract by said scheduled dates, the Contractor will not be permitted to perform any work during normal school hours. Such work shall only be performed after school hours, Saturdays, Sundays, holidays or periods when school is unoccupied at no additional cost of any kind to the Owner. In addition to damages incurred by the Owner in connection with the Contractor's delay, the Contractor shall be liable for all costs incurred by the Owner to provide staff and the Architect's personnel as required to make facility accessible by Contractor and perform inspections during such off hours.

4. The Owner shall not be responsible for any overtime charges incurred by the Contractor during the course of this project. Any and all costs associated with work which is

performed at hours requiring the payment of such overtime by the Contractor to its workers shall be the Contractor's responsibility.

I. Construction and maintenance operations shall not produce noise in excess of 60 dba in occupied spaces or shall be scheduled for times when the building or affected building spaces are not occupied or acoustical abatement measures shall be taken.

J. The Contractor shall provide all required temporary access walkways, both interior and exterior, and the like necessary to complete its work. The Contractor shall maintain an unobstructed condition at all entrances and/or exits from present buildings. No equipment, other than equipment with rubber tires, will be allowed on any existing or new pavement, UNLESS THE CONTRACTOR HAS OBTAINED THE PRIOR APPROVAL OF THE OWNER AND THE PAVEMENT HAS BEEN FIRST PROTECTED WITH PLANKING OR BY OTHER MEANS APPROVED BY THE OWNER.

K. The Contractor and any entity for whom the Contractor is responsible shall not erect any sign on the premises of the School District without the prior written consent of the Owner, which consent may be withheld at the sole discretion of the Owner.

L. 1. Without the prior approval of the Owner, the Contractor shall not permit any workers to use any existing School District facilities, including, without limitation, lavatories, toilets, entrances and parking areas other than those designated by the Owner. Employees, vehicles, and equipment of the Contractor and of all others engaged by the Contractor for the performance of its work shall enter onto the premises of the School District for which construction work is to be performed only at those locations designated or approved by the Owner. The parking for construction personnel shall be limited to the designated trailer park area only. Failure to abide by this rule will result in towing of cars at the expense of the contractor who employs the individual.

2. The Contractor shall ensure that its work, at all times, is performed in a manner that affords reasonable access to both vehicles and individuals, to the premises of the School District and all adjacent areas. The Contractors' work shall be performed, to the fullest extent possible, in such a manner that areas in and around the construction area shall be free from all debris, building materials and equipment likely to cause hazardous conditions, and do not close or obstruct walkways, roadways or other occupied facilities or facilities to be used by the Owner. Without limitation to any other provision of the agreement between the Contractor and the Owner, the Contractor shall use its best efforts to minimize any interference with the occupancy of areas, buildings, entrances, and parking areas in and around the premises at which work is being performed. Free access to fire hydrants and standpipe connections shall be maintained at all times during construction operations, and portable fire extinguishers shall be provided by the Contractor and made conveniently available throughout the construction site.

3. The Owner and the Architect, shall designate locations at the site at which the Contractor, its subcontractors and employees may utilize in connection with its work. The Contractor's employees and the employees of the Contractor's Subcontractors and others

engaged by the Contractor to perform its work are prohibited from trespassing or leaving any vehicle on any property not assigned by the Owner as set aside for the use of the Contractor. The Contractor's employees and the employees of the Contractor's Subcontractors and other engaged by the Contractor to perform its work are restricted to the immediate area at which work is to be performed. Only persons having official business will be admitted to the construction site. NO COMMUNICATION BETWEEN THE CONTRACTOR, ITS EMPLOYEES, SUBCONTRACTORS' EMPLOYEES, OR OTHERS ENGAGED BY THE CONTRACTOR FOR THE PERFORMANCE OF ITS WORK AND STUDENTS OR STAFF WILL BE PERMITTED.

4. The Contractor, its employees, its Subcontractors and their employees or agents, and all others engaged by the Contractor in connection with the performance of its work are required to wear photographic identification badges at all times. The Contractor shall provide such individuals with said photographic identification badges. These badges shall be worn so as to be readily and easily visible. All workers and representatives of the Contractor, its subcontractors or suppliers shall wear these badges while on school property. The information on these badges shall be as prescribed by the Owner. Each person seen without a photo identification badge (or otherwise failing to comply with this requirement in the opinion of the Owner) shall be ordered to leave school property. No warnings shall be necessary. The Contractor(s) and their subcontractor(s) employing the offending person(s) shall be solely responsible for making-up and paying for any loss of production or required progress in the Work resulting from this action (including any claims by other Contractors dependent on the work of this Contractor). All parties agree that any action taken to enforce this requirement shall not be construed by any Contractor or its subcontractors or suppliers as the basis for a claim (for either time or money) for delay to the Work or to the Contractor, its Subcontractors, or Suppliers.

5. Without limitation of any other provision of the agreement between the Owner and Contractor, the Contractor shall use its best efforts to comply with all rules and regulations promulgated by the Owner in connection with the use and occupancy of the premises of the School District. The Contractor shall immediately notify the Owner in writing if during the performance of its work, the Contractor finds compliance with any portion of such rules and regulations to be impracticable, setting forth the problems of such compliance and suggesting alternative through which the same results intended by such portion of the rules and regulations can be achieved. The Owner may, in the Owner's sole discretion, adopt such suggestions, develop new alternatives or require compliance with the existing requirements of the rules and regulations.

M. No drinking of alcoholic beverages, smoking or use of controlled substances is permitted on the grounds. The Contractor shall insure that none of its or its Subcontractors, its employees, agents, and/or consultants report to the site impaired by alcohol or controlled substances. The Contractor bears the responsibility of determining if its, or its subcontractors, employees are in any way impaired and whether the safety of the public, the employees of other Contractors and their Subcontractors, the Owner, or the Architect are jeopardized. Each contractor shall provide drinking water for its own employees.

N. The Contractor's employees, representatives, agents and consultants, and all of its Subcontractors' employees, representatives, agents and consultants at the site are to refrain from using indecent language. All doing so will be removed from the site. Artwork or decoration found on vehicles belonging to Contractor or Subcontractor employees parked on or near the school property which contain indecent language or pictures shall either be covered or removed from the location.

O. The Contractor's employees, representative, agents and consultants, and all of its Subcontractors' employees, representatives, agents and consultants at the site are to wear shirts, long pants and proper footwear.

P. Each contractor shall keep the premises and surrounding area in which it is working free from accumulation of waste materials or rubbish caused by the performance of all of the work being performed on-site and in the buildings. On a daily basis at the conclusion of work on the project, each contractor shall clean the areas in which it has performed work and shall remove all waste, materials, rubbish, its tools, construction equipment, machinery and surplus materials. Each Contractor shall broom sweep all construction areas in which it has performed worked every day. The Owner shall perform an inspection each afternoon to determine that the work areas of the contractors have been properly cleaned. In the event the work areas are not cleaned, the Owner shall advise the offending contractor to provide cleaning as required herein. If any contractor fails to keep the site safe and clean within four (4) hours of being notified by the Owner, either verbally or in writing, the Owner will have the clean up work performed and back charged to the offending contractor without further notification to the Contractor. The cost of such cleaning company, together with the cost of any custodial costs of the School District, at prevailing overtime rates plus 15% will be charged to the offending contractor. Notice to field personnel shall be deemed notice to the Contractor.

Q. The Contractor shall provide ventilation of enclosed areas during construction as may be required to permit proper curing and drying out and to prevent excessive humidity, moisture and condensation. Ventilation shall be by natural or artificial means as required by conditions involved.

R. The Contractor shall be responsible for the control of chemical fumes, gases and other contaminants produced by welding, gasoline or diesel engines, roofing, paving, painting, etc. to ensure that they do not enter occupied portions of the building or air intakes.

S. The Contractor shall be responsible for ensuring that activities and materials which result in "off-gassing" of volatile organic compounds such as glues, paints, furniture, carpeting, wall covering, drapery, etc. are scheduled, cured or ventilated in accordance with manufacturers' recommendations before a space can be occupied.

T. From the commencement to the completion of the Project, the Contractor shall keep the parts of the work and the buildings free from accumulation of water no matter what the source or cause of water.



U. 1. The General Contractor shall construct temporary partitions where shown on drawings or where otherwise required for safety of the public or to prevent dust from entering occupied areas. Partitions shall be dust-proof from floor to slab or structure above (if existing condition is a drop in tile ceiling, Contractor shall remove tile and install partition to structure above). In addition to framing and sheetrock, the Contractor shall install fire resistant plastic partitions on the work area side of its work. If an access door is required, an alternating 3 layer plastic system shall be used. The door shall be a standard hollow metal door with lockset and closer. Keys shall be distributed to the Owner's other contractors, the Owner and the Architect.

2. All cutting and welding performed within an occupied building or adjacent to a window or intake vent shall be performed during off hours.

V. 1. The Contractor shall control the safe handling and storage of all welding materials, acetylene and oxygen tanks, and other equipment required for welding and cutting work at the job site. Such storage shall be in compliance with OSHA regulations.

2. Welding materials and equipment shall be removed promptly from the premises upon completion of the welding and cutting work.

W. The Contractor shall be responsible for all costs incurred by the Owner caused by false security/fire alarms set off by the Contractor. Costs shall include custodial response charges etc.

X. The Contractor shall be responsible for broken glass, and at the completion of the Work shall replace such damaged or broken glass. After damaged or broken glass has been replaced, the Contractor shall remove all labels, wash and polish both sides of all glass. In addition to general broom cleaning, the General Contractor shall perform the following final cleaning for all trades at completion of the Work:

1. Remove temporary protections;
2. Remove marks, stains, fingerprints and other soil or dirt from painted, decorated and natural finished woodwork and other Work;
3. Remove spots, plaster, soil and paint from ceramic tile, marble and other finished materials, and wash or wipe clean;
4. Clean fixtures, cabinet work and equipment, removing stains, paint, dirt and dust, and leave same in undamaged, new condition;
5. Clean aluminum in accordance with recommendations of the manufacturer; and
6. Clean all floors thoroughly in accordance with recommendations of the manufacturer.

Y. Where a contractor other than the General Contractor is the only contractor engaged to perform work, the responsibilities allocated to the General Contractor in these General Conditions shall be performed by such other contractor.

## **ARTICLE 5 SUBCONTRACTORS**

A. 1. As soon as practicable after receipt of Letter of Intent to Award, Notice to Proceed or other form of official notice of award of the Contract, but not more than ten (10) days after receipt of official notice of award of the Contract, the Contractor shall furnish the Owner and the Architect, in writing, with (1) the name, trade and subcontract amount for each Subcontractor and (2) the names of all persons or entities proposed as manufacturers of the products identified in the Specifications (including those who are to furnish materials or equipment fabricated to a special design) and, where applicable, the name of the installing Subcontractor. Copies of all Subcontractor contracts, fully executed, are to be provided to the Architect, including but not limited to all addenda, appendices, and/or exhibits including scope of work sheets. All such subcontracts shall be submitted to the Architect within ten (10) days of the Owner's award of the contract to the Contractor.

2. Upon review of the Contractor's list of Subcontractors, the Architect will advise the Contractor in writing stating whether or not the Owner or the Architect, after due investigation, accepts or rejects, any proposed Subcontractor. Subcontractors will not be acceptable unless, when requested by the Architect, evidence is furnished that the proposed subcontractor has satisfactorily completed similar subcontracts as contemplated under this prime contract, and has the necessary experience, personnel, equipment, plant, and financial ability to complete the subcontract in accordance with the intent to the Documents. As verification of financial ability, the Owner reserves the right to request and receive up to five (5) years worth of financial statements, bank references, bond/insurance company references and all other information required to assess financial ability.

3. If the Owner or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner and Architect have no objection. No increase in the Contract Sum shall be allowed where a sub-contractor is rejected by the Architect or Owner who is (1) deemed unqualified to perform the particular work subcontracted by the Contractor, (2) does not have the necessary experience, personnel, equipment, plant and financial ability to complete the subcontract, or (3) has a history of poor performance in work of similar nature. Upon receipt of a rejection of a subcontractor by the Architect, the Contractor shall have the right to request a meeting with the Architect and the Owner to discuss the reasons it believes the subcontractor is qualified to perform the work. Upon review of such reasons, the Architect shall re-consider its determination and shall advise the Contractor of its determination upon such review. If the Architect still finds that such subcontractor does not meet the requirements above-stated, it shall advise the Contractor. The Architect's determination upon such review shall be final and binding on the Contractor and its Subcontractor and the Contractor hereby waives any and all claims it or its subcontractor might have against the Owner, and/or the Architect concerning the rejection of such Contractor and shall require its subcontractors to execute such similar waiver in its agreement with the Contractor.



4. The Contractor shall not change a Subcontractor, person or entity previously selected if the Owner or Architect makes reasonable objection to such change.

B. By appropriate agreement, the Contractor shall require each Subcontractor to be bound to the Contractor by terms of the Contractor's agreement with the Owner, and to assume toward the Contractor all the obligations and responsibilities which the Contractor, by said agreement, assumes toward the Owner and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner and Architect under the Contractor's agreement with the Owner so that subcontracting thereof will not prejudice such rights, and shall allow the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies and redress against the Contractor that the Contractor, by its agreement with the Owner, has against the Owner. However, the Subcontract agreement between the Contractor and Subcontractor shall not provide, nor shall this Agreement be deemed to provide any rights, remedies or redress by the Subcontractor(s) against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors.

C. The Contractor shall promptly notify the Owner and the Architect of any material defaults by any Subcontractors and/or whether it has terminated its agreement with any of its subcontractors for any reason.

D. The Contractor hereby assigns all of its rights in its agreements with its Subcontractor(s) and hereby does assign, transfer and set over to the Owner all of its rights and/or interests in its agreements with its Subcontractor(s), but only in the event of termination of the Contractor's agreement with the Owner pursuant to Article 17, paragraph A of these General Conditions of the Contract for Construction and only to the extent the Owner implements its rights to take such assignment of contract by notifying the Subcontractor in writing of its intention to do so. Such an assignment is subject to the prior rights of the surety, if any, obligated to the Owner pursuant to a performance bond submitted in connection with the Contractor's work.

E. If the Work in connection with a subcontract has been suspended for more than ninety (90) days after termination of the Contract by the Owner and the Owner accepts assignment of such subcontract, the Subcontractor's compensation shall not be adjusted for any increase in direct costs incurred by such Subcontractor as a result of the suspension.

F. It shall be the Contractor's responsibility, when sub-contracting any portion of his work, to arrange or group items of work under particular trades to conform with then prevailing customs of the trade, regardless of the particular Divisions and Sections of the Specifications in which the work is described.

G. All subcontracts must be in writing.

**ARTICLE 6**  
**CONTRACTOR'S USE OF DRAWINGS/SPECIFICATIONS**

A. The Agreement between the Owner and Contractor, and all documents incorporated therein by reference, including but not limited to, the drawings and project manual shall be signed by the Contractor and the Owner.

B. The intent of the agreement between the Owner and the Contractor is to include all items necessary for the proper execution and completion of the work to be performed by the Contractor. The documents comprising the agreement between the Contractor and the Owner are complementary, and what is required by one shall be as binding as if required by all.

C. 1. In the event of inconsistencies within or between parts of the agreement between the Contractor and the Owner or between the agreement between the Contractor and the Owner and applicable standards, codes and ordinances, the Contractor shall (a) provide the better quality or greater quantity of Work or (b) comply with the more stringent requirement; either or both in accordance with the Architect's interpretation.

2. On the Drawings, given dimensions shall take precedence over scaled measurements and large scale drawings over small scale drawings.

3. Before ordering any materials or performing any of its work, the Contractor and each Subcontractor shall verify measurements at the Project site and shall be responsible for the correctness of such measurements. No extra charge or compensation will be allowed on account of differences between actual dimensions and the dimensions indicated on the Drawings. Any difference which may be found shall be submitted to the Architect for resolution before proceeding with the performance of the work.

4. If a minor change in the Work is found necessary due to actual field conditions, the Contractor shall submit detailed drawings of such departure for the approval by the Architect before making the change.

5. Drawings, in general, are made to scale, but all working dimensions shall be taken from the figured dimensions or by actual measurements at the job and in no case by scaling. The Contractor shall study and compare all Drawings and verify all figures before laying out or constructing the work and shall be responsible for any and all errors in his work which might have been avoided thereby. Whether or not an error is believed to exist, deviation from the Drawings and the dimensions given thereon shall be made only after approval in writing is obtained from the Architect.

6. In the event addendum (a) are issued and contain changes to the Drawings and/or Specifications, the provisions in the addendum (a) supersede previously issued Drawings and/or Specifications.

D. Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control Contractor in dividing the work among Subcontractor or in establishing the extent of Work to be performed by any trade.

E. Unless otherwise stated in the agreement, words and abbreviations which have well-known technical or construction industry meanings are used in the agreements in accordance with such recognized meanings.

F. The Contractor, and all Subcontractors, shall refer to all of the Drawings, including those showing the work of others performing work in connection with the project, including but not limited to the General Contractor (if any), the Plumbing Contractor, the Heating, Ventilation, Air Conditioning Contractor, Electrical Contractor and other specialized trades, and to all of the Divisions of the Project Manual, and shall perform all work reasonably inferable therefrom as being necessary to produce the indicated results.

G. All indications or notations on the drawings which apply to one of a number of similar situations, materials or processes shall be deemed to apply to all such situations, materials or processes wherever they appear in the Work, except where a contrary result is clearly indicated by the drawings or project manual. All work mentioned or indicated in the drawings or project manual shall be performed by the Contractor unless it is specifically indicated therein that the work is to be performed by others.

H. The Drawings, Specifications and other documents prepared by the Architect are instruments of the Architect's service through which the Contractor's work is to be performed. The Contractor may retain one contract record set during the course of the project. Neither the Contractor nor any Subcontractor, Sub-subcontractor or material or equipment supplier shall own or claim a copyright in the Drawings, Specifications and other documents prepared by the Architect, and unless otherwise indicated the Architect shall be deemed the author of them and will retain all common law, statutory and other reserved rights, in addition to the copyright. All copies of them, except the Contractor's record set, shall be returned or suitably accounted for to the Architect, on request, upon completion of the Work.

I. The Drawings, Specifications and other documents prepared by the Architect, and copies thereof furnished to the Contractor, are for use solely with respect to this Project. They are not to be used by the Contractor or any Subcontractor, Sub-subcontractor or material or equipment supplier on other projects without the specific written consent of the Owner and Architect. The Contractor, Subcontractors, Sub-subcontractors and material or equipment suppliers are granted a limited license to use and reproduce applicable portions of the Drawings, Specifications and other documents prepared by the Architect appropriate to and for use in the performance of its work pursuant to its agreement with the Owner. All copies made under this license shall bear the statutory copyright notice, if any, shown on the Drawings, Specifications and other documents prepared by the Architect. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with this Project is not to be construed as publication in derogation of the Architect's copyright or other reserved rights.

J. The Owner shall furnish surveys describing physical characteristics of the site, upon written request of the Contractor and to the extent such survey is in existence at the time of said request, legal limitations and utility locations for the project sites. Nothing herein shall be construed as requiring the Owner to generate any document which it does not possess at the time of the request by the Contractor. In the event that the survey provided does not clearly delineate the metes and bounds of the Owner's property, the Contractor shall stop work and immediately notify the Architect and the Owner. The Contractor shall NOT proceed with its work until it receives written permission from the Owner and/or the Architect. The Contractor shall be fully responsible for all costs arising from non-compliance with this provision. Any delays associated with this provision shall not serve as a basis for a claim by the Contractor.

K. From the basic data established by the Owner, the General Contractor shall establish reference control points and complete the layout of the work. Each Contractor is responsible for utility markouts as it pertains to the scope of their work and maintain markout during work. Sketch of layout with reference points to be given to the Architect at the time of markout.

L. The Contractor shall be responsible for all measurements that may be required for execution of the work to the exact position and elevation as prescribed in the specifications, shown on the drawings, or as the same may be modified at the direction of the Architect to meet changed conditions.

M. The General Contractor shall be responsible for the establishment of points, wall and partition lines required by the various Prime Contractors and subcontractors in laying out their work.

N. Each Contractor shall furnish such stakes and other required equipment, tools and materials, and all labor as may be required in laying out any part of the work from the base lines and bench marks established by the Owner.

O. 1. The General Construction Contractor shall establish a baseline and benchmark system for each building addition, area of renovation or component using the services of a licensed professional surveyor. The surveyor(s) employed to establish this system or to extend and maintain an existing benchmark system for the work of other trades shall have not less than five years experience in performing construction surveys similar to the work they will perform for this project. The remaining Contractors and their respective subcontractors shall be responsible for extending these lines, levels and grades, and for performing all layout for their own work. The Contractor is solely responsible for any damage or loss due to incorrect extension of lines, level or grades in their layout. The Contractor and its subcontractors shall be responsible for the accuracy with respect to the layout of their work. Any discrepancies or errors in the drawings, perceived by another contractor or subcontractor shall be immediately reported to the Architect or the Owner. If any corrections are necessary, they shall be executed in accordance with the terms and provisions of these General Conditions.

2. The Contractor and its subcontractors shall be responsible to offset or to protect their markings from anything that may disturb them.

3. Every contractor shall work off the lines and elevations established and maintained as the baseline and benchmark system.

4. Each Contractor is responsible for the accuracy of his own work.

P. The Architect may require that construction work be suspended at any time when location and limit marks established by the Contractor are not reasonably adequate to permit checking completed work or the work in progress.

Q. Except for the basic building permit, the Contractor shall be responsible for securing and maintaining for the life of the project: all permits, P.E. Licenses, connection fees, inspections, etc. applicable to, or customarily secured for the work. This provision includes any permits to be issued in the name of the Contractor required for the work. Originals of all permits are to be issued in the name of the Contractor as required for the work. The Contractor shall furnish the Owner with original copies of all permits prior to the commencement of the work, and shall prominently display a copy of all permits at a location approved by the Owner.

R. The Contractor shall take field measurements and verify field conditions and shall carefully compare such field measurements and conditions and other information known to the Contractor with the Contract Documents before commencing activities. Errors, inconsistencies or omissions discovered shall be reported to the Architect at once.

S. The exactness of grades, elevations, dimensions, or locations given on any Drawings issued by the Architect, or the work installed by other contracts, is not guaranteed by the Architect or the Owner. The Contractor shall, therefore, satisfy itself as to the accuracy of all grades, elevations, dimensions, utilities and locations. In all cases of interconnection of its Work with existing or other work, it shall verify at the site all dimensions relating to such existing or other work. Any errors due to the Contractor's failure to so verify all such grades, elevations, locations or dimensions shall be promptly rectified by the Contractor without any additional cost to the Owner.

T. 1. The Contractor shall give the Architect timely notice of any additional design drawings, specifications, or instructions required to define its work in greater detail, or to permit the proper progress of its work. To the extent the Architect advises the Contractor that the existing design drawings, specifications and/or instructions given are sufficiently detailed for the Contractor to perform its work, the Architect shall be under no obligation to further clarify or define the work to be performed. In all other circumstances, the Architect shall issue a field order which responds to the request for information.

2. Requests for Information (RFIs) are for requests on clarifications or questions on contract drawings and specifications, not contract terms, scheduling items, or general correspondence, nor, as a means to describe or request approval of alternate construction means, methods or concepts or substitution of materials, systems means and methods. The Contractor

shall fill all RFIs out in accordance with the provisions of the Project Manual. Neither the Architect nor the Owner shall fill said forms out on the Contractor's behalf.

U. The Contractor shall, prior to the start of any portion of the Work:

1. review any specified construction or installation procedures, including those as may be recommended by the proposed manufacturer.
2. advise the Architect if the specified procedure(s) deviates from good construction practice.
3. advise the Architect if following said procedure(s) will affect any warranty, including the contractor's general warranty.
4. advise the Architect of any objections the Contractor may have to the specified procedure(s).
5. propose any alternative procedure(s) which the Contractor will warrant.

V. 1. To the fullest extent possible, the Contractor shall provide products of the same kind, from a single source. When two or more items of same material or equipment are required (pumps, valves, air conditioning units, etc.), they shall be of the same manufacturer. Product manufacturer uniformity does not apply to raw materials, bulk materials, pipe, tube, fittings (except flanged and grooved types), sheet metal, wire, steel bar stock, welding rods, solder, fasteners, motors for dissimilar equipment units, and similar items used in the work, except as otherwise indicated. The Contractor shall provide products which are compatible within systems and other connected items. 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.

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

3. With respect to sitework materials, all products submitted for use and incorporated into this project shall be on the Approved List of Materials and Equipment published by the NYSDOT Materials Bureau, most recent edition.

4. All products submitted for use and incorporated into this project shall be asbestos free.



W. Equivalents. In the Specifications, one or more kinds, types, brands, or manufacturers or materials are regarded as the required standard of quality and are presumed to be equal. The Contractor may select one of these items or, if the contractor desires to use any kind type, brand, or manufacturer or material other than those named in the specifications, they shall indicate in writing, and prior to award of contract, what kind, type, brand or manufacturer is included in the base bid for the specified item. The Contractor shall follow the submission requirements for substitutions as set forth in Article 6.X below.

X. 1. Substitutions. If the Contractor desires to substitute any kind, type, brand, or manufacturer of material other than those named in the Specifications, the Contractor shall indicate the desired substitution in its bid, including the following:

a. For which specified material or equipment the request for substitution is being made;

b. What kind, type, brand, or manufacturer is sought to be substituted for the specified items;

c. Written documentation evidencing that the substituted material or equipment meets or exceeds the specifications for materials and/or equipment set forth in the project manual. Such documentation shall include, but not limited to, a full explanation of the proposed substitution, together with a submittal of all supporting data including technical information, catalog cuts, warranties, test results, installation instructions, operating procedures, significant qualities of proposed substitution (e.g. performance, weight, size, durability and visual effects), and other like information necessary for a complete evaluation of the substitution. Additionally, the Contractor shall provide material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated. All such data shall be provided to the Architect and Owner at the Contractor's sole expense. The Contractor's written explanation shall also include a list of reasons the substitution is advantageous and necessary, including the benefits to the Owner and the project in the event the substitution is acceptable. Additionally, the Contractor shall submit to the Architect information describing in specific detail how the proposed substituted product differs from the quality and performance required by the base specifications, and such other information as may be required by the Owner or the Architect.

d. 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.

e. Samples, where applicable or requested.

f. 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.

g. Detailed comparison of the difference in cost between the specified product and the proposed substitution including any and all costs associated with changes or modifications needed to other parts of the work and to construction performed by the Owner and/or separate Contractors that will be necessary to accommodate proposed substitution. In the event the substitution is accepted, the Contractor proposing the use of the substitution shall bear all costs associated with said changes or modifications.

2. By making said requests in conformance with procedures established herein and elsewhere in the Project Manual, the Contractor:

a. Represents that a representative of it has personally investigated the proposed substitute product and has determined that it is equal to or superior in all respects to that specified.

b. Represents that the warranty for the substitution will be the same, or greater than, that applicable to the specified product.

c. Certifies that the cost data is complete and includes all related costs under this contract, including professional services necessary and/or required for the architect and engineers to implement said substitution and waives any and all claims for additional costs related to the substitution which subsequently become apparent.

d. Represents that it will coordinate the installation of the accepted substitute, making all such changes to the drawings effected by the change, including but not limited to the electrical, plumbing, site work and heating and ventilating specifications as may be required for the work to be complete in all respects.

e. An affidavit stating that (1) the proposed substitution conforms and meets all the requirements of the pertinent Specifications and the requirements shown on the Drawings and (2) the Contractor accepts the warranty and correction obligations in connection with the proposed substitution as if originally specified by the Architect; and the proposed substitution will have no effect on the construction schedule.

3. Proposals for substitutions shall be with the Contractor's bid.

4. No substitutions will be considered or allowed without the Contractor's submittal of complete substantiating data and information as stated hereinbefore.



5. All proposed substitutions shall be submitted to the Architect within twenty one (21) days of the award of the contract to the Contractor. *(This provision 6(W)(5) shall not apply to equivalents.)*

Y. 1. Submittal of shop drawings, product data, material safety data sheets, samples or similar submittals shall be in accordance with the provisions of the project manual.

2. The Contractor represents and warrants that all shop drawings have been prepared by persons and entities possessing expertise and experience in the trade for which the shop drawing is prepared and, if required by the Architect or applicable law, by a licensed engineer, job specific, reviewed by Contractor and stamped by the Contractor.

3. If the Contractor elects to perform its work without approvals, such work shall be at the Contractor's own risk and expense.

4. By approving and submitting shop drawings, product data, samples and similar submittals, the Contractor represents that the Contractor has determined and verified materials, field measurements and field construction criteria related thereto and has checked and coordinated the information contained within such submittals with the requirements of its work.

5. The Contractor shall not be relieved of responsibility for deviations from requirements of its work by the Architect's approval of shop drawings, product data, samples or similar submittals unless the Contractor has specifically informed the Architect in writing of such deviation at the time of submittal and the Architect has given written approval to the specific deviation. The Contractor shall not be relieved of responsibility for errors and/or omissions in the shop drawings, product data, samples or other of its submittals to the Architect, by the Architect's approval thereof.

6. The Architect shall review, approve, reject or take other appropriate action respecting submittals made by the Contractor as set forth in the Project Manual. The Architect shall check for conformance with information given in the drawings and project manual and the design concept expressed in the agreement between the Owner and the Contractor. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities or for substantiating instructions for installation or performance of equipment or systems designed by the Contractor, all of which remain the responsibility of the Contractor. Further, the Architect's review shall not constitute approval of safety precautions or, unless otherwise specifically stated by the Architect, of construction means, methods, techniques, sequences or procedures.

The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component. When professional certification of performance characteristics of materials, systems or equipment is required by the Contract Documents, the Architect shall be

entitled to rely upon such certification to establish that the materials, systems or equipment will meet the performance criteria required by the Contract Documents.

7. Upon the Architect's rejection of the Contractor's shop drawings, product data, samples and/or other documentation submitted by the Contractor to the Architect, the Contractor shall review the rejection and re-submit such shop drawing, product data, sample and or other document in accordance with the Architect's instruction. The Contractor shall direct the Architect's specific attention in writing or on re-submitted shop drawings, product data, samples, or similar submittals, to revision which have been made, including revisions not specifically requested by the Architect. Resubmission of rejected documents shall be performed within ten (10) calendar days. No claim for delay or cost shall be accepted as a result of rejected documents.

8. When professional certification of performance criteria of materials, systems or equipment is required of the Contractor, the Architect shall be entitled to rely in a reasonable and professional fashion upon the accuracy and completeness of such calculations and certifications provided, however, if the Architect, in its reasonable and professional judgment considers it advisable, the Architect shall verify the accuracy and completeness of any and all such calculations and/or certifications. In the event any and all such calculations and/or certifications are found to be inaccurate and/or incomplete by the Architect, the Contractor shall assume full responsibility and bear all costs attributable or related thereto, including, without limitation, the expense of the Architect's additional services associated with the verification of such calculations and/or certifications and the expense of the Architect's additional service made necessary by the failure of such calculations and/or certifications to be accurate or complete.

9. If the Architect is required to review the Contractor's submittal more than twice, the Contractor shall bear the cost and expense associated with such additional review as set forth in the Project Manual.

Z. The Architect will interpret and decide matters concerning performance under and requirements of the drawings and/or technical specifications on written request of the Contractor. Such interpretations may, at the Architect's option, be issued in the form of additional drawings or instructions indicating in greater detail the construction or design of the various parts of the Contractor's work. Such drawings or instructions may be forwarded by the Architect to the Contractor by field order, construction change directive or other notice to the Contractor. The Contractor shall execute the work for which it requested an interpretation in accordance with such additional drawings or instructions without additional cost or extension of its contract time. After a decision has been rendered by the Architect on a matter for which the Contractor sought the Architect's interpretation of the drawings and/or technical specifications, the Contractor shall proceed with the work as directed by the Architect. Failure to proceed with the work in accordance with the Architect's interpretation may be used as a basis for termination of the Contractor's contract pursuant to Article 17 of these General Conditions.

AA. The Contractor shall maintain at the site one record copy of the Drawings, Specifications, Addenda, Change Orders and other Modifications, in good order and marked currently to record changes and selections made during construction, and in addition approved Shop Drawings,

Product Data, Samples and similar required submittals. These shall be available to the Architect and the Owner and shall be delivered to the Architect for submittal to the Owner upon the completion of its work.

BB. The Contractor shall maintain at the site, and shall make available to the Owner and the Architect, one record copy of the Drawings (the "Record Drawings") in good order. The Record Drawings shall be prepared and updated during the prosecution of the Contractor's work. The prints for Record Drawing use will be a set of black line prints provided by the Architect to the Contractor at the start of construction. The Contractor shall maintain said set in good condition and shall use colored pencils to mark up said set with "record information" in a legible manner to show: (i) deviations from the Drawings made during construction; (ii) details in the work not previously shown; (iii) changes to existing conditions or existing conditions found to differ from those shown on any existing drawings; (iv) the actual installed position of equipment, piping, conduits, light switches, electric fixtures, circuiting, ducts, dampers, access panels, control valves, drains, openings, and stub-outs, etc.; (v) architectural and/or structural changes in the design; and (vi) such other information as either Owner or Architect may reasonably request. At the completion of the work, Contractor shall transfer all information on record drawings to reproducible drawings with new information clouded and noted. Such drawings shall be stamped with the Contractor's name and "AS-BUILT" in the lower right hand corner. The colored record drawing and the as-built reproducible drawing shall be forwarded to the Architect for delivery to the Owner. Final payment and any retainage shall not be due and owing to Contractor until the Record and/or As Built drawings receive the approval from the Architect and the Owner (and all other closeout requirements are met).

CC. The Contractor shall maintain all approved permit drawings in a manner so as to make them accessible to government inspectors and other authorized agencies. All approved drawings shall be wrapped, marked and delivered to the Owner within sixty (60) days of final completion of the Contractor's work.

DD. Each Prime Contractor shall be furnished, free of charge, 3 copies of the Contract Documents and Project Manuals, including all Addenda. Any and all additional copies will be furnished to the Contractor at the cost of reproduction, postage and handling.

## **ARTICLE 7**

### **CONTRACTOR'S SAFETY/SECURITY PROGRAM**

A. 1. The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of its work. Prior to beginning any work, the contractor shall submit a copy of its corporate safety plan to the Owner and the Architect. Two (2) weeks after receipt of the Notice to Proceed, the Contractor shall provide a Site Safety/Logistics Plan to the Owner and the Architect. The site logistics plan should minimally include locations of the eight-foot high temporary fence and gates, traffic plans for deliveries and removals, refuse container locations, crane locations, pick locations, boom radius, and lift locations, stockpiles, toilet locations, site water and power locations, and safety. This plan shall also show the location of all staging and storage areas, clearly separating

construction and school areas. The logistical information represented by the construction documents shall serve as a minimal guide. Each contractor is required to submit their corporate safety policy within ten (10) days of receipt of the Notice to Proceed. Said policy must minimally meet OSHA standards and define details concerning the maintenance of a safe work environment. The Contractor shall make the participation of its subcontractors in its safety program mandatory. A list of key personnel, with addresses and telephone numbers for emergency purposes shall be forwarded to the Owner and the Architect. The Owner and the Architect shall establish a fire coordination procedure and shall forward same to the Contractor for its use during the performance of its work.

2. All laborers, workers, and mechanics employed in the performance of the work of this Project shall be certified as having successfully completed a course in construction safety and health approved by the United States Department of Labor's Occupational Safety and Health Administration that is at least ten (10) hours in duration.

The Contractor and its subcontractors shall conduct their operation in accordance with the Safety Guides for Construction as issued by the SED, and, the Contractors' Safety Program.

3. All safety equipment including hard hats and weather protective gear required for the Contractor to perform its work are to be supplied by the Contractor and/or its subcontractors. Within the designated construction areas, the Contractor's employees, superintendents, and/or other agents, and its subcontractors, employees, superintendents, and/or other agents are required to wear hard hats and other required and/or essential safety equipment. Each person seen without a hard hat, or otherwise failing to comply with this requirement, will be ordered to leave the project. No prior warnings will be given by the Owner or the Architect. The Contractor and its subcontractors shall be solely responsible for making up and paying for any loss of production or required progress resulting from the removal of personnel from the project as set forth herein including any costs incurred by the Owner in connection with the work of other contractors.

4. The Contractor and its subcontractors shall provide blankets and auxiliary fire protection as part of its construction safety program to prevent damage to adjacent work or materials as a result of its welding or burning operations. Additionally, as part of its construction safety program, the Contractor and its subcontractors shall provide a fire watch, with a fire extinguisher, which is acceptable to the Owner.

5. The Owner reserves the right to have all operating equipment periodically inspected by an independent inspector whose finding will be binding. The Prime Contractor, at its own expense, must make corrections within two (2) working days of receiving a written report.

6. All flagmen required for deliveries to the site are to be furnished by the Contractor or its Subcontractors responsible for the delivery. Any and all deliveries crossing the site or student traffic areas shall be escorted by flagmen. All flagmen shall wear orange vests.

B. The Contractor shall schedule weekly safety meetings and each of its subcontractors must be properly represented at such meetings. The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. The Contractor shall notify the Architect and the Owner in writing its "OSHA Competent Person Regarding Safety". Said person must be an individual capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner and Architect. The Contractor shall take all necessary steps to prevent its employees from disturbing and/or damaging the facility and shall be responsible for preventing the escape of fires set in connection with the construction. The Contractor shall notify its employees and subcontractors of the location of the nearest fire alarm box at all locations where the work is in progress. On a weekly basis, the Contractor shall submit to the Owner and the Architect minutes of its safety meetings, which minutes shall include a list of the individuals present at such meetings.

C. The Contractor and each of its subcontractors shall conduct its/their operation in accordance with all applicable laws, regulations and order of local, state and federal governments. The Contractor agrees, in order that the work will be completed with the greatest degree of safety to conform to the requirements of the Occupational Safety and Health Act of 1970 (OSHA) and the Construction Safety Act of 1969, including all standards and regulations that have been since or shall be promulgated by the governmental authorities which administer such acts.

D. The Contractor shall give notices and comply with applicable laws, ordinances, rules, regulations and lawful orders of public authorities bearing on safety of persons or property or their protection from damage, injury or loss.

E. The Contractor shall erect and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for surety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations and notifying owners and users of adjacent sites and utilities.

F. The Contractor shall take reasonable precautions for the safety and protection of employees at the project site and other person who may be affected by its work, including but not limited to students, staff, employees and agents of the Owner and the Architect.

G. The Contractor shall protect and secure its work and the materials and/or equipment to be utilized in connection with its work, whether stored on or off the site and whether in its care, custody and control or that of its Subcontractors, subcontractors to its subcontractors, or material suppliers.

H. The Contractor shall take all steps necessary to protect all property at or adjacent to the site, including but not limited to trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.



I. All delivery vehicles/trucks/machinery/etc. permitted on the site must be equipped with back-up alarms and enter through the designated access points. The Contractor's failure to demonstrate this ability will result in cancellation of delivery or stoppage of work. All delays associated with this cancellation will be the responsibility of the contractor responsible for the work involved.

J. All crane picks, materials delivery, etc. must be coordinated so as not to lift over any occupied area of the building. If absolutely necessary, this work shall be done on off hours to insure the safety of the building occupants. Crane location must approved by the Architect and the Owner to insure the safety of building occupants.

K. The Owner reserves the right to have all hoisting equipment periodically inspected by an independent inspector whose findings will be binding. The Contractor, at its own expense, must make corrections cited by the inspector before continuing work. The Owner will not assume any responsibility for the safe operation of any hoisting equipment by exercising this right. The Contractor and/or its subcontractor(s) shall cooperate with the inspector by allowing time for the inspection. The Contractor shall be notified twenty four (24) hours prior to the time of the inspection. These inspections do not release the Contractor if its responsibility to provide all engineering, permits and inspections as required by OSHA or the New York State Education Department prior to use of any hoisting equipment.

L. The Contractor shall use the entrances designated on the site logistic plans and drawings for personal vehicles, trucks, equipment, deliveries and the like.

M. All interior temporary partitions and emergency egress barriers (if required) are to be installed on an after hours basis (weekends/school holidays).

N. 1. When use or storage of hazardous materials or equipment or unusual construction methods are necessary to perform its Work, the Contractor shall obtain the Owner's and the Architect's consent for the use of such materials, equipment or unusual construction methods. In the event the Owner determines that the use of such hazardous material or equipment or unusual construction methods can be performed by the Contractor with alternative means, methods and/or techniques, the Contractor shall employ such alternate means of prosecuting its work at no additional cost to the Owner.

2. In the event the Owner approves the use or storage of such hazardous materials, equipment or unusual construction methods, the Contractor shall provide for the Owner's and the Architect's use a full set of safety instructions relating to all such materials. Additionally, when the Owner and/or the Architect reviews the use of storage of such hazardous materials, equipment and or unusual construction methods, the Contractor shall exercise the highest degree of care and carry on such activities under supervision of properly qualified personnel.

3. Transportation, storage, and use of explosives shall be in strict accordance with all local, state and federal regulations, statutes, and requirements. All safety precautions as set forth

in the "Manual of Accident Prevention in Construction" published by the Associated General Contractors of America, Inc. shall be observed.

4. The Contractor is responsible for its own storage and personnel trailers at the site. The Contractor will be required to supply man trailers and storage box trailers as required. All costs related to delivery, construction, protection, power, etc. for said trailers are the responsibility of the contractor utilizing the space. The Owner WILL NOT PROVIDE STORAGE SPACE. The placement of personnel and/or storage trailer will be strictly limited to pre-determined locations. The Contractor shall obtain the written approval of the placement of any trailer or storage box from the Owner.

O. During construction, the General Contractor shall be responsible for maintaining a watertight structure. This shall include additions and existing buildings. The contractor shall be responsible for temporary roofing, tarps and other protection at roofs, cavity walls, etc. Should the contractor fail to provide adequate protection, causing flooding, damage or other disturbance to the existing building, contractor shall be responsible for all costs associated with clean up and repairs. Inasmuch as flooding and damage have safety implications to the general public, clean up and repairs may be made by the Owner without warning to the Contractor. Administration costs incurred by the Owner and Architect will also be back charged to the Contractor. The Contractor, by entering into contract with the Owner agrees to be liable for these costs.

P. When all or a portion of the Contractor's work is suspended for any reason, the Contractor shall securely fasten down all coverings and protect the work, as necessary, from injury by any cause.

Q. 1. The Contractor shall promptly remedy damage and loss to all property of the Owner, or adjacent to the Owner's property (other than damage or loss covered by insurance) caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable, except damage or loss attributable to acts or omissions of the Owner or Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor.

2. Title to all completed or partially completed work at the job site, and to all materials delivered to and stored at said job site which are intended to become a part of the completed work covered by the agreement between the Contractor and the Owner, shall be in the name of the Owner. Notwithstanding the foregoing, and prior to acceptance of the completed work by the Owner, the Contractor shall be liable for all loss of or damage to said completed work, partially completed work, materials furnished by the Contractor, and/or materials or equipment furnished by others, the custody of which has been given to the Contractor, arising from any cause other than those against which the Owner herein undertakes to carry insurance. In the event of loss or damage from cause other than those against which the Owner undertakes to carry insurance, the Contractor shall replace or repair the said work or materials at his own cost and expense, to the complete satisfaction of the Owner and the Architect.

R. The Contractor shall promptly report in writing to the Owner and the Architect all accidents arising out of or in connection with the Work which cause death, person injury, or property damage, giving full details and statements or any witnesses. In addition, if death, serious personal injuries, or serious property damages are caused, the accident shall be reported immediately by telephone or messenger to the Owner and the Architect.

S. In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury or loss.

T. Any and all fines or citations levied against the Owner or Architect due to the failure of the Contractor to comply with regulations of any governing authority, shall be paid for by the Contractor. This shall include any interest or late charges which accrue due to the Contractor's failure to remit payment upon receipt of such levies.

U. The Contractor shall indemnify and hold harmless the Owner and the Architect from any and all claims, damages, losses, suits, obligations, fines, penalties, costs, charges and expenses which may be imposed upon or incurred by or asserted against any of them by reason of any act or omission of such Contractor or any subcontractor or any person or firm directly or indirectly or indirectly employed by such Contractor, with respect to violations of OSHA requirements, rules and/or regulations.

V. The Contractor acknowledges that the Labor Law of the State of New York, and regulations adopted thereunder, place upon both the Owner and Contractor certain duties and that liability for failure to comply therewith is imposed on both the Owner and Contractor regardless of their respective fault. The Contractor hereby agrees that, as between the Owner and the Contractor, and to the extent permitted by law, the Contractor is solely responsible for compliance with all such laws and regulations imposed for the protection of persons performing the Contract.

W. The Contractor shall indemnify and hold harmless the Owner and the Architect of and from any and all liability for violation of such laws and regulations and shall defend any claims or actions which may be brought against the Owner as the result thereof. In the event that the Contractor shall fail to refuse to defend any such action, the Contractor shall be liable to the Owner for all costs of the Owner or the Architect in defending such claim or action and all costs of the Owner, including attorney's fees, in recovering such defense costs from the Contractor.

X. The Contractor and its subcontractors shall indemnify and hold harmless the Owner and the Architect from any and all claims, damages, losses, suits, obligations, fines, penalties, costs, charges and expenses which may be imposed upon or incurred by or asserted against any of them by reason of any act or omission of such Contractor or any subcontractor or any person or firm directly or indirectly employed by such Contractor, for the act and/or omissions of any Contractor or Subcontractor that resulted in an incident and/or accident causing personal injury and/or property damage.



Y. The Owner and/or the Architect will not assume any responsibility for the safe operation of any cranes or equipment by exercising this right. The Contractor and its subcontractors shall cooperate with the inspector by allowing time for inspection. The Contractor will be notified 24 hours prior to the time of the actual inspection. The Contractor is obligated to perform all engineering, obtain permits, and to have all hoisting equipment inspected as required by OSHA, Village, Town, County, State, and Federal regulations as well as any other agency having jurisdiction. Copies of all inspection reports and certificates must be transmitted to the Architect and the Owner as soon as possible.

## **ARTICLE 8 CHANGES IN THE WORK**

A. Without invalidating the agreement between the Owner and the Contractor, and without notice to the Contractor's surety, the Owner may, at any time or from time to time, order additions, deletions or revisions in the Contractor's work. Such additions, deletions or revisions will be authorized by field order, change order, or construction change directive.

B. Field Orders are an interpretation of the contract drawings and/or specifications which order minor changes in the Contractor's work which will not result in an increase or decrease in the Contractor's total contract sum. From time to time, the Architect may issue field orders to the Contractor. The work included in such field order shall be performed by the Contractor at no additional cost to the Owner and shall not form the basis for a claim for an extension of time of the Contractor's time to complete its work. Hence, the Contractor shall perform the work included in field orders so as to cause no delay to its work and/or the work of other contractors engaged by the Owner in connection with the project. All field orders shall be given to the Contractor and the Owner by the Architect in writing.

C. 1. When the Owner or Architect request that the Contractor perform work which is not included in the contract drawings or specifications and which will result in additional cost to the Owner, the Architect shall issue a PCO Number and shall request that the Contractor submit its proposal for performing such additional work. The Contractor shall submit its proposal to the Owner and the Architect for review. The Contractor's proposal shall include a complete itemization of the costs associated with performing its work including labor and materials. All proposals for any work that a Contractor, its subcontractor(s) or subcontractor(s) of subcontractor(s) perform in connection with additional work shall be submitted using the following format and in no event shall the total for overhead and profit on any change order exceed fifteen percent (15%) of the cost of the work.

1.	Materials (Itemized Breakdown) including quantities and cost	
2.	Labor (Itemized Breakdown)	

3.	Subtotal (Add lines 1 and 2)	
4.	Credit for work not required due to additional or changes to the work reflected in the within change order (if any)	
5.	Overhead (10% x line 3)	
6.	Subtotal (Add lines 3 through 5)	
7.	Sub-Contract Work (Include itemized breakdown. Sub-Contractor(s) overhead and profit allowed is 10%)	
8.	Subtotal (Add lines 6 and 7)	
9.	Profit (5% x line 8)	
10.	Subtotal (Add lines 8 and 9)	
11.	Rental Value of Equipment (Itemized Breakdown)	
12.	Actual additional charges for bonds	
13.	TOTAL CHANGE ORDER (Add lines 10, 11 and 12)	

2. All proposals submitted by the Contractor without the itemization indicated herein will be returned to the Contractor for re-submission by the Contractor. For any work performed by the Contractor's own forces, fifteen percent (15%) for overhead and profit will be allowed for labor and material related costs. Costs to which overhead is to be applied shall be limited to cost of labor and materials including the cost of delivery. Under no circumstances shall any change order proposal exceed fifteen percent (15%) of the cost of overhead and profit.

The Contractor shall not be entitled to recover overhead and profit on the rental value of equipment and machinery. "Equipment and machinery" shall not include (1) tools customarily used by the contractor's trade, including but not limited to hand tools, and/or (2) equipment and machinery already on site and being utilized by the Contractor for the original scope of work.

The Contractor shall submit with its change order proposals actual invoices from its insurance broker reflecting actual additional costs associated with the procurement of bonds.

3. The Contractor's subcontractor's proposal for any work it is to perform in connection with the additional work shall only include ten percent (10%) for the subcontractor's overhead and profit including sub-subcontracted work. The Contractor is entitled to five percent (5%) on work performed by its subcontractor in accordance with paragraph C (1) of this Article 8. Costs to which overhead is to be applied shall be limited to cost of labor and materials including the cost of delivery. Under no circumstances shall the Contractor or the Contractor's subcontractor(s) be entitled to be reimbursed for overtime, except when specifically approved by the Owner in writing and not as an Extraordinary Measure as set forth in Article 13, and in such event the Contractor shall be paid for by the Owner on the basis of premium payment.

4. Notwithstanding the foregoing, work which is performed pursuant to an allowance included in the Contractor's base contract, the provisions of Article 9, paragraph B, concerning itemization of such work shall be controlling.

5. a. A change in the Contract Sum shall be accomplished only by a written Change Order. Accordingly, no course of conduct or dealings between the parties, nor express

or implied acceptance of alterations or additions to the Work, whether or not there is, in fact, any unjust enrichment to the Work, shall be the basis of any claim as defined in Article 18 of these General Conditions to an increase in any amounts due under the Contract Documents or a change in any time period provided for in the Contract Documents. **No amount shall be payable by the Owner to the Contractor for performance of work without a written and fully executed Change Order.**

b. Upon the Contractor's completion of the change order work, and prior to payment being made to the Contractor for such work, the Contractor shall provide the Owner with the following information:

1. Certified payrolls itemizing the labor actually utilized in connection with the change order work.
2. Copies of invoices from subcontractors supplying work in connection with the change order work.

D. 1. When the Owner or Architect request that portions of the Contractor's work originally included in the contract drawings or specifications be deleted and which will result in a reduction of the Contractor's original contract sum, the Architect shall request that the Contractor submit its proposal for deleting the scope of such work from its contract. The Contractor's proposal shall include a complete itemization of the costs associated with deducting such work including labor and materials and shall be submitted using the format set forth in Article 8, paragraph C(1) of these General Conditions of the Contract for Construction or the schedule of values, whichever is greater. The Contractor shall not be entitled to retain its overhead and/or profit for such work nor shall any of its subcontractors which were to perform the work being deducted from the Contractor's scope of work. Additionally, the Contractor shall reflect the reduced cost of premiums on bonds which are to be supplied herein as a result of such change. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase/decrease with respect to that change.

2. The Owner may in its sole discretion deduct and/or reduce the scope of the Contractor's contract with or without any specific reasons therefor.

E. 1. In the event the Contractor and the Owner cannot agree on the sum by which its contract with the Owner is to be increased or reduced based upon changes to the scope of the work as described in Article 8, the Architect shall issue a construction change directive reflecting the deduction and/or reduction of the scope of the Contractor's contract and the Contractor will (a) in the case of additional work to be performed by the Contractor, perform such additional work in an expeditious manner so as not to delay the work of this or other contractors working at the site, and (b) in the case of work to be deducted from the scope of the Contractor's work, refrain from taking any steps in connection with the work associated with the deduction and/or reduction of the scope of the Contractor's work. The construction change directive shall include (a) a description of the work being added or deducted from the Contractor's scope of work; (b)

the amount the Owner has determined to be the cost associated with the additional work or deduction and/or reduction of the scope of the Contractor's contract until the Owner and the Contractor agree upon the increase or decrease in the Contractor's contract sum, or until a claim filed by the Contractor has been determined; (c) the extent to which the contract time will be adjusted as a result of the change in the scope of work. Any claims must be filed in accordance with the requirements set forth in Article 18 of these General Conditions. Failure to timely file any claim in accordance with requirements set forth therein shall constitute a waiver of such claim.

2. In the event the Contractor and the Owner reach agreement on the amount by which the Contractor's contract sum is to be increased or decreased based upon changes to the scope of the Contractor's work as described in Article 8, the Architect, Owner and Contractor shall sign a change order reflecting such agreement. The change order shall include (a) the description of the change in the scope of the Contractor's work; (b) the amount of the adjustment to the Contractor's contract sum, if any; and (c) the length of time by which the time to complete the contract will be adjusted, if any. Agreement between the Owner and the Contractor in connection with any change order shall constitute a final settlement of all matters relating to the change in the Contractor's work as reflected in said change order, including but not limited to, all direct and indirect costs associated with such change and any and all adjustments to the Contractor's contract sum and the construction schedule. All such change orders for which the Owner and the Contractor have reached agreement shall be included as a separate line item in the Contractor's applications for payment as if originally part of the Contractor's agreement with the Owner.

F. Neither the Owner nor the Architect may issue instructions to the Contractor to change the amount of the Contract, except by properly executed Change Orders. Instructions are issued by the Owner or the Architect, to the Contractor. The instructions shall not be carried out by the Contractor prior to a written order in the form of a Change Order, signed by the Owner, Architect and Contractor, authorizing a change in the Contract amount or an adjustment to the Contract Sum. No amount shall be payable by the Owner to the Contractor for performance of work without an executed Change Order.

## **ARTICLE 9 PAYMENTS**

A. 1. Prior to commencing its work on the project and within one (1) week of receipt of a Notice to Proceed, the Contractor shall submit to the Owner and the Architect, a schedule of values which includes the amount of money it has allocated in its bid price for the following items of work which are applicable to the Contractor's work. Said schedule of values shall include each of the CSI division sections reflected in the specifications and applicable to the contract for which the Contractor has been awarded the contract, together with the requirements for bonds/insurance (based upon actual invoice amount), general conditions, meeting attendance and meeting documentation (at least two (2) percent of the contract sum), shop drawing/product data/sample submissions (at least one (1) percent of contract sum), labor and materials on line items as applicable, temporary utilities and services, HVAC balance reports, coordination

drawings, punchlist (at least one (1) percent of the contract sum), warranties/guarantees and close out of the project (at least three (3) percent of the contract sum), and allowance, where applicable.

2. Any schedule of values which fails to include sufficient detail, is unbalanced or exhibits "front loading" of the value of the Contractor's work will be rejected. Furthermore, if the schedule of values has been approved by the Owner and the Architect and is subsequently used, but later is found by the Owner or the Architect to be improper for any reason, sufficient funds shall be withheld from the Contractors' future applications for payment to ensure an adequate reserve (exclusive of normal retainage) to complete the Contractor's work.

3. The schedule of values shall be drafted so as to reflect multiple construction sites, multiple locations within each site, additions versus renovations of work, and the like so as to satisfy any New York State Education Department requirements for the project.

4. The Schedule of Values prepared by the Contractor must be approved by the Owner and the Architect prior to the payment of any sums due the Contractor.

B. The Contractor shall include in its contract sum all allowances stated in the specifications. However, the Contractor's costs for unloading and handling at the site, overhead, profit and other expenses contemplated for the stated allowance amounts shall be included in its contract sum and not in the allowances.

C. The Contractor shall submit its applications for payment to the Architect on a periodic basis. The form to be used by the Contractor shall be AIA 702 and 703 approved by the Architect and the Owner for use in connection with the Contractor's work. The form shall be divided in sufficiently in the same form as the Contractor's schedule of values and shall reflect in separate line items for the work:

1. Total value of the work listing labor and material separately
2. Percentage of work completed at the time of submission of the application for payment
3. Value of the work completed at the time of submission of the application for payment
4. Percent of previous amount billed
5. Previous amount billed
6. Current percent completed;
7. Value of work completed to date
8. Percent remaining to be completed by the Contractor; and
9. Value of work remaining to be completed by the Contractor

D. 1. Payments to the Contractor shall be based upon materials and equipment delivered and suitably stored at the site and/or incorporated into the Contractor's work, together with the labor utilized by the Contractor in connection with its work. The Contractor may be paid for materials and/or equipment which has been delivered to the Owner's facilities but which, at the time of submission of its application for payment, has not yet been incorporated

into the Contractor's work upon such conditions and requirements as the Owner and/or the Architect may advise the Contractor it must satisfy.

2. The Architect shall review the application for payment submitted by the Contractor and shall advise the Contractor of any adjustments to be made thereto. The Architect may make such adjustments under the following circumstances:

- a. the Contractor's failure to remedy defective work;
- b. the filing of third party claims or reasonable evidence that there is a probability that such claims will be filed;
- c. receipt by the Owner of a notice of withholding from the New York State Department of Labor or other administrative agencies having jurisdiction over the project;
- d. the Contractor's failure to make proper payments to its subcontractors or material suppliers for labor, materials and/or equipment;
- e. reasonable evidence that the Contractor will not complete its work for the unpaid balance of the remaining monies on its contract;
- f. damages caused to the Owner, the Architect or another contractor as a result of the Contractor's performance of its work;
- g. reasonable evidence that the Contractor will not complete its work in accordance with its agreement with the Owner, and/or that the remaining monies available on the Contractor's contract will not be sufficient to cover actual or liquidated damages for the anticipated delay;
- h. the Contractor's failure to carry out its work in accordance with the contract drawings and/or specifications;
- i. the Contractor's failure to notify the Architect of errors or inconsistencies between and among the contract drawings and specifications;
- j. the Contractor's and/or its subcontractors' failure to comply with the requirements for maintaining record drawings;
- k. the Architect's discovery or observation of work which has been previously paid for by the Owner which is defective and/or incomplete;
- l. such other acts and/or omissions by the Contractor in connection with the performance of its work.



m. The amount requested exceeds the percent completion of work on the site.

3. After any such adjustments are made to the Contractor's application for payment, the Contractor shall submit four (4) copies of the final draft of its application for payment to the Architect, which shall be accompanied by the following documentation:

- a. A current Contractor's lien waiver and duly executed and acknowledged sworn statement showing all Subcontractors and material suppliers with whom the Contractor has entered into subcontracts, the amount of each such subcontract, the amount requested for any Subcontractor and material suppliers in the requested progress payment and the amount to be paid to the Contractor from such progress payment, together with similar sworn statements from all such Subcontractors and material suppliers;
- b. Duly executed waivers of public improvement liens from all Subcontractors and material suppliers and lower tiered Subcontractors or material suppliers establishing payment or satisfaction of payment of all amounts requested by the Contractor on behalf of such entities or persons in any previous Application for Payment; and AIA Form G706 or G706A.
- c. Certified payroll for employees of the Contractor and employees of subcontractors performing work on the Project.
- d. Copies of invoices submitted to the Contractor by its subcontractors and/or material suppliers.
- e. Such other information which the Owner and/or the Architect request the Contractor furnish in connection with its application for payment, including but not limited to, contractor change order log, contractor submittal log and as built drawings to date.

4. Upon submission of its application for payment, the Contractor represents that it is entitled to payment in the amount for which it seeks payment.

5. In addition to the right to make adjustments to the amount the Contractor claims is due it (as set forth in paragraph 3 of this paragraph (2)), the Owner may withhold payment from the Contractor and/or may withhold certification for payment, if any of the reasons set forth in paragraph 3 exist.

6. The Owner shall make payment to the Contractor within forty-five days of receipt of the Contractor's requisition of payment unless such requisition of payment is not in accordance with the terms of the Construction Documents.

7. Upon receipt of payment by the Owner, the Contractor shall promptly make payment to each of its subcontractors and/or material suppliers for which it has received payment from the Owner. This provision does not obligate the Architect and/or the Owner to ensure payment to the Contractor's subcontractors and/or material suppliers.

8. a. In the event a subcontractor and/or material supplier files with the Owner a public improvement lien, the Owner shall withhold payment on previously certified applications for payment which have not yet been paid or subsequent applications for payment submitted by the Contractor an amount equal to 150% of the amount set forth in such public improvement lien. This provision is in addition to and does not supersede the indemnity provisions set forth in Article 12 of these General Conditions.

b. The Owner may release any payment withheld due to the filing of a public improvement lien if the Contractor obtains security acceptable to the Owner or a lien bond which is: (1) issued by a surety acceptable to the Owner, (2) in form and substance satisfactory to the Owner, and (3) in an amount not less the 150% of such lien claim. The cost of the premiums for any such bond posted shall be borne solely by the Contractor. By posting a lien bond or other acceptable security, however, the Contractor shall not be relieved of its obligations pursuant to these General Conditions, including but not limited to the indemnity provisions set forth in Article 12 of these General Conditions.

E. 1. The Contractor shall not be entitled to payment for materials and/or equipment stored off the site unless previously approved in writing by the Owner and/or the Architect and upon the Contractor meeting any and all conditions which the Owner and/or the Architect may impose in connection with such materials and/or equipment, including but not limited to insurance for such materials and cost of storage and transportation associated with such materials and/or equipment. No payment will be made for "commodity type" stored materials such as block, studs, sheetrock, roofing, insulation, piping, fittings, conduit work, etc.

2. In connection with materials and/or equipment stored off the project site, the Contractor must submit with its application for payment the following information:

- a. Type of material must be specifically identified by the Contractor;
- b. The Contractor must furnish an invoice from its supplier showing the total value of material and/or equipment being stored off site and must provide the bill of lading for such material and/or equipment;
- c. The Contractor must provide a Certificate of Insurance in a form approved by the Owner for the full value of the item plus 10%.



- d. The Contractor must execute a security agreement, together with an executed UCC-1 form;
- e. The materials must be stored in a bonded warehouse;
- f. The Contractor must furnish a bill of sale for stored material and/or equipment;

Contractor still has liability for all materials whether paid or not until installed.

3. Any and all materials and/or equipment for which the Contractor has been paid shall be titled in the Owner upon installation by the Contractor and shall be stored in a bonded facility. For payment to be made to the Contractor, the Contractor must provide the Owner with a waiver of lien and general release from its supplier in connection with its provisions of such materials and/or equipment. Notwithstanding payment by the Owner, any and all warranties and/or guarantees required by this agreement shall not begin to run until the Contractor has completed all of its work.

4. Prior to payment by the Owner, the Contractor may be required to provide the Architect with an opportunity to visually inspect the materials and/or equipment for the purpose of determining that such materials are in fact in storage, are the materials specified for the Contractor's work and for any other purpose which the Owner and/or Architect deem necessary for payment to be made to the Contractor.

F. If the Owner is entitled to reimbursement or payment from the Contractor under or pursuant to its agreement with the Owner, including but not limited to these General Conditions of the Contract for Construction, such payment shall be made promptly upon demand by the Owner. Notwithstanding anything contained herein to the contrary, if the Contractor fails to promptly make any payment due the Owner, or the Owner incurs any costs and expenses to cure any default of the Contractor or to correct defective work, the Owner shall have an absolute right to offset such amount against the Contract Sum and may, in the Owner's sole discretion, elect either to: (1) deduct an amount equal to that which the Owner is entitled from any payment then or thereafter due the Contractor from the Owner, or (2) issue a written notice to the Contractor reducing the Contractor's contract sum by an amount equal to that which the Owner is entitled.

G. The Contractor may not assign any monies due or to become due to it pursuant to its agreement with the Owner without the Owner's written consent. Any such assignment shall be in a form acceptable to the Owner. If the Contractor attempts to make such an assignment without such consent from the Owner, the Contractor shall nevertheless remain legally responsible for all obligations under its agreement with the Owner.

H. Progress payments and all other payments shall be made in accordance with Section 106 (b) of the General Municipal Law.

I. At the same time the Contractor submits its insurance certificate to the Owner and the Architect, it shall also submit to the Owner and the Architect the labor rates of each category of labor for which it and/or its subcontractors shall employ (either directly or indirectly).

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This information shall be itemized in the format shown below:

Contractor's Name					
Contractor's Address					
Contractor's Office Phone					
Contractor's Fax Number					
Contractor's Email Address					
<b>Labor Rate Breakdown</b>					
Worker's Title		<b>Journeyman</b>	<b>1.5 Rate</b>	<b>Foreman</b>	<b>1.5 Rate</b>
Base Hourly Rate					
<b>Payroll Tax &amp; Insurance:</b>	<b>\$ Per Hr.</b>				
FICA					
Federal Unemployment					
State					
Workers Compensation					
Disability					
Other (Explanation Required)					
<b>Subtotal</b>					
<b>Benefits:</b>	<b>\$ Per Hr</b>				
Vacation					
Health & Welfare					
Pension					
Annuity					
401K Fund					
Other (Explanation Required)					
Other Explanation Required)					
<b>Subtotal</b>					
<b>Hourly Labor Rate</b>					

## ARTICLE 10 INSURANCE REQUIREMENTS

A. Within ten (10) days of the award of the bid, the Contractor, at its sole cost and expense, shall provide the Owner with the following insurance coverage whether the operations to be covered thereby are through the Contractor or by a Subcontractor, or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

1. Workers' Compensation and Disability:

Coverage	Statutory
Extensions	Voluntary compensation All states coverage employers Employer's liability - unlimited

2. Commercial General and Umbrella Liability

Coverage	Occurrence using ISO occurrence Form CG 00 01 07 98 or later form
Limits per project	General Aggregate - \$2,000,000.00 on a per project basis  Products/Completed Operations - \$2,000,000.00  Personal & Advertising Injury - \$1,000,000.00  Fire Damage (any one fire) - \$100,000.00  Medical Expenses (any one person) - \$10,000.00

3. Owners and Contractors Protective Liability Insurance:

- a. \$2,000,000 per occurrence, \$4,000,000 general aggregate for contracts greater than \$1,000,000, or any contracts involving scaffolds or work above a height of one story.
- b. \$1,000,000 per occurrence, \$2,000,000 general aggregate for contracts less than or equal to \$1,000,000 that do not involve scaffolds or work above a height of one story.

Excess Liability (excess coverage shall be on a follow-form basis):

- a. \$10,000,000 for contracts greater than \$1,000,000, or any contracts involving scaffolds or work above a height of one story
- b. \$5,000,000 for contracts less than or equal to \$1,000,000 that do not involve scaffolds or work above a height of one story.

- 4. Automobile Liability  
(all vehicles hired  
or non hired)

\$1,000,000.00 per accident

- 5. If this project requires the removal of asbestos and/or hazardous materials, Contractors shall provide hazardous material liability insurance as follows:

\$2,000,000 per occurrence/\$2,000,000 aggregate, including products and completed operations. Such insurance shall include coverage for the Contractor's operations including, but not limited to, removal, replacement enclosure, encapsulation and/or disposal of asbestos, or any other hazardous material, along with any related pollution events, including coverage for third-party liability claims for bodily injury, property damage and clean-up costs. If a retroactive date is used, it shall pre-date the inception of the Contract. If motor vehicles are used for transporting hazardous materials, the Contractor shall provide pollution liability broadened coverage (ISO endorsement CA 9948), as well as proof of MCS 90. Coverage shall fulfill all requirements of this Article 10 and shall extend for a period of three (3) years following acceptance by the District of the Certificate of Completion.

- 6. Testing Company Errors and Omission Insurance

\$1,000,000 per occurrence/\$2,000,000 aggregate for the testing and other professional acts of the Contractor performed under the Contract with the Owner.

Notwithstanding any terms, conditions or provisions, in any other writing between the parties, Contractor hereby agrees to effectuate the naming of the Owner as an additional insured on the Contractor's commercial general liability and excess liability insurance policies. If the policy is written on a claims-made basis, the retroactive date must precede the date of the contract.

- a. The policy naming the Owner as an additional insured shall:
  - i. Be an insurance policy from an A.M. Best rated "Secure" insurer, licensed in New York State.

- ii. State that the coverage shall be primary and non-contributory coverage for the District, its Board, employees and volunteers.
- b. The Owner and Architect shall be listed as an additional insured by using endorsement CG 2038 or equivalent. The decision to accept an alternative endorsement rests solely with the Owner. A completed copy of the endorsement must be attached to the certificate of insurance.
- c. The certificate of insurance must describe the work that is covered by the liability policies.
- d. At the Owner's request, the Contractor shall provide a copy of the declaration page of the liability and excess policies with a list of endorsements and forms. If so requested, the Contractor will provide a copy of the policy endorsements and forms.
- e. The Contractor agrees to indemnify the Owner for any applicable deductibles and self-insured retentions.

If written on a "claims-made" basis, the retroactive date must pre-date the inception of the Contract or agreement. Coverage shall remain in effect for two years following the completion of work. The testing company shall also provide proof of Workers' Compensation and NY State Disability Benefits Insurance, Commercial General Liability and Excess Liability with limits of \$2,000,000 each occurrence and in the aggregate.

Coverages shall be maintained without interruption from the date of commencement of the work until the date of final payment and termination of any coverage required to be maintained after final payment.

B. Article 10 of the General Conditions shall remain in effect and the Contractor will be required to provide the insurance set for therein. The Contractor will be permitted to commence work on the Project with the insurance certificates currently on file with the Owner. On or before July 15 of each year, the Contractor will substitute said insurance certificates with insurance in strict compliance with Article 10. In addition to any other rights or remedies that the Owner may have in law, equity or pursuant to the General Conditions of Construction set forth in the Agreement between the Owner and the Contractor, in the event the Contractor fails to provide evidence of the insurance required by Article 10 by July 15, the Owner shall assess liquidated damages of \$1,000 for every day the Contractor fails to meet the requirements for insurance as set forth in Article 10 through final completion of the Project or the date the required insurance is submitted, whichever is earlier.

C. The insurance required to be procured by the Contractor, pursuant to paragraph A of this Article 10, shall be purchased from and maintained by an insurance carrier licensed to do business in the State of New York, with an A.M. Best Rating of "secured" or better. The Contractor must submit the Certificate of Insurance to the Architect for the Owner's approval prior to the

commencement of any work. **EXCESS OR SURPLUS LINE INSURANCE CARRIERS WILL NOT BE ACCEPTED.**

D. All insurance coverage to be provided by the Contractor, pursuant to paragraph A of this Article 10, shall include a cancellation notice to the Owner pursuant to the policy terms and conditions. All insurance coverage to be provided by the Contractor shall name the Owner and the Architect as additional insureds on the policy, with the exception of Owners Contractors Policies. Additionally, the insurance coverage to be provided by the Contractor, pursuant to paragraph A of this Article 10, shall state that the Contractor's coverage shall be the primary and non-contributory coverage for the Contractor's work. Contractors shall include a completed copy of the ACORD 855 - NY Construction Certificate of Liability, with explanations of "yes" responses to Items G through L.

E. In the event that any of the insurance coverage to be provided by the Contractor to the Owner contains a deductible, or a self-insured retention, or the insurance provided by the Owner contains a deductible, the Contractor shall indemnify and hold the Owner and the Architect harmless from the payment of such deductible or self-insured retention, which deductible shall in all circumstances remain the sole obligation and expense of the Contractor.

F. The Contractor acknowledges that its failure to obtain or keep current the insurance coverage required by paragraph A of this Article 10 shall constitute a material breach of Contract and subjects the Contractor to liability for damages, including but not limited to direct, indirect, consequential, special and such other damages the Owner sustains as a result of such breach. In addition, the Contractor shall be responsible for the indemnification to the Owner and the Architect, of any and all costs associated with such lapse in coverage, including but not limited to reasonable attorney's fees.

G. The Contractor shall require all Subcontractors to carry insurance coverages and limits of liability, as set forth in paragraph A of this Article 10 and submit same to the Owner for approval prior to start of any work. In the event the Subcontractor is unable to provide insurance by a carrier that is licensed and admitted to do business in New York, the Owner reserves the right to accept Excess or Surplus lines insurance coverage for said Subcontractor, in the Owner's sole discretion. Notwithstanding the foregoing, the Owner is under no obligation to waive the requirement that the insurance be supplied by an insurer licensed and admitted in New York. In the event the Contractor fails to obtain the required certificates of insurance from the Subcontractor and a claim is made or suffered, the Contractor shall indemnify, defend, and hold harmless the Owner, the Architect, Engineers, Consultants, and Sub-consultants and their agents or employees from any and all claims for which the required insurance would have provided coverage. This indemnity obligation is in addition to any other indemnity obligation provided in the Contract.

H. The Contractor assumes responsibility for all injury or destruction of the Contractor's materials, tools, machinery, equipment, appliances, shoring, scaffolding, false and form work, and personal property of the Contractor's employees from whatever cause arises. Any policy of insurance secured covering the Contractor or Subcontractors leased or hired by them and any

policy of insurance covering the Contractor or Subcontractors against physical loss or damage to such property shall include an endorsement waiving the right of subrogation against the Owner for any loss or damage to such property.

I. The Owner in good faith may adjust and settle a loss with the Contractor's insurance carrier.

J. The Owner and the Contractor waive all rights against each other and any of their Subcontractors, Sub-subcontractors, agents and employees for damages caused by fire or other perils to the extent of actual recovery of any insurance proceeds under any property insurance policy procured, pursuant to paragraph A of this Article 10, or other property insurance applicable to the Contractor's work.

K. Before commencement of its work, the Contractor shall obtain and pay for such insurance as may be required to comply with the indemnification and hold harmless provisions outlined under Article 12 of these General Conditions of the Contract for Construction.

L. Review and acknowledgment of the Certificate of Insurance by the Owner or the Architect shall not relieve or decrease the liability of the Contractor hereunder.

M. If the terms of policies expire, or the lives of the insurance companies terminate, before the Contract is completed or during the period of completed operations coverage, and the Contractor fails to maintain continuance of such insurance, the Owner is entitled to provide protection for itself, to pay premiums, and to charge the cost to the Contractor.

## **ARTICLE 11 REQUIRED BONDS FOR THE PROJECT**

A. Within ten (10) days of the award of the bid the Contractor shall furnish a Performance Bond and Labor and Material Payment Bond meeting all statutory requirements of the State of New York.

B. All Surety companies are subject to the approval of the Owner and may be rejected by the Owner without cause.

C. Except as otherwise required by statute, the form and substance of such bonds shall be satisfactory to the Owner in the Owner's sole judgment.

D. Bonds shall be executed by a responsible surety licensed to do business in New York with an A.M. Best Rating of "A-" or better as to Policy Holder Ratings, and "VII" or better as to "Financial Size Category." Such bonds shall remain in effect for a period not less than two (2) years following final completion of the work by the Contractor.



E. Bonds shall further be executed by a surety that is currently listed on the U.S. Treasury Department Circular 570 entitled "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies," as amended.

F. The Performance Bond and the Labor and Material Payment Bond shall each be in an amount equal to 100% of the Contract Sum. The value of each bond shall be adjusted during the Project construction period to reflect changes in the Contract Sum.

G. Every Bond must display the Surety's Bond Number.

H. Each bond must be accompanied by an original Power of Attorney, giving the names of Attorneys-in-fact, and the extent of their bonding capacity.

I. A rider including the following provisions shall be attached to each Bond:

1. Surety hereby agrees that it consents to and waives notice of any addition, alteration, omission, change, or other modification of the Contract Documents. Such addition, alteration, change, extension of time, or other modification of the Contract Documents, or a forbearance on the part of either the Owner or the Contractor to the other, shall not release the Surety of its obligations hereunder and notice to the Surety of such matters is hereby waived.
2. Surety further agrees that in event of any default by the Owner in the performance of the Owner's obligations to the Contractor under the Contract, the Contractor or Surety shall cause written notice of such default (specifying said default in detail) to be given to the Owner, and the Owner shall have thirty (30) days from time after receipt of such notice within which to cure such default, or such additional reasonable period of time as may be required if the nature of such default is such that it cannot be cured within thirty (30) days. Such Notice of Default shall be sent by certified or registered U.S. Mail, return receipt requested, first class postage prepaid, to Lender and the Owner.
3. Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and shall be instituted within three years after termination by the Owner of the Contractor's contract or within three years after final completion by the Contractor. In the event the Contractor files for bankruptcy, the commencement of the three year period shall not start to run until the bankruptcy proceeding is finalized or the Owner obtains relief from an automatic stay, whichever is later.

J. The Contractor shall deliver the required bonds to the Owner prior to beginning construction activity at the site, but no later than 10 days of issue date of Notice of Award of Contract. Said bonds shall be in the form set forth in the Project Manual. No work shall be performed by the Contractor until such bonds have been reviewed and approved.

K. The Owner may, in the Owner's sole discretion and without prior notice to the Contractor, inform surety of the progress of the Contractor's work and obtain consents as necessary to protect the Owner's rights, interest, privileges and benefits under and pursuant to any bond issued in connection with the Contractor's work.

L. If the surety on any Bond furnished by Contractor is declared a bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the Project is located or it ceases to meet the requirements of this Article, the Contractor shall within ten (10) days thereafter substitute another Performance and Payment Bond and surety, both of which must be acceptable to the Owner.

## **ARTICLE 12 INDEMNIFICATION**

A. The Contractor and its subcontractors shall indemnify and hold harmless (1) the Owner, its consultants, employees, officers and agents, and (2) the Architect and its consultants, employees, officers and agents, and any of their respective employees, or agents from and against any and all claims, damages, losses, suits, obligations, fines, penalties, costs, charges and expenses, including but not limited to attorneys' fees, which may be imposed upon or incurred by or asserted against any of them by reason of any act or omission of such Contractor or any of its subcontractors or any person or firm directly or indirectly employed by such Contractor, for the act(s) and/or omission(s) of any Contractor or Subcontractor in connection with the work of the Project.

B. To the fullest extent permitted by law, the Contractor and its subcontractors shall indemnify and hold harmless (1) the Owner, its consultants, employees, officers and agents, and (2) the Architect and its consultants, employees, officers and agents, and any of their respective employees, or agents from and against claims, damages, losses and expenses including but not limited to attorneys' fees, arising out of or resulting from performance of its work, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction, of tangible property including loss of use resulting therefrom, but only to the extent caused in whole or in part by negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity which would otherwise exist as to a party or person described in this Paragraph B. The Contractor's indemnity obligations under this Paragraph B shall, but not by way of limitation, specifically include all claims and judgments which may be made against the Owner, the Architect, the Architect's consultants and agents and employees of any of them under any applicable statute, rule or regulation including the New York Statute, Occupational Safety and Hazardous Act, and the Federal Occupational Safety and Hazardous Act. In claims against any person or entity indemnified under this Paragraph B by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under this Paragraph B

shall not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for the Contractor or a Subcontractor under workers' or workmen's compensation acts, disability benefit acts or other employee benefit acts.

C. The Contractor and its subcontractors shall indemnify and hold harmless (1) the Owner, its consultants, employees, officers and agents, and (2) the Architect and its consultants, employees, officers and agents, and any of their respective employees or agents against any fines, penalties, judgments, or damages, including reasonable attorney's fees, imposed on or incurred by the parties indemnified hereunder which are incurred as a result of the Contractor's failure to give the notices required by Article 6(T) of these General Conditions of the Contract for Construction.

D. The Contractor and its subcontractors shall indemnify and hold harmless (1) the Owner, its consultants, employees, officers and agents, and (2) the Architect and its consultants, employees, officers and agents, and any of their respective employees or agents against any actions, lawsuits or proceedings or claims of liens brought against each or any of them as a result of liens filed against the Contractor's project funds, including all the cost and expense of said liens, and including but not limited to attorneys' fees incurred by each or any of them.

E. The Contractor and its subcontractors shall indemnify and hold harmless (1) the Owner, its consultants, employees, officers and agents, and (2) the Architect and its consultants, employees, officers and agents, and any of their respective employees or agents of and from any and all liability for violation of any laws and regulations applicable to the Contractor's work and shall defend any claims or actions which may be brought against the Owner as the result thereof. In the event that the Contractor shall fail to refuse to defend any such action, the Contractor shall be liable to the Owner for all costs of the Owner in defending such claim or action and all costs of the Owner, including attorney's fees, in recovering such defense costs from the Contractor.

F. The Contractor and its subcontractors shall indemnify and hold harmless (1) the Owner, its consultants, employees, officers and agents, and (2) the Architect and its consultants, employees, officers and agents, and any of their respective employees or agents of and from any and all liability for claims made by third parties, including subcontractors, in connection with this Agreement and shall defend any claims or actions which may be brought against the Owner as the result thereof. In the event that the Contractor shall fail to refuse to defend any such action, the Contractor shall be liable to the Owner for all costs of the Owner in defending such claim or action and all costs of the Owner, including attorney's fees, in recovering such defense costs from the Contractor.

G. The indemnification obligations set forth herein shall become effective upon the Owner's or the Architect's receipt of a claim for which the Contractor is required to provide indemnification to the Owner or the Architect. In the event the Owner or the Architect is required to bring an action to enforce the indemnification obligation, the Contractor shall be liable to the Owner and/or the Architect for all costs associated with said action including attorneys' fees.

## **ARTICLE 13**

### **TIME FOR COMPLETION OF WORK**

A. The date of commencement of the Contractor's work shall be as indicated in the agreement between the Contractor and the Owner. The date shall not be postponed or extended by the failure to act of the Contractor or of persons or entities for whom the Contractor is responsible to act. Time limits stated in the agreement between the Owner and the Contractor are of the essence of the Contract. By executing the Agreement the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

B. The Contractor shall not commence work on the site until two certified copies of all insurance policies and bonds required by Article 10 and Article 11 of these General Conditions of the Contract for Construction are provided to the Owner and accepted by the Owner. The date of commencement and/or completion of the Contractor's work shall not be changed by the effective date of such insurance. The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, prematurely commence operations on the site or elsewhere prior to the acceptance of the insurance and bonds required by Article 10 and Article 11 of these General Conditions.

C. The Contractor shall proceed expeditiously with adequate forces and shall achieve substantial completion of its contract in accordance with the schedule set forth in its agreement. The Contractor shall cooperate with the Owner, Architect and other Contractors on the Project, making every reasonable effort to reduce the contract time.

D. 1. In the event the Owner determines that the performance of the Contractor's work, as of a milestone date, has not progressed or reached the level of completion required by its contract, the Owner shall have the right to order the Contractor to take corrective measures necessary to expedite the progress of construction, including, without limitation, (1) working additional shifts or overtime, (2) supplying additional manpower, equipment, and facilities and (3) other similar measures (hereinafter referred to collectively as "Extraordinary Measures"). Such Extraordinary Measures shall continue until the Contractor progresses its work in compliance with the stage of completion required by its agreement with the Owner. The Owner's right to require Extraordinary Measures is solely for the purpose of ensuring the Contractor's compliance with the construction schedule.

2. The Contractor shall not be entitled to an adjustment in its contract sum in connection with Extraordinary Measures ordered by the Owner under or pursuant to this Paragraph D.

3. The Owner may exercise the rights furnished the Owner under or pursuant to this Paragraph D as frequently as the Owner deems necessary to ensure that the Contractor's performance of its work will comply with any Milestone Date or completion date set forth in the Contractor's agreement with it.

4. The Owner reserves the right to withhold payment from the Contractor until such time as the Contractor submits a daily schedule showing work to be again on schedule with the Construction Schedule and/or until its work is being installed according to the project construction schedule, without additional cost to the Owner.

E. The Contractor shall achieve substantial completion of its work in accordance with the schedule for the work set forth in the project manual included as part of its agreement with the Owner. Milestone Dates are dates critical to the Owner's operations that establish when a part of the work is to commence or be complete. All Milestone Dates are of the essence and shall have the same meaning as Substantial Completion for the purpose of Liquidated Damages in this Article 13.

F. Substantial completion shall be achieved by the Contractor when the Contractor has completed ninety eight (98%) of its work. Work remaining to be completed after substantial completion shall be limited to items which can ordinarily be completed within the period between the payment at the time of substantial completion and final payment.

G. 1. This project is to be physically completed in accordance with the time limits set forth in the agreement between the Owner and Contractor and as further set forth in the project manual and/or bidding documents. Liquidated damages will be assessed in the amount of \$1,000.00 for each and every calendar day after such time allowed for completion.

2. Contractor realizes that time is of the essence on this Contract and the completion date and milestone date for each work item in its agreement, a Milestone Date reflected on the project schedule, or the date of substantial completion of the Contractor's work shall be no later than the date indicated therein. In the event the Contractor fails to complete any work or substantially complete the work under this contract by said schedule date, the sum per calendar day for each date not met, as delineated above, will be subtracted from the payment due the Contractor (or, if the amount due Contractor as payment is insufficient, any deficiency shall be paid by the Contractor to the Owner), except in cases where the Contractor has applied for and been granted an extension of time in accordance with the provisions of this Article 13.

3. The said sum per calendar day shall constitute the Liquidated Damages incurred by the Owner for each day of delay beyond the agreed upon dates of Substantial Completion. Such Liquidated Damages shall be in addition to any other damages (other than by reason of delay) Owner may incur as a result of Contractor's breach of Contract. In the event that substantial completion of its work is not achieved in accordance with the project schedule, inspections will be performed once each week unless the Owner or the Architect determines, at their sole discretion, that additional inspections are not needed. All costs incurred by the Owner, Owner's Representative and the cost of additional inspections, at the rate of One Thousand Dollars (\$1,000) per inspection, will be subtracted from payment due the Contractor. If the amount due the Contractor for payment is insufficient, any deficiency shall be paid by the Contractor to the Owner.

H. 1. Within five (5) calendar days from the occurrence of same, the Contractor must apply in writing to the Owner or the Architect for an extension of time to complete its work where it has been delayed as a result of: unforeseeable causes beyond the control and without the fault or negligence of the contractor, including acts of God, acts of the public enemy, acts of the federal or state government in either their sovereign or contractual capacities, fires, floods, epidemics, quarantine restrictions, priority or allocation orders duly issued by the federal government; freight embargoes; changes in the work to be performed by the Contractor. The Contractor may not apply for an extension of time for delays in acquisitions of materials other than by reason of freight embargoes. All other delays of the project, including but not limited to, Architect review and/or approval of shop drawings and/or submittals, requests for information, clarifications, samples, and change orders; Owner schedule; Architect certification of payment; payment by Owner of Contractor's Application for Payment; coordination amongst Contractors; unavailability of materials and/or equipment; surveying/testing; closeout, etc. are deemed to be foreseeable and, therefore shall not form the basis for a claim for an extension of time by the Contractor.

2. All claims for additional time shall be supported by documentation which demonstrates to the Architect's and the Owner's satisfaction that the Critical path of the Work has been significantly altered by the delays to the activities in question, and that the schedule cannot be maintained by re-ordering other activities within the project at no cost. Upon receipt of the Contractor's request for an extension of time, the Owner will ascertain the facts and extent of the delay, and may, in its sole discretion, extend the time for completion of the Contractor's work when in its judgment such an extension is justified. The Owner's determination will be final and binding in any litigation commenced by the Contractor against the Owner which arises out of the Owner's denial of an extension of time to the Contractor. Any approval of an extension of the Contractor's time to complete its work shall be memorialized by written change order, signed by the Owner, Contractor and the Architect. Where the Owner determines that the Contractor will be granted an extension of time, such extension shall be computed in accordance with the following:

For each day of delay in the completion of its work, the Contractor shall be allowed one day of additional time to complete its contract. The Contractor shall not be entitled to receive a separate extension of time for each one of several causes of delay operating concurrently; only the actual period of delay as determined by the Owner or its Architect may be allowed.

3. Notwithstanding anything to the contrary in the Contract Documents, an extension in the contract time, to the extent permitted under subparagraph H of this Article 13, shall be the sole remedy of the Contractor for any (1) delay in the commencement, prosecution, or completion of the Work; (2) hindrance or obstruction in the performance of the Work; (3) loss of productivity or acceleration; or (4) other similar claims (collective referred to herein as "delay(s)"), unless a delay is caused by the Owner's active interference with the Contractor's performance of the Work, and only to the extent such acts continue after the Contractor furnishes the Owner with three (3) days' written notice of such interference. In no event shall the



Contractor be entitled to any compensation or recovery of any damages in connection with any Delay, including, but not limited to, consequential damages, lost opportunity costs, impact damages, or other similar remuneration. The Owner's exercise of any of its rights or remedies under the Contract Documents (including, but not limited to, ordering changes in the Work, or directing suspension, rescheduling or correction of the Work), regardless of the extent or frequency of the Owner's exercise of such rights or remedies, shall not be construed as active interference with the Contractor's performance of the Work.

#### **ARTICLE 14**

#### **DEFICIENT AND INCOMPLETE WORK**

A. The Owner, through its Architect, will have the authority to reject work performed by the Contractor which does not conform to the requirements of the drawings and/or specifications.

B. The Owner, through its Architect, shall have the authority to require additional inspection or testing of the Contractor's work whether or not such work is fabricated, installed or completed. However, neither this authority of the Architect nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect to the Contractor, Subcontractors, material and equipment suppliers, their agents or employees, or other persons performing portions of the work to have performed additional inspection or testing of the work.

C. 1. If a portion of the Contractor's work is covered contrary to the Architect's request or to requirements specifically expressed in the drawings and/or specifications, upon request by the Architect or the Owner, the Contractor shall uncover such work for the Architect's or any governmental authority's observation and be replaced at the Contractor's sole expense without change in the Contract Time or Contract Sum.

2. If a portion of the Contractor's work has been covered which the Architect or any governmental authority has not specifically requested to observe prior to its being covered, the Architect or any governmental authority may request to see such work and it shall be uncovered by the Contractor. If such work is in accordance with the drawings and/or specifications, costs of uncovering and replacement shall, by appropriate Change Order, be charged to the Owner. If such Work is not in accordance with the Contract Documents, the Contractor, at its sole cost and expense, shall uncover and replace such work.

D. The Contractor shall promptly correct work rejected by the Owner, through its Architect, or failing to conform to the requirements of its contract with the Owner, whether observed before or after Substantial Completion and whether or not fabricated, installed or completed. The Contractor shall bear the all costs of correcting such rejected work, including but not limited to the cost of said additional testing and/or inspection, the cost of the Architect's services incurred in conjunction with such additional testing, and any cost, loss or damages to the Owner resulting from such actions. If prior to the date of Substantial Completion, the Contractor, a Sub-contractor or anyone for whom either is responsible uses or damages any portion of the Work or premises, including, without limitation, mechanical, electrical, plumbing and other building systems,

machinery, equipment or other mechanical device, the Contractor shall cause such item to be restored to "like new" condition at no expense to the Owner.

E. If the Contractor (1) fails to correct work which is not in accordance with the requirements of its agreement with the Owner, or (2) fails to carry out its work in accordance with the requirements of its agreement with the Owner, or (3) fails or refuses to provide a sufficient amount of properly supervised and coordinated labor, materials, or equipment so as to be able to complete the work within the contract time, or (4) fails to remove and discharge (within ten (10) days) any lien filed upon Owner's property by anyone claiming by, through, or under the Contractor, or (5) disregards the instructions of the Architect or the Owner, the Architect, on behalf of the Owner may order the Contractor to stop its work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity. This right shall be in addition to, and not in restriction of, other rights the Owner may have pursuant to these General Conditions or at law.

F. 1. If the Contractor defaults or neglects to carry out its work in accordance with its agreement with the Owner and fails within a three (3) day period after receipt of written notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such deficiencies. In such case, an appropriate Change Order shall be issued deducting from payments then or thereafter due the Contractor the cost of correcting such deficiencies, including compensation for the Architect and the Owner and such other consultants whose participation is deemed necessary by the Architect, for additional services and expenses made necessary by such default, neglect or failure. Such action by the Owner or the Architect, including the amounts to be charged to the Contractor as a result of such action are subject to the prior approval of the Architect. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner.

2. Where the Contractor's default and/or neglect to carry out its work in accordance with its agreement with the Owner threatens the health, safety and/or welfare of the occupants of the school district's facilities and/or threatens the structural integrity and/or preservation of the school district's facilities, the Owner may proceed to carry out the Contractor's work upon twenty-four (24) hours notice of its intention to do so to the Contractor.

G. If the Owner prefers to accept work which is not in accordance with the terms and conditions of the agreement between the Owner and the Contractor, the Owner may, in its discretion, accept such work and reduce the Contractor's contract sum accordingly.

## **ARTICLE 15**

### **FINAL COMPLETION AND CLOSEOUT OF THE PROJECT**

A. 1. When advised by the Architect that the Contractor's work is near substantial completion, the Architect shall visit the site to determine whether the Contractor's work is substantially complete. If the Architect's observations of the Contractor's work discloses any item



which has not been performed in accordance with the requirements of the drawings and/or specifications and/or which has not been completed to the point indicated in Article 13 paragraph F of these General Conditions, the Contractor shall complete or correct such items upon receipt of notification from the Architect that a deficiency exists. The Architect shall not issue a certificate of substantial completion for the work of the Contractor until the work has been completed in accordance with Article 13(F). Upon completion of the work outlined by the Architect to it in accordance with this paragraph A, the Contractor shall advise the Architect of the need for an inspection of the work. If the Architect is required to inspect the Contractor's work more than twice, the Contractor shall be liable to the Owner for the services performed by the Architect as a result of additional inspections.

2. Upon determining that the Contractor's work has progressed to the point of Substantial Completion, the Architect shall prepare a punch list of the Contractor's work which shall include only minor items of work remaining to be performed by the Contractor to bring its work into compliance with the requirements of the drawings and/or specifications. The Contractor shall proceed promptly to complete and correct items on the punch list issued by the Architect and shall complete said items within thirty (30) days of its receipt of the punch list from the Architect. At the time of substantial completion, the Owner shall retain 200 percent of the value of the punch list items from the Contractor's remaining contract sum. The value of said remaining work shall be determined by the Architect. Upon completion of the work reflected in the final punch list, the Owner shall release the monies withheld pursuant to this paragraph to the Contractor.

3. The Architect's failure to include an item of deficiency on the punch list issued to the Contractor shall not relieve the contractor of its responsibility to perform its work in accordance with the drawings and/or specifications.

B. 1. If within three (3) years after the date of Substantial Completion of the Contractor's work or designated portion thereof, or after the date for commencement of warranties established pursuant to these General Conditions, or by terms of in applicable special warranty required by the agreement between the Owner and the Contractor, any of the Work is found to be not in accordance with the requirements of said agreement, the Contractor shall correct it promptly after receipt of written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. This period of three (3) years shall be extended with respect to portions of the Contractor's work first performed after Substantial Completion by the period of time between Substantial Completion and the actual performance of such work. The obligation set forth hereunder shall survive acceptance by the Owner of the Contractor's and/or termination of the Contractor's agreement with the Owner. The Owner shall give such notice within a reasonable period of time after discovery of the condition.

2. The Contractor shall, within a reasonable time after receipt of written notice thereof, but in no event no later than seventy-two (72) hours after receipt of such notice, commence to correct, repair, and make good any defects in its work.

3. The obligations of the Contractor pursuant to this paragraph shall cover any repairs to or replacement of work affected by the defective work.

4. In the case of any work performed in correcting defects pursuant to this paragraph, the guarantee periods specified herein shall begin anew from the date of acceptance by the Owner of such work.

C. Upon receipt of written notice from the Architect that the Contractor's work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect will promptly make such inspection. When the Architect finds the Contractor's work acceptable pursuant to the terms and conditions of its agreement with the Owner and the Contract fully performed and upon receipt of the closeout documentation required by the Contract Documents and elsewhere in the agreement between the Owner and the Contractor, the Architect will certify to the Owner that the Contractor is entitled to final payment on the project.

D. 1. Prior to receipt of final payment from the Owner, the Contractor shall provide to the Architect the close out documentation required by the Contract Documents.

2. The Contractor shall schedule a close out meeting with the Architect and the Owner for the purpose of delivering the close out documents required pursuant to the Contract Documents and elsewhere in the agreement between the Owner and the Contractor.

E. If the Contractor's work is not accepted by the Owner after final inspection and additional time is required to complete items identified during the final inspection, the date starting the warranty periods described in the Contract Documents shall be set by the Architect at his discretion.

F. If the Architect is required to perform more than one final inspection because the Contractor's work fails to comply with the requirements of the contract, the amount of compensation paid to the Architect by the Owner for additional services shall be deducted from the final payment to the Contractor.

G. Acceptance of final payment by the Contractor, a Subcontractor or material supplier shall constitute a waiver of claims by that payee except those claims previously made in writing in accordance with the terms of Article 18 hereof and identified by that payee as unsettled at the time of final Application for Payment.

H. Contractor shall submit all documentation identified in this section within ninety (90) days from the date of Substantial Completion. If the documentation has not been submitted, the Owner will obtain same through whatever means necessary. The Contractor shall solely be responsible for all expenses incurred by the Owner in securing such documentation.

## **ARTICLE 16**

### **RELEVANT STATUTORY PROVISIONS**

A. The Contractor shall at all times observe and comply with all Federal and State Laws and all Laws, Ordinances and Regulations of the Owner, in any manner affecting the work and all such orders decreed as exist at present and those which may be enacted later, by bodies or tribunals having jurisdiction or authority over the work, and the Contractor shall indemnify and save harmless the Owner and all his officers, agents, or servants against any claim or liability arising from, or based on, a violation of any such law, ordinances, regulation, order or decree, whether by himself or by his employee or agents.

B. The Contractor and each of its subcontractors shall comply with Prevailing Wage Rates as issued by the State of New York Department of Labor for the location and duration of this Project and shall comply with all requirements governing its payments to its employees as set forth in Labor Law, section 220 et seq of the New York State Labor Law, as amended.

C. The Contractor and each of its subcontractors shall post a notice at the beginning of the performance of every public work contract on each job site that includes the telephone number and addresses for the Department of Labor and a statement informing laborers, workers or mechanics of their right to contact the Department of Labor if he/she is not receiving the proper prevailing rate of wages and/or supplements for his/her particular job classification.

D. The Contractor specifically agrees, as required by Labor Law, Sections 220 and 220-d, as amended, that:

1. No laborer, workman or mechanic in the employ of the Contractor, subcontractor or other person doing or contracting to do the whole or any part of the work contemplated by the Contract, shall be permitted or required to work more than eight hours in any one calendar day or more than five days in any one week, except in the emergencies set forth in the Labor Law.

2. The wages paid for a legal day's work shall not be less than the prevailing rate of wages as defined by law.

3. The minimum hourly rate of wages to be paid shall not be less than that stated in the Project Manual, and any re-determination of the prevailing rate of wages after the Contract is approved shall be deemed to be incorporated herein by reference as of the effective date of re-determination and shall form a part of this Contract. The Labor Law provides that the Contract may be forfeited and no sum paid for any work done thereunder on a second conviction for willfully paying less than:

- a. The stipulated wage scale as provided in Labor Law, Section 220, Sub division 3, as amended; or

- b. The stipulated minimum hourly wage scale as provided in Labor Law, Section 220-d, as amended.

E. The Contractor acknowledges that its work is governed by the provisions of Section 101

of the General Municipal Law of the State of New York.

F. The Contractor specifically agrees, as required by the provisions of the Labor Law of New York, Section 220-E, as amended that:

1. In the hiring of employees for the performance of this contract or any sub-contractor hereunder, no contractor, sub-contractor, nor any person acting on behalf of such contractor or sub-contractor shall by reason of race, creed, color or national origin discriminate against any citizen of the State of New York who is qualified and available to perform the work to which the employment relates.
2. No contractor, sub-contractor, nor any person on his behalf shall, in any manner, discriminate against or intimidate any employee hired for the performance of work under this contract on account of race, color, creed, sex or national origin.
3. There may be deducted from the amount payable to the Contractor a penalty of fifty dollars for each person for each calendar day during which such person was discriminated against or intimidated in violation of the provisions of the Contract.
4. This Contract may be canceled or terminated by the Owner and all monies due or to become due hereunder may be forfeited for a second or any subsequent violation of the terms or conditions of this section of the Contract.

The aforesaid provisions of this section covering every Contract for or on behalf of the Owner, the State or a municipality for the manufacture, sale or distribution of materials, equipment or supplies shall be limited to operations performed within the territorial limits of the State of New York.

G. The successful Contractor shall conform to the guidelines spelled out in the County's Affirmative Action Program, if any.

H. The Contractor shall comply with all of the provisions of the Immigration Reform and Control Act of 1986 and regulations promulgated pursuant thereto and shall require its subcontractors to comply with same. The Contractor shall and does hereby agree to fully indemnify, protect, defend, and hold harmless the Owner, Owner's agents and employees from and against any penalties, fees, costs, liabilities, suits, claims, or expenses of any kind or nature, including reasonable attorney's fees, arising out of or resulting from any violation or alleged violation of the provisions of said laws in connection with the work performed hereunder.

I. This Contract shall be void if the Contractor fails to install, maintain, and effectively operate appliances and methods for the elimination of harmful dust when a harmful dust shall have been identified in accordance with Section 222-a of the Labor Law of the State of New York.

J. The Contractor shall insure that absolutely no asbestos containing material is used in conjunction with the performance of its work. The Contractor bears the sole responsibility to

provide assurances that no asbestos containing material is built into the construction, or that any equipment used in the construction contains any asbestos containing material. If asbestos containing material is found, at any time during or after the construction is completed, it shall be the responsibility of the Contractor who installed said material to remove it and replace it with new non-asbestos containing material, as per federal, state and local mandates.

K. Large and small asbestos abatement projects as defined by 12 N.Y.C.R.R. 56 shall not be performed while the building is occupied. As referenced in this section, the term “Abuilding” shall mean a wing or major section of a building that can be completely isolated from the rest of the building with sealed non-combustible construction. The isolated portion of the building must contain exits that do not pass through the occupied portion, and ventilation systems must be physically separated and sealed at the isolation barrier. Exterior work such as roofing, flashing, siding or soffit work may be performed on occupied buildings provided proper variances are in place as required, and complete isolation of ventilation systems and windows is provided. Work must be scheduled so that classes are not disrupted by noise or visual distraction.

L. Surfaces that will be disturbed by reconstruction must have a determination made as to the presence of lead. Projects which disturb surfaces that contain lead shall have in the specifications a plan prepared by a certified Lead Risk Assessor or Supervisor which details provisions for occupant protection, worksite preparation, work methods, cleaning and clearance testing which are in general accordance with the HUD Guidelines.

M. No smoking is allowed anywhere on school property per New York State and County law. Violators are subject to a \$1,000 fine and/or banishment from the property.

N. Applicable codes and standards for material furnished and work installed shall include all state laws, local ordinances, requirements of governmental agencies having jurisdiction, and applicable requirements of following codes and standards, including but not limited to:

1. New York State Uniform Fire Prevention and Building Code, and amendments thereto.
2. New York State Energy Conservation Construction Code.
3. State Education Department Manual of Planning Standards.
4. New York State Department of Transportation, Office of Engineering, Standard Specification, Construction and Materials, latest edition.
5. Life Safety Code - NFPA.

O. Wherever in the specifications reference is made to ANSI or ASTM Standards, Federal Specifications, Consumer Product Standards, or similar recognized standards, the latest edition of the respective publishing agency in effect at the date of “Bid Issuance” shall be accepted as establishing the technical requirements for which compliance is required.

P. The Owner shall be entitled to request of Contractor or its successor in interest adequate assurance of future performance in accordance with the terms and conditions of its agreement in the event (1) an order for relief is entered on behalf of the Contractor pursuant to Title 11 of the

United States Code, (2) any other similar order is entered under any other debtor relief laws, (3) the Contractor makes a general assignment for the benefit of its creditors, (4) a receiver is appointed for the benefit of its creditors, or (5) a receiver is appointed on account of its insolvency. Failure to comply with such request within ten (10) days of delivery of the request shall entitle the Owner to terminate the Contract in accordance with Article 17 hereof. In all events, pending receipt of adequate assurance of performance and actual performance in accordance therewith, the Owner shall be entitled to proceed with the Contractor's work with its own forces or with other contractors on a time and material or other appropriate basis, the cost of which will be back charged against the Contractor.

Q. The Contractor shall maintain policies of employment as follows:

1. The Contractor and the Contractor's Subcontractors shall not discriminate against any employee or applicant for employment because of race, religion, color, sex or national origin. The Contractor shall take affirmative action to insure that applicants are employed, and that employees are treated during employment without regard to their race, religion, color, sex or national origin. Such action shall include, but not be limited to, the following: employment, upgrading, demotion or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the policies of non-discrimination.
2. The Contractor and the Contractor's Subcontractors shall, in all solicitations or advertisements for employees placed by them or on their behalf, state that all qualified applicants will receive consideration for employment without regard to race, religion, color, sex or national origin.

## **ARTICLE 17**

### **TERMINATION OR SUSPENSION**

- A. 1. The Owner may terminate the Contractor's agreement in the event the Contractor:
- a. refuses or fails to supply sufficient skilled workers or suitable materials or equipment to complete the Work in a diligent, efficient, timely, workmanlike, skillful, and careful manner;
  - b. refuses or fails to correct deficient work performed by it;
  - c. fails to make prompt payments to subcontractors for labor, materials, and/or equipment in accordance with the respective agreements between the Contractor and the Subcontractors;
  - d. disregards laws, ordinances, rules, regulations, or orders of a public authority having jurisdiction;



- e. disregards the instructions of the Architect or the Owner (when such instructions are based on the requirements of the Contract Documents);
- f. is adjudged a bankrupt or insolvent, or makes a general assignment for the benefit of Contractor's creditors, or a trustee or receiver is appointed for Contractor or for any of its property, or files a petition to take advantage of any debtor's act or to reorganize under bankruptcy or similar laws; or
- g. breaches any warranty made by the Contractor under or pursuant to the Contract Documents.
- h. fails to furnish the Owner with assurances satisfactory to the Owner evidencing the Contractor's ability to complete the Work in compliance with all the requirements of the Contract Documents; or
- i. fails after commencement of the Work to proceed continuously with the construction and completion of the Work for more than ten (10) days, except as permitted under the Contract Documents.
- j. fails to keep the Project free from strikes, work stoppages, slowdowns, lockouts or other disruptive activity;
- k. or otherwise does not fully comply with the Contract Documents.

2. When any of the above reasons exists, may without prejudice to any other rights or remedies of the Owner, terminate employment of the Contractor upon three (3) days written notice and may, subject to any prior rights of the surety:

- a. take possession of the site and of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;
- b. take possession of materials stored off site by the Contractor;
- c. take assignments of the Contractor's subcontractors in accordance with these General Conditions;
- d. finish the Work by whatever reasonable method the Owner may deem expedient.

3. When the Owner terminates the Contract for one of the reasons stated in Subparagraph 1 hereof, the Contractor shall not be entitled to receive further payment until the completion of the Contractor's work. If the Owner's costs to complete the Contractor's work,

including the expenses incurred by the Owner in connection with the services of the Architect, and/or other consultants, exceed the contract balance remaining on the Contractor's contract, the Contractor shall be liable to the Owner for such excess costs. This provision shall survive termination of the Contractor's agreement with the Owner.

B. 1. In addition to the Owner's right to carry out the work of the Contractor pursuant to its agreement with the Contractor, the Owner may at any time, at will and without cause, terminate any part of the Contractor's work or all of the Contractor's remaining work for any reason whatsoever by giving three (3) days' written notice to Contractor, specifying the portion of the Contractor's work to be terminated and the effective date of termination.

2. Upon receipt of a notice of termination for convenience, the Contractor shall immediately, in accordance with instructions from the Owner, proceed with performance of the following duties regardless of delay in determining or adjusting amounts due under this Paragraph:

- a. cease operation as specified in the notice;
- b. place no further orders and enter into no further subcontracts for materials, labor, services or facilities except as necessary to complete continued portions of the Contract;
- c. terminate all subcontracts and orders to the extent they relate to the Work terminated;
- d. proceed to complete the performance of the remaining work on its contract which has not been so terminated; and
- e. take actions that may be necessary, or that the Owner may direct, for the protection and preservation of the terminated Work.

3. The Contractor shall continue to prosecute that portion of its work which has not been terminated by the Owner pursuant to this paragraph. If the Contractor's work is so terminated, the Owner shall not be liable to the Contractor by reason of such termination except that the Contractor shall be entitled to payment for the work it has properly executed in accordance with its agreement and prior to the effective date of termination (the basis for such payment shall be as provided in the Contract) and for costs directly related to work thereafter performed by Contractor in terminating such Work, provided such work is authorized in advance by the Architect and the Owner. No payment shall be made by Owner, however, to the extent that such work is, was, or could have been terminated under the Contractor's agreement with the Owner.

4. In case of a termination pursuant to this paragraph B, the Owner will issue a Construction Change Directive or authorize a Change Order, making any required adjustment to the Date of Substantial Completion and/or the sum of contract monies remaining to be paid to



the Contractor. The Owner shall be credited for (1) payments previously made to the Contractor for the terminated portion of the Work, (2) claims which the Owner has against the Contractor under the Contract and (3) the value of the materials, supplies, equipment or other items that are to be disposed of by the Contractor that are part of the Contract Sum; multiplied by 15% representing the Contractor's overhead and profit.

5. For the remaining portions of the Contractor's work which have not been terminated pursuant to this paragraph B, the terms and conditions of the Contractor's agreement with the Owner shall remain in full force and effect.

6. Upon termination of the Contractor's work or a portion of the Contractor's work pursuant to this paragraph B, the Contractor shall recover as its sole remedy, payment for work which it has properly performed in connection with the terminated portion of the Work prior to the effective date of termination and for items properly and timely fabricated off the Project site, delivered and stored in accordance with the Owner's instructions. The Contractor hereby waives and forfeits all other claims for payment and damages, including, without limitation, overhead and profit related to work terminated by the Owner pursuant to this paragraph B.

C. 1. In addition to Owner's right to suspend, delay, or interrupt Contractor from proceeding with any portion of its work pursuant to the terms and conditions of its agreement with the Owner, the Owner may at any time, at will and without cause suspend, delay, or interrupt any part of the Contractor's work or all work for any reason whatsoever for such period of time as the Owner may determine by giving three (3) days' prior written notice to Contractor, specifying that portion of the Contractor's work which is to be suspended, delayed, or interrupted, and the effective date of such suspension, delay, or interruption, as the case may be.

2. The Contractor shall continue to prosecute that portion of its work which has not been suspended, delayed, or interrupted, and shall properly protect and secure the portion of its work so suspended, delayed or interrupted.

3. The Owner shall incur no liability to Contractor by reason of such suspension, delay, or interruption except that Contractor may request an extension of its time to complete its work in accordance with Article 13 hereof.

D. The Contractor agrees and acknowledges that payments for the work have been obtained through obligations or bonds which have been sold after public referendum. In the event the work is suspended or canceled as a result of the order of any court, agency, department entity or individual having jurisdiction, or in the event the work is suspended or canceled due to the fact that a court, agency, department, entity or individual having jurisdiction has issued an order, the result of which is that the aforesaid obligations or bonds are no longer available for payment for the work, the Contractor expressly agrees that it shall be solely entitled to payment for work accomplished until a notice of suspension or cancellation is served upon it. The Contractor expressly waives any and all rights to institute an action, claim, cause of action or similar for any damages it may suffer as a result of the suspension or cancellation of the Work and/or its contract pursuant to this section.

## ARTICLE 18 CLAIMS AND DISPUTES

A. Definition. A “Claim” is a demand or assertion by one of the parties seeking, as a matter of right, adjustment or interpretation of Contract terms, payment of money, extension of time or other relief with respect to the terms of the Contract. The term “Claim” also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract.

B. Time Limits on Claims. Claims by the Contractor must be made within thirty (30) days after occurrence of the event giving rise to such Claim, or within thirty (30) days after the claimant first recognizes the condition giving rise to the Claim, whichever is earlier. Claims must be made by written notice. An additional Claim made after the initial Claim has been decided by the Owner will not be considered unless submitted in a timely manner. Failure of the Contractor to give timely notice of claim shall constitute waiver of the claim. Claims must be made by written notice to the Architect and Owner. The responsibility to substantiate Claims shall rest with the Contractor.

C. Pending final resolution of a Claim, unless otherwise agreed in writing, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents.

D. Claims for Concealed or Unknown Conditions. If conditions are encountered at the site which are (1) subsurface or otherwise concealed physical conditions which differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature, which differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, then notice by the Contractor shall be given to the Owner and Architect promptly before conditions are disturbed and in no event later than five (5) days after first observance of the conditions; and, (3) in the case of a condition at the site which involves a hazardous or toxic substance, as those terms are defined by OSHA or AHERA, notice to the Owner and the Architect shall be given immediately upon discovery of such hazardous or toxic substance. The Architect and/or Owner will promptly investigate such conditions and, if they differ materially and cause an increase or decrease in the Contractor’s cost of, or time required for, performance of any part of the Work, will recommend an equitable adjustment in the Contract Sum or Contract Time, or both. If the Architect determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall so notify the Contractor in writing, stating the reasons.

E. Claims for Additional Cost. If the Contractor wishes to make Claim for an increase in the Contract Sum as a result of a Change in the Work pursuant to Article 8 of these General Conditions, written notice as provided in this Article 18 shall be given before proceeding to execute the Work.

F. Claims for Additional Time. If the Contractor wishes to make Claim for an increase in the Contract Time, the Contractor shall comply with the requirements set forth in Article 13.

G. Nothing contained in the Contract Documents shall relieve a Contractor from compliance with any statutory requirement., including, but not limited to those contained in Education Law Section 3813.

## **ARTICLE 19 MISCELLANEOUS PROVISIONS**

A. The agreement between the Owner and the Contractor shall be governed by the law of the place where the project is located; venue to be in the County in which the project is located.

B. Historical lack of enforcement of any law, local or otherwise, shall not constitute a waiver of Contractor's responsibility for compliance with such law in a manner consistent with its agreement with the Owner unless and until the Contractor has received written consent for the waiver of such compliance from the Owner and the Agency responsible for the enforcement of such law.

C. All notices to be given hereunder shall be in writing and may be given, served, or made (1) by depositing the same for first class mail delivery in the United States mail addressed to the authorized representative of the party to be notified; (2) by depositing the same in the United States mail addressed to the authorized representative of the party to be notified, postpaid and registered or certified with return receipt requested; (3) by depositing the same for overnight delivery (prepaid by or billed to the party giving notice) with the United States Postal Service or other nationally recognized overnight delivery service addressed to the authorized representative of the party to be notified; or (4) by delivering the same in person to the said authorized representative of such party. Notice deposited in the mail by certified mail or overnight delivery in accordance with the provisions hereof shall be effective from and after the fourth (4th) day next following the date postmarked on the envelope containing such notice, or when actually received, whichever is earlier. All notices to be given to the parties hereto shall be sent to or made at the addresses set forth hereinbelow. By giving the other parties at least seven (7) days' written notice thereof, the parties hereto shall have the right to change their respective addresses and specify as their respective addresses for the purposes hereof any other address in the United States of America.

D. Except as expressly provided in the agreement between the Owner and the Contractor, duties and obligations imposed by such agreement and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights and remedies otherwise imposed or available by law, or in equity or by other agreement, and such rights and remedies shall survive acceptance of the Contractor's work and/or any other termination of the Contractor's agreement with the Owner.

E. No action or failure to act by the Owner, Architect or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed in writing.

F. The headings denoting the separately numbered Articles of these General Conditions are specifically set forth for reference purposes only and are not in any way to be deemed explanatory of or limiting of the contents of any paragraph or subparagraph. Furthermore, said headings are not to be deemed part of this Agreement for purposes of interpretation, litigation or as defining or limiting the rights or obligations of the parties.

G. In case any provision of this Agreement should be held to be contrary to, or invalid, under the law of any country, state or other jurisdiction, such illegality or invalidity, shall not affect in any way, any other provisions hereof, all of which shall continue, nevertheless, in full force and effect in any country, state or jurisdiction in which such provision is legal and valid.

H. The rights stated in these General Conditions and the documents which form the agreement between the Owner and the Contractor are cumulative and not in limitation of any rights of the Owner at law or in equity.

I. The Owner shall not be responsible for damages or for loss of anticipated profits on work not performed on account of any termination of the Contractor by the Owner or by virtue of the Owner's exercise of its right to take over the Contractor's work pursuant to its agreement with the Contractor.

J. The Owner shall not be liable to the Contractor for punitive damages on account of any its termination of the Contractor or any other alleged breach of the agreement between it and the Contractor and the Contractor hereby expressly waives its right to claim such damages against the Owner.

K. The Contractor hereby expressly waives any rights it may have in law or in equity to lost bonding capacity as a result of any of the actions of the Owner or the Architect taken in connection with the Contractor's work on the Project.

L. Upon determination by legal means (e.g. court action, etc.) that termination of Contractor pursuant to Article 17.A.1 was wrongful, such termination will be deemed converted to a termination for convenience pursuant to Article 17.B.1 and Contractor's remedy for such termination shall be limited to the recovery of the payments permitted for termination for convenience as set forth in Article 17.B.1.

M. As between the Owner and Contractor:

1. Before Substantial Completion. As to acts or failures to act occurring prior to the relevant date of Substantial Completion, any applicable statute of limitations shall

commence to run and any alleged cause of action shall be deemed to have accrued in any and all events not later than such date of Substantial Completion;

2. Between Substantial Completion and Final Certificate for Payment. As to acts or failures to act occurring subsequent to the relevant date of Substantial Completion and prior to issuance of the final Certificate for Payment, any applicable statute of limitations shall commence to run and any alleged cause of action shall be deemed to have accrued in any and all events not later than the date of issuance of the final Certificate for Payment; and
3. After Final Certificate for Payment. As to acts or failures to act occurring after the relevant date of issuance of the final Certificate for Payment, any applicable statute of limitations shall commence to run and any alleged cause of action shall be deemed to have accrued in any and all events not later than the date of any act or failure to act by the Contractor pursuant to warranties provided in accordance with its agreement with the Owner, the date of any correction of work performed by the Contractor or failure to correct its work, or the date of actual commission of any other act or failure to perform any duty or obligation by the Contractor or Owner, whichever occurs last.

N. 1. The Owner may occupy or use any completed or partially completed portion of the Contractor's work at any stage when such occupancy is authorized by public authorities having jurisdiction over the project.

2. Partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of the Contractor's work, nor does it waive the Owner's right to liquidated damages. Further such occupancy alone shall not determine when substantial completion and performance has been reached.

3. Immediately prior to such partial occupancy or use, the Owner, Contractor and Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Contractor's work, and in order to prepare a complete punchlist of omissions of materials, faulty workmanship, or any items to be repaired, torn out or replaced.

O. The Contractor agrees not to assign, transfer, convey or sublet or otherwise dispose of this Contract or his right, title and interest therein or his power to execute such Contract, to any other person, firm or corporation without the previous consent in writing of the Owner.

P. The Owner is a tax exempt organization and will take title to materials used in the Project in order to permit tax exemption.

Q. The Owner will furnish a certificate with the Owner's Tax Exemption Number to the Contractor for use in purchasing tangible personal property required for the Project.

R. This exemption shall not apply to machinery, equipment, tools, and other items purchased, leased, rented, or otherwise acquired for the Contractor's use even though the machinery, equipment, tools or other items are used either in part or entirely on the Work. This exemption shall apply only to materials fully incorporated into the Work of the Contract as accepted and approved by the Architect.

S. The Contractor shall, upon request by the Owner, furnish a bill of sale or other instrument indicating the quantities and types of materials purchased directly by the Contractor or subcontractor for incorporation into the Work. Upon delivery of the materials to the site, the Contractor shall mark or otherwise identify the materials to be incorporated into the Work. This exemption shall apply only to materials so identified and accepted.

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***END OF GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION***

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# **FINAL REPORT OF ENVIRONMENTAL SERVICES**

*Performed at:*

**OAKSIDE ELEMENTARY SCHOOL  
200 DECATUR AVENUE  
PEEKSKILL, NY 10566**

*Prepared for:*



**Peekskill City School District  
1031 Elm Street  
Peekskill, NY 10566**

*Prepared by:*



**565 Taxter Road, 5<sup>th</sup> Floor  
Elmsford, New York 10523  
Tel. (914) 798-3710  
Fax (914) 592-1734**

**Project No. 2043465.32  
Final Submission Date: November 20, 2019**



November 20, 2019

Mr. Carmine Crisci  
Director of Facilities, Operations and Maintenance  
Peekskill City School District  
1031 Elm Street  
Peekskill, New York 10566

**Subject: Final Report of Environmental Services  
Oakside Elementary School  
200 Decatur Avenue  
Peekskill, NY 10566**

Dear Mr. Crisci:

Louis Berger (Berger), A WSP company, has completed a limited material inspection at Oakside Elementary School located at 200 Decatur Avenue, Peekskill, NY. The limited inspection included visual observation, material sampling, and laboratory sample analysis of suspect Asbestos-Containing Materials (ACM) and Polychlorinated-Biphenyls (PCBs) as part of the school district's renovation for HDG Project: 201 at Oakside ES.

The attached report presents descriptions and results of the material sampling procedures and visual analysis. Relevant general project information is provided, followed by our findings, assessments and recommendations. Laboratory analysis data and certifications are provided in the Appendices.

If you have any questions concerning this report or if we may be of further assistance to you, please contact us.

Sincerely,

**LOUIS BERGER, A WSP COMPANY**

A handwritten signature in blue ink, appearing to read 'CN', with a stylized flourish at the end.

Craig Napolitano, CHMM  
Vice President, Emergency Management & IH Services





# ***Final Report for Environmental Inspection Services***

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### **Appendices**

Appendix A: Asbestos Sample Analysis Results in Tabular Form

Appendix B: Asbestos Bulk Sample Field Data Sheets with Chain of Custody & Laboratory Results

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Appendix F: Company License, Personnel Certifications & Laboratory Accreditations

Appendix G: Photographic Documentation



## ***Final Report for Environmental Inspection Services***

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### **1.0 EXECUTIVE SUMMARY**

Louis Berger (Berger), A WSP company, has completed a limited material inspection at Oakside Elementary School located at 200 Decatur Avenue, Peekskill, NY. The limited inspection included visual observation, material sampling, and laboratory sample analysis of suspect Asbestos-Containing Materials (ACM) and Polychlorinated-Biphenyls (PCBs) as part of the school district's renovation for HDG Project: 201 at Oakside ES.

Drew Cheskin & Luis Nevarez of Berger performed the inspection on November 13, 2019. Mr. Cheskin (Cert# 05-04280) and Mr. Nevarez (Cert# 12-12740) are New York State Department of Labor (NYSDOL) Asbestos Inspectors.

The results of the visual inspection and bulk sample analysis determined that the following suspect ACM and PCB materials may be impacted by the proposed HDG Project: 201 at Oakside Elementary School.

#### **A. ASBESTOS-CONTAINING MATERIAL**

Analytical results of the bulk samples collected by Berger indicate that the following materials **contain asbestos** (greater than 1-percent).

- **Joint Compound**
- **Exterior Louver Calking**

Analytical results of the bulk samples collected indicate that the following materials **did not contain asbestos** (less than 1-percent);

- Mastic To 12"x12" Beige with Blue Spots FT
- 12"x12" Beige with Blue Spots FT
- Mastic to Blue 6" Cove Base
- Blue 6" Cove Base
- Gypsum
- Exterior Brick Mortar
- Wall Paper Over Gypsum
- CMU Mortar

#### **B. PCB-CONTAINING MATERIAL**

Analytical results of the bulk samples collected indicate that the following materials **contain PCB** (greater than 50 PPM).

- **Exterior Louver Calking**

Analytical results of the bulk samples collected indicate that the following materials **did not**



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contain PCB (less than 50 PPM);

- None

### **2.0 FIELD INSPECTION PROCEDURES AND SAMPLE ANALYSIS METHODS**

#### ***ASBESTOS-CONTAINING MATERIAL***

Guidelines used for the inspection were established by the Environmental Protection Agency (EPA) in the Guidance for Controlling Asbestos Containing Materials in Buildings, Office of Pesticides and Toxic Substances, Doc 560/5-85-024, and 40 CFR Part 763, Asbestos Hazard Emergency Response Act (AHERA).

Field information was organized in accordance with the AHERA methodology of homogenous area (HA). During the Inspection, reasonable effort was made to identify all locations and types of ACM materials associated with the scope of work. Sampling has included multiple samples of the same materials chosen at random. However, due to inconsistencies of a manufacturer's processes and the contractor's installation methods, materials of similar construction may contain various amounts of asbestos. Furthermore, some materials that were not originally specified to contain asbestos may in fact contain this mineral. For example, cementitious pipe insulation and plaster were frequently mixed with asbestos at the construction site for ease of application. Locating all asbestos materials can only be definitively achieved by conducting exploratory demolition and sampling every section of pipe insulation, fitting or valve covering, fireproofing, and other suspect ACM.

Bulk samples of suspect ACM are analyzed using polarized light microscopy (PLM) coupled with dispersion staining, as described in 40 CFR Part 763 and the National Emissions Standard for Hazardous Air Pollutants (NESHAPS). NESHAPS is the standard industry protocol for the determination of asbestos in building materials. A suspect material is immersed in a solution of known refractive index and subjected to illumination by polarized light. The color displays that result are compared to a standardized atlas whereby the specific variety of asbestos is determined. It should also be recognized that PLM is primarily a qualitative identification method whereby asbestos percentage, if any, is estimated. While EPA, New York State, and New York City regulations governing ACM consider materials containing greater than 1-percent as asbestos, accurately quantifying asbestos content below 5-percent has been shown to be unreliable.

The New York State Department of Health has recently revised the PLM Stratified Point Counting Method. The March 25<sup>th</sup>, 2011 method, "Polarized Light Microscopy Methods for Identifying and Quantifying Asbestos in Bulk Samples" can be found as Item 198.1 in the Environmental Laboratory Approval program (ELAP) Certification manual. Whereas the procedure of analysis for bulk samples that fall into the category of "Non-friable Organically Bound" (NOB) can be found in the March 25<sup>th</sup> 2011 method "Polarized-Light Microscope Method for Identifying and Quantifying Asbestos in Non-Friable Organically Bound Bulk Samples", Item 198.6 in the ELAP Certification Manual. This category includes any sample in a flexible to rigid asphalt or vinyl matrix (floor tiles, mastic, roofing shingles, roofing felt, etc.).



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These samples must be “ashed” in a muffle furnace at 480-degrees Celsius (to remove organic matrix), treated with acid (to remove any mineral carbonate), and filtered through a 0.4-micron polycarbonate filter before being analyzed by PLM. The sample must be weighted between each of these steps to track the percent loss of organic matrix.

ELAP has determined that analysis of NOB materials is not reliably performed by PLM. Therefore, if PLM analysis yields results of 1-percent asbestos or less, the result must be confirmed by TEM. For bulk samples that undergo TEM analysis, the March 25th, 2011 method “Transmission Electron Microscope Method for Identifying and Quantitating Asbestos in Non-Friable organically Bound Bulk Samples” must be used and can be found as Item 198.4 in the ELAP Certification Manual. ELAP certified laboratories must include the following statement with their PLM analysis results for each “negative” (1-percent or less asbestos) NOB sample: "Polarized-light microscopy is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Before this material can be considered or treated as non-ACM, confirmation must be made by quantitative transmission electron microscopy".

All samples are initially analyzed by Polarized Light Microscopy in accordance with Item 198.1 and 198.6 of the ELAP Certification Manual. Samples which yield a negative PLM result and which are classified as a "non-friable" material, are then re-analyzed utilizing TEM methodology in accordance with Item 198.4 of the ELAP Certification Manual. The laboratory performing both these analysis procedures is EMSL located at 528 Mineola Ave, Carle Place, NY 11514. The laboratory has received accreditation from the following agencies:

- National Voluntary Laboratory Accreditation Program (Lab Code 101048-10)
- New York State Environmental Laboratory Approval Program (Lab No. 11469)
- American Industrial Hygiene Association Accredited Laboratory (Lab No. 102344)

### **POLYCHLORINATED BIPHENYLS (PCBs)**

PCBs belong to a broad family of man-made organic chemicals known as chlorinated hydrocarbons. PCBs were domestically manufactured from 1929 until their manufacture was banned in 1979. They have a range of toxicity and vary in consistency from thin, light-colored liquids to yellow or black waxy solids. Due to their non-flammability, chemical stability, high boiling point, and electrical insulating properties, PCBs were used in hundreds of industrial and commercial applications including electrical, heat transfer, and hydraulic equipment; as plasticizers in paints, plastics, and rubber products; in pigments, dyes, and carbonless copy paper; and many other industrial applications.

Although no longer commercially produced in the United States, PCBs may be present in products and materials produced before the 1979 PCB ban. Products that may contain PCBs include: Transformers and capacitors, Oil used in motors and hydraulic systems, Fluorescent light ballasts, Adhesives and tapes, Caulking, Plastics, etc.



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The PCBs used in these products were chemical mixtures made up of a variety of individual chlorinated biphenyl components, known as congeners. Most commercial PCB mixtures are known in the United States by their industrial trade names. The most common trade name is aroclor.

Polychlorinated biphenyls (PCBs) are regulated pursuant to the United States Environmental Protection Agency Code of Federal Regulations (40 CFR Part 761), the Toxic Substances Control Act (TSCA – 15 U.S.C. 2605), New York State Department of Environmental Conservation 6NYCRR 370-376 and federal Occupational Safety and Health Administration (OSHA) 29CFR 1926 & 1910. These regulations require certain testing and reporting requirements to determine management, recycling and disposal options for PCBs.

### **3.0 INSPECTION SCOPE AND MATERIAL ASSESSMENT**

The areas inspected for ACM and PCB materials that may be impacted by the proposed HDG Project: 201 at Oakside Elementary School include:

- Rooms 201, 202, 203, 204, 208, 209, 210, 211, 212, 213, 214, 215 & 216
- Exterior Façade/Louvers associated with rooms 201, 202, 203, 204, 208, 209, 210, 211, 212, 213, 214, 215 & 216
- Water Service Room across from Boiler Room

#### **A. ASBESTOS-CONTAINING MATERIAL**

Materials examined during the Berger inspection included:

- Mastic To 12"x12" Beige with Blue Spots FT
- 12"x12" Beige with Blue Spots FT
- Mastic to Blue 6" Cove Base
- Blue 6" Cove Base
- Gypsum
- Joint Compound
- Exterior Brick Mortar
- Exterior Louver Calking
- Wall Paper Over Gypsum
- CMU Mortar

#### **A. ASBESTOS-CONTAINING MATERIAL**

Analytical results of the bulk samples collected by Berger indicate that the following materials **contain asbestos** (greater than 1-percent).

- **Joint Compound**



## ***Final Report for Environmental Inspection Services***

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- **Exterior Louver Calking**

Analytical results of the bulk samples collected indicate that the following materials **did not contain asbestos** (less than 1-percent);

- Mastic To 12"x12" Beige with Blue Spots FT
- 12"x12" Beige with Blue Spots FT
- Mastic to Blue 6" Cove Base
- Blue 6" Cove Base
- Gypsum
- Exterior Brick Mortar
- Wall Paper Over Gypsum
- CMU Mortar

### ***B. PCB-CONTAINING MATERIAL***

Analytical results of the bulk samples collected indicate that the following materials **contain PCB** (greater than 50 PPM).

- **Exterior Louver Calking**

Analytical results of the bulk samples collected indicate that the following materials **did not contain PCB** (less than 50 PPM);

- None



## Final Report for Environmental Inspection Services

### 4.0 INSPECTION RESULTS

#### A. ASBESTOS-CONTAINING MATERIAL

The asbestos inspection involved a thorough visual examination of all areas that may be impacted by the proposed HDG Project: 201 at Oakside Elementary School. The following suspect materials were sampled and analyzed for asbestos content by Berger:

**4.1 Table 4.1 – Suspect Materials Inspected**

HOMOGENOUS MATERIAL	MATERIAL	SAMPLE LOCATION	ASBESTOS CONTENT
01	Mastic To 12"x12" Beige with Blue Spots FT	Rooms 210, 204 & 212	NAD
02	12"x12" Beige with Blue Spots FT	Rooms 210, 204 & 212	NAD
03	Mastic to Blue 6" Cove Base	Rooms 210, 204 & 213	NAD
04	Blue 6" Cove Base	Rooms 210, 204 & 213	NAD
05	Gypsum	Rooms 210, 204 & 213	NAD
<b>06</b>	<b>Joint Compound</b>	<b>Rooms 210, 204 &amp; 213</b>	<b>1.50% Chrysotile</b>
07	Exterior Brick Mortar	Exterior to Rooms 215, 213 & 216	NAD
<b>08</b>	<b>Exterior Louver Calking</b>	<b>Exterior to Rooms 215 &amp; 213</b>	<b>2.50% Chrysotile</b>
09	Wall Paper Over Gypsum	Rooms 210, 204 & 213	<1% Chrysotile
10	CMU Mortar	Water Service Room, Across from Boiler Room	NAD

**Bold = Positive for ACM**      NAD = No Asbestos Detected

#### 4.2 CONDITION AND FRIABILITY ASSESSMENT TABLE

For each inspection conducted, the inspector classifies ACM or Assumed ACM materials by friability and condition. This helps to determine the extent of damage in certain areas as well as the potential for further damage and Asbestos release due to disturbance of the material.

**Table 4.2 – Condition and Friability Assessment**

Material	Material Location	Quantity	Friability	Condition
Joint Compound	Rooms 201, 202, 203, 204, 208, 209, 210, 211, 212, 213, 214, 215 & 216	150 SF <sup>1</sup>	Y	Good
Exterior Louver Caulking	Exterior Louvers (and window frames) associated with rooms 201, 202, 203, 204, 208, 209, 210, 211, 212, 213, 214, 215 & 216	250 LF <sup>1</sup>	N	Good

Notes: All quantities in this assessment are estimations and should be confirmed by the abatement contractor should abatement be performed.

<sup>1</sup> Represents quantity which may potentially be affected by scope of work.



## ***Final Report for Environmental Inspection Services***

### **Condition Definitions:**

**Good:** None/Minimal apparent damage to ACM

**Fair:** Up to 10% localized damage or up to 25% of the entire ACM is damaged

**Poor:** Over 10% localized damage or over 25% of the entire ACM is damaged

### **4.3 SAMPLE ANALYSIS TABLE**

Laboratory analysis results, in tabular form, are included in Appendix A.

#### ***B. PCB-CONTAINING MATERIAL***

The PCB Inspection involved a thorough visual examination of all areas that may be impacted by the proposed HDG Project: 201 at Oakside Elementary School. The following suspect materials were tested for PCB content:

<b>HOMOGENOUS MATERIAL</b>	<b>MATERIAL</b>	<b>SAMPLE LOCATION</b>	<b>PCB CONTENT (PPM)</b>
<b>08</b>	<b>Exterior Louver Calking</b>	<b>Exterior to Rooms 215, 213 &amp; 216</b>	<b>680</b>

**Bold = Positive for PCB**      **ND = No PCB Detected**

<sup>(1)</sup> Will be removed as ACM

### **5.0 AREAS NOT ACCESSIBLE**

During the inspection the following areas were not accessible:

Spaces within Walls/Floors/Ceilings: No destructive sampling was performed on concealed spaces in walls to access plenum, chases etc. It should be assumed that asbestos containing materials may exist in these spaces. Any suspect materials encountered during work should be sampled for analysis before work continues.

Spaces within Building Envelope: No destructive sampling was performed to the building envelope. It should be assumed that asbestos containing materials may exist in these spaces. Any suspect materials encountered during work should be sampled for analysis before work continues.





## ***Final Report for Environmental Inspection Services***

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### **6.0 CONCLUSIONS AND RECOMMENDATIONS**

ACM and PCB materials have been identified in this inspection that may be impacted as part of the HDG Project: 201 at Oakside Elementary School. These materials, reported in Section 3.0 of this report, may require complete removal prior to the start of any renovations.

The inspection was conducted at the request of the Peekskill City School District to determine materials which may be impacted by the current scope of work as outlined in the drawings for HDG Project: 201 at Oakside Elementary School, as well as emails offering further clarification of the work. Should the scope of work change, further investigation may be warranted to accurately classify any additional ACM or PCB materials not identified in this inspection.

### **7.0 REPORT CERTIFICATIONS**

This report, and the supporting data, findings, conclusions, opinions, and recommendations it contains represent the result of Berger's efforts for the environmental inspection work for the Peekskill City School District.

Opinions and recommendations presented in this report apply to site conditions and features as they existed at the time of Berger's site visits, and those reasonably foreseeable. They cannot necessarily apply to conditions and features of which Berger is unaware and has not had the opportunity to evaluate.

The conclusions presented in this report are professional opinions solely upon Berger's visual observations of accessible areas, laboratory test data, and current regulatory requirements. These conclusions are intended exclusively for the purpose stated herein and the site indicated for the project indicated.

Prepared by:

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Drew Cheskin  
NYS DOL Inspector

Reviewed by:

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Craig Napolitano, CHMM  
Vice President, Emergency  
Management & IH Services



**APPENDIX A:  
ASBESTOS SAMPLE ANALYSIS RESULTS IN TABULAR FORM**



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APPENDIX A  
SAMPLE ANALYSIS RESULTS IN TABULAR FORM  
OAKSIDE ELEMENTARY SCHOOL  
200 DECATUR AVE  
PEEKSKILL, NY 10566

Homogeneous Area No.	Sample No.	Material	Sample Location	PLM Result	TEM Result
01	01A	Mastic To 12"x12" Beige with Blue Spots FT	Room 210	NAD	NAD
01	01B	Mastic To 12"x12" Beige with Blue Spots FT	Room 204	NAD	NAD
01	01C	Mastic To 12"x12" Beige with Blue Spots FT	Room 212	NAD	NAD
02	02A	12"x12" Beige with Blue Spots FT	Room 210	NAD	NAD
02	02B	12"x12" Beige with Blue Spots FT	Room 204	NAD	NAD
02	02C	12"x12" Beige with Blue Spots FT	Room 212	NAD	NAD
03	03A	Mastic to Blue 6" Cove Base	Room 210	NAD	NAD
03	03B	Mastic to Blue 6" Cove Base	Room 204	NAD	NAD
03	03C	Mastic to Blue 6" Cove Base	Room 213	NAD	NAD
04	04A	Blue 6" Cove Base	Room 210	NAD	NAD
04	04B	Blue 6" Cove Base	Room 204	NAD	NAD
04	04C	Blue 6" Cove Base	Room 213	NAD	NAD
05	05A	Gypsum	Room 210	NAD	N/A
05	05B	Gypsum	Room 204	NAD	N/A
05	05C	Gypsum	Room 213	NAD	N/A
<b>06</b>	<b>06A</b>	<b>Joint Compound</b>	<b>Room 210</b>	<b>1.50% Chrysotile</b>	<b>N/A</b>
<b>06</b>	<b>06B</b>	<b>Joint Compound</b>	<b>Room 204</b>	<b>NA/PS</b>	<b>N/A</b>
<b>06</b>	<b>06C</b>	<b>Joint Compound</b>	<b>Room 213</b>	<b>NA/PS</b>	<b>N/A</b>
07	07A	Exterior Brick Mortar	Exterior to Room 215	NAD	N/A
07	07B	Exterior Brick Mortar	Exterior to Room 213	NAD	N/A
07	07C	Exterior Brick Mortar	Exterior to Room 216	NAD	N/A
<b>08</b>	<b>08A</b>	<b>Exterior Louver Calking</b>	<b>Exterior to Room 215</b>	<b>2.50% Chrysotile</b>	<b>N/A</b>
<b>08</b>	<b>08B</b>	<b>Exterior Louver Calking</b>	<b>Exterior to Room 213</b>	<b>NA/PS</b>	<b>N/A</b>

**Bold = Positive for ACM**  
NAD = No Asbestos Detected

N/A = Not Applicable  
NA/PS = Not analyzed/ positive sample



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<b>Homogeneous Area No.</b>	<b>Sample No.</b>	<b>Material</b>	<b>Sample Location</b>	<b>PLM Result</b>	<b>TEM Result</b>
09	09A	Wall Paper Over Gypsum	Room 210	NAD	<1% Chrysotile
09	09B	Wall Paper Over Gypsum	Room 204	NAD	N/A
09	09C	Wall Paper Over Gypsum	Room 213	NAD	N/A
10	10A	CMU Mortar	Water service Room, Across from Boiler Room	NAD	N/A
10	10B	CMU Mortar	Water service Room, Across from Boiler Room	NAD	N/A

**Bold = Positive for ACM**  
NAD = No Asbestos Detected

N/A = Not Applicable  
NA/PS = Not analyzed/ positive sample



**APPENDIX B:  
ASBESTOS BULK SAMPLE FIELD DATA SHEETS  
WITH CHAIN OF CUSTODY & LABORATORY RESULTS**



# EMSL Analytical, Inc.

528 Mineola Avenue Carle Place, NY 11514  
 Tel/Fax: (516) 997-7251 / (516) 997-7528  
<http://www.EMSL.com / carleplacelab@emsl.com>

**EMSL Order:** 061925574  
**Customer ID:** LBAP78  
**Customer PO:** 2043465.32.00  
**Project ID:**

**Attention:** Marvin Luccioni  
 Louis Berger U.S., Inc  
 96 Morton Street  
 8th floor  
 New York, NY 10014

**Phone:** (718) 730-2741

**Fax:**

**Received Date:** 11/15/2019 2:03 AM

**Analysis Date:** 11/15/2019 - 11/16/2019

**Collected Date:** 11/13/2019

**Project:** Peekskill City S.D., Oakside E. S., Proj. #2043465.32.00

## Test Report:Asbestos Analysis of Bulk Material

Test	Analyzed Date	Color	Non-Asbestos		Asbestos
			Fibrous	Non-Fibrous	
<b>Sample ID</b> 01-01A 061925574-0001		<b>Description</b> <b>Homogeneity</b>	Room 210 - Mastic to 12" x 12" Beige with Blue Spots FT Homogeneous		
<b>PLM NYS 198.1 Friable</b>					<b>Not Analyzed</b>
<b>PLM NYS 198.6 VCM</b>					<b>Not Analyzed</b>
<b>PLM NYS 198.6 NOB</b>	11/15/2019	Brown		100.00% Other	<b>Inconclusive: None Detected</b>
<b>TEM NYS 198.4 NOB</b>	11/16/2019	Brown		100.00% Other	<b>None Detected</b>
<b>Sample ID</b> 01-01B 061925574-0002		<b>Description</b> <b>Homogeneity</b>	Room 204 - Mastic to 12" x 12" Beige with Blue Spots FT Homogeneous		
<b>PLM NYS 198.1 Friable</b>					<b>Not Analyzed</b>
<b>PLM NYS 198.6 VCM</b>					<b>Not Analyzed</b>
<b>PLM NYS 198.6 NOB</b>	11/15/2019	Brown		100.00% Other	<b>Inconclusive: None Detected</b>
<b>TEM NYS 198.4 NOB</b>	11/16/2019	Brown		100.00% Other	<b>None Detected</b>
<b>Sample ID</b> 01-01C 061925574-0003		<b>Description</b> <b>Homogeneity</b>	Room 212 - Mastic to 12" x 12" Beige with Blue Spots FT Homogeneous		
<b>PLM NYS 198.1 Friable</b>					<b>Not Analyzed</b>
<b>PLM NYS 198.6 VCM</b>					<b>Not Analyzed</b>
<b>PLM NYS 198.6 NOB</b>	11/15/2019	Brown		100.00% Other	<b>Inconclusive: None Detected</b>
<b>TEM NYS 198.4 NOB</b>	11/16/2019	Brown		100.00% Other	<b>None Detected</b>
<b>Sample ID</b> 02-02A 061925574-0004		<b>Description</b> <b>Homogeneity</b>	Room 210 - Beige with Blue Spots FT Homogeneous		
<b>PLM NYS 198.1 Friable</b>					<b>Not Analyzed</b>
<b>PLM NYS 198.6 VCM</b>					<b>Not Analyzed</b>
<b>PLM NYS 198.6 NOB</b>	11/15/2019	White/ Various		100.00% Other	<b>Inconclusive: None Detected</b>
<b>TEM NYS 198.4 NOB</b>	11/16/2019	White/ Various		100.00% Other	<b>None Detected</b>
<b>Sample ID</b> 02-02B 061925574-0005		<b>Description</b> <b>Homogeneity</b>	Room 204 - Beige with Blue Spots FT Homogeneous		
<b>PLM NYS 198.1 Friable</b>					<b>Not Analyzed</b>
<b>PLM NYS 198.6 VCM</b>					<b>Not Analyzed</b>
<b>PLM NYS 198.6 NOB</b>	11/15/2019	White/ Various		100.00% Other	<b>Inconclusive: None Detected</b>
<b>TEM NYS 198.4 NOB</b>	11/16/2019	White/ Various		100.00% Other	<b>None Detected</b>

Initial report from: 11/16/2019 08:54:40



# EMSL Analytical, Inc.

528 Mineola Avenue Carle Place, NY 11514  
 Tel/Fax: (516) 997-7251 / (516) 997-7528  
<http://www.EMSL.com> / [carleplacelab@emsl.com](mailto:carleplacelab@emsl.com)

**EMSL Order:** 061925574  
**Customer ID:** LBAP78  
**Customer PO:** 2043465.32.00  
**Project ID:**

## Test Report: Asbestos Analysis of Bulk Material

Test	Analyzed Date	Color	Non-Asbestos		Asbestos
			Fibrous	Non-Fibrous	
<b>Sample ID</b> 02-02C 061925574-0006		<b>Description</b> <b>Homogeneity</b>	Room 212 - Beige with Blue Spots FT Homogeneous		
<b>PLM NYS 198.1 Friable</b>					<b>Not Analyzed</b>
<b>PLM NYS 198.6 VCM</b>					<b>Not Analyzed</b>
<b>PLM NYS 198.6 NOB</b>	11/15/2019	White/ Various		100.00% Other	<b>Inconclusive: None Detected</b>
<b>TEM NYS 198.4 NOB</b>	11/16/2019	White/ Various		100.00% Other	<b>None Detected</b>
<b>Sample ID</b> 03-03A 061925574-0007		<b>Description</b> <b>Homogeneity</b>	Room 210 - Mastic to Blue 6" Cove Base Homogeneous		
<b>PLM NYS 198.1 Friable</b>					<b>Not Analyzed</b>
<b>PLM NYS 198.6 VCM</b>					<b>Not Analyzed</b>
<b>PLM NYS 198.6 NOB</b>	11/15/2019	Brown/ Tan		100.00% Other	<b>Inconclusive: None Detected</b>
<b>TEM NYS 198.4 NOB</b>	11/16/2019	Brown/ Tan		100.00% Other	<b>None Detected</b>
<b>Sample ID</b> 03-03B 061925574-0008		<b>Description</b> <b>Homogeneity</b>	Room 204 - Mastic to Blue 6" Cove Base Homogeneous		
<b>PLM NYS 198.1 Friable</b>					<b>Not Analyzed</b>
<b>PLM NYS 198.6 VCM</b>					<b>Not Analyzed</b>
<b>PLM NYS 198.6 NOB</b>	11/15/2019	Brown/ Tan		100.00% Other	<b>Inconclusive: None Detected</b>
<b>TEM NYS 198.4 NOB</b>	11/16/2019	Brown/ Tan		100.00% Other	<b>None Detected</b>
<b>Sample ID</b> 03-03C 061925574-0009		<b>Description</b> <b>Homogeneity</b>	Room 213 - Mastic to Blue 6" Cove Base Homogeneous		
<b>PLM NYS 198.1 Friable</b>					<b>Not Analyzed</b>
<b>PLM NYS 198.6 VCM</b>					<b>Not Analyzed</b>
<b>PLM NYS 198.6 NOB</b>	11/15/2019	Brown/ Tan		100.00% Other	<b>Inconclusive: None Detected</b>
<b>TEM NYS 198.4 NOB</b>	11/16/2019	Brown/ Tan		100.00% Other	<b>None Detected</b>
<b>Sample ID</b> 04-04A 061925574-0010		<b>Description</b> <b>Homogeneity</b>	Room 210 - Blue 6" Cove Base Homogeneous		
<b>PLM NYS 198.1 Friable</b>					<b>Not Analyzed</b>
<b>PLM NYS 198.6 VCM</b>					<b>Not Analyzed</b>
<b>PLM NYS 198.6 NOB</b>	11/15/2019	Blue		100.00% Other	<b>Inconclusive: None Detected</b>
<b>TEM NYS 198.4 NOB</b>	11/16/2019	Blue		100.00% Other	<b>None Detected</b>
<b>Sample ID</b> 04-04B 061925574-0011		<b>Description</b> <b>Homogeneity</b>	Room 204 - Blue 6" Cove Base Homogeneous		
<b>PLM NYS 198.1 Friable</b>					<b>Not Analyzed</b>
<b>PLM NYS 198.6 VCM</b>					<b>Not Analyzed</b>
<b>PLM NYS 198.6 NOB</b>	11/15/2019	Blue		100.00% Other	<b>Inconclusive: None Detected</b>
<b>TEM NYS 198.4 NOB</b>	11/16/2019	Blue		100.00% Other	<b>None Detected</b>

Initial report from: 11/16/2019 08:54:40





# EMSL Analytical, Inc.

528 Mineola Avenue Carle Place, NY 11514

Tel/Fax: (516) 997-7251 / (516) 997-7528

<http://www.EMSL.com> / [carleplacelab@emsl.com](mailto:carleplacelab@emsl.com)

EMSL Order: 061925574

Customer ID: LBAP78

Customer PO: 2043465.32.00

Project ID:

## Test Report:Asbestos Analysis of Bulk Material

Test	Analyzed Date	Color	Non-Asbestos		Asbestos
			Fibrous	Non-Fibrous	
Sample ID 04-04C 061925574-0012		Description Homogeneity	Room 213 - Blue 6" Cove Base Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	11/15/2019	Blue		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	11/16/2019	Blue		100.00% Other	None Detected
Sample ID 05-05A 061925574-0013		Description Homogeneity	Room 210 - Gypsum Heterogeneous		
PLM NYS 198.1 Friable	11/15/2019	Brown/ Tan	10.00% Cellulose	8.00% Ca Carbonate 70.00% Gypsum 12.00% Non-fibrous (other)	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 05-05B 061925574-0014		Description Homogeneity	Room 204 - Gypsum Heterogeneous		
PLM NYS 198.1 Friable	11/15/2019	Brown/ Tan	15.00% Cellulose	7.00% Ca Carbonate 60.00% Gypsum 18.00% Non-fibrous (other)	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 05-05C 061925574-0015		Description Homogeneity	Room 213 - Gypsum Heterogeneous		
PLM NYS 198.1 Friable	11/15/2019	Brown/ White	12.00% Cellulose	8.00% Ca Carbonate 75.00% Gypsum 5.00% Non-fibrous (other)	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 06-06A 061925574-0016		Description Homogeneity	Room 210 - Joint Compound Homogeneous		
PLM NYS 198.1 Friable	11/15/2019	Tan	None	65.00% Ca Carbonate 12.00% Mica 21.50% Non-fibrous (other)	1.50% Chrysotile
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 06-06B 061925574-0017		Description Homogeneity	Room 204 - Joint Compound		
PLM NYS 198.1 Friable	11/15/2019				Positive Stop (Not Analyzed)
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed

Initial report from: 11/16/2019 08:54:40



# EMSL Analytical, Inc.

528 Mineola Avenue Carle Place, NY 11514

Tel/Fax: (516) 997-7251 / (516) 997-7528

<http://www.EMSL.com> / [carleplacelab@emsl.com](mailto:carleplacelab@emsl.com)

EMSL Order: 061925574

Customer ID: LBAP78

Customer PO: 2043465.32.00

Project ID:

## Test Report:Asbestos Analysis of Bulk Material

Test	Analyzed Date	Color	Non-Asbestos		Asbestos
			Fibrous	Non-Fibrous	
Sample ID 06-06C 061925574-0018		Description Homogeneity	Room 213 - Joint Compound		
PLM NYS 198.1 Friable	11/15/2019				Positive Stop (Not Analyzed)
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 07-07A 061925574-0019		Description Homogeneity	Exterior to Room 215 - Exterior Brick Mortar		
PLM NYS 198.1 Friable	11/15/2019	Gray/ Tan/ White		20.00% Ca Carbonate 3.00% Mica 12.00% Non-fibrous (other) 65.00% Quartz	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 07-07B 061925574-0020		Description Homogeneity	Exterior to Room 213 - Exterior Brick Mortar		
PLM NYS 198.1 Friable	11/15/2019	Gray/ Tan/ White		20.00% Ca Carbonate 3.00% Mica 7.00% Non-fibrous (other) 70.00% Quartz	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 07-07C 061925574-0021		Description Homogeneity	Exterior to Room 216 - Exterior Brick Mortar		
PLM NYS 198.1 Friable	11/15/2019	Gray/ Tan/ White		25.00% Ca Carbonate 2.00% Mica 8.00% Non-fibrous (other) 65.00% Quartz	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 08-08A 061925574-0022		Description Homogeneity	Exterior to Room 215 - Exterior Louver Caulking		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	11/15/2019	Gray	None	97.50% Other	2.50% Chrysotile
TEM NYS 198.4 NOB	11/15/2019				Not Analyzed

Initial report from: 11/16/2019 08:54:40



# EMSL Analytical, Inc.

528 Mineola Avenue Carle Place, NY 11514

Tel/Fax: (516) 997-7251 / (516) 997-7528

<http://www.EMSL.com> / [carleplacelab@emsl.com](mailto:carleplacelab@emsl.com)

EMSL Order: 061925574

Customer ID: LBAP78

Customer PO: 2043465.32.00

Project ID:

## Test Report: Asbestos Analysis of Bulk Material

Test	Analyzed Date	Color	Non-Asbestos		Asbestos
			Fibrous	Non-Fibrous	
Sample ID 08-08B 061925574-0023		Description Homogeneity	Exterior to Room 213 - Exterior Louver Caulking		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	11/15/2019				Positive Stop (Not Analyzed)
TEM NYS 198.4 NOB	11/15/2019				Not Analyzed
Sample ID 09-09A 061925574-0024		Description Homogeneity	Room 210 - Wall Paper over Gypsum		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	11/15/2019	White/ Yellow/ Green		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	11/16/2019	White/ Yellow/ Green	None	100.00% Other	<1% Chrysotile
Sample ID 09-09B 061925574-0025		Description Homogeneity	Room 204 - Wall Paper over Gypsum		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	11/15/2019	Tan/ White/ Yellow		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	11/16/2019	Tan/ White/ Yellow		100.00% Other	None Detected
Sample ID 09-09C 061925574-0026		Description Homogeneity	Room 213 - Wall Paper over Gypsum		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	11/15/2019	White/ Blue/ Yellow		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	11/16/2019	White/ Blue/ Yellow		100.00% Other	None Detected
Sample ID 10-10A 061925574-0027		Description Homogeneity	Water Service Room Across from Boiler Room - CMU Mortar		
PLM NYS 198.1 Friable	11/15/2019	Gray/ Tan/ White		30.00% Ca Carbonate 2.00% Mica 8.00% Non-fibrous (other) 60.00% Quartz	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed

Initial report from: 11/16/2019 08:54:40



# EMSL Analytical, Inc.

528 Mineola Avenue Carle Place, NY 11514

Tel/Fax: (516) 997-7251 / (516) 997-7528

<http://www.EMSL.com> / [carleplacelab@emsl.com](mailto:carleplacelab@emsl.com)

EMSL Order: 061925574

Customer ID: LBAP78

Customer PO: 2043465.32.00

Project ID:

## Test Report:Asbestos Analysis of Bulk Material

Test	Analyzed Date	Color	Non-Asbestos		Asbestos
			Fibrous	Non-Fibrous	
Sample ID	10-10B	Description	Water Service Room Across from Boiler Room - CMU Mortar		
	061925574-0028	Homogeneity	Homogeneous		
PLM NYS 198.1 Friable	11/15/2019	Gray/ Tan/ White		25.00% Ca Carbonate 3.00% Mica 7.00% Non-fibrous (other) 65.00% Quartz	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed

Initial report from: 11/16/2019 08:54:40



## EMSL Analytical, Inc.

528 Mineola Avenue Carle Place, NY 11514

Tel/Fax: (516) 997-7251 / (516) 997-7528

<http://www.EMSL.com> / [carleplacelab@emsl.com](mailto:carleplacelab@emsl.com)

EMSL Order: 061925574

Customer ID: LBAP78

Customer PO: 2043465.32.00

Project ID:

### Test Report: Asbestos Analysis of Bulk Material

The samples in this report were submitted to EMSL for analysis by Asbestos Analysis of Bulk Materials via NYS ELAP Approved Methods. The reference number for these samples is the EMSL Order ID above. Please use this reference number when calling about these samples.

#### Report Comments:

Sample Receipt Date: 11/15/2019

Analysis Completed Date: 11/15/2019

Sample Receipt Time: 2:03 AM

Analysis Completed Time: 10:43 PM

#### Analyst(s):

Tomas Montes De Oca PLM NYS 198.1 Friable (9)

Steve Juszczuk PLM NYS 198.6 NOB (16)

Rosemary Ortega TEM NYS 198.4 NOB (15)

#### Samples reviewed and approved by:

Daniel Clarke, Asbestos Laboratory Manager  
or Other Approved Signatory

NOB = Non Friable Organically Bound N/A = Not Applicable VCM = Vermiculite Containing Material

-In New York State, TEM is currently the only method that can be used to determine if NOB materials can be considered or treated as non-asbestos containing.

All samples examined for the presence of vermiculite when analyzed via NYS 198.1.

-NYS Guidelines for Vermiculite containing samples are available at [http://www.wadsworth.org/labcert/elapcert/forms/VermiculiteInterimGuidance\\_Rev070913.pdf](http://www.wadsworth.org/labcert/elapcert/forms/VermiculiteInterimGuidance_Rev070913.pdf) EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. Samples were received in good condition unless otherwise noted.

This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government. This report may contain data that is not covered by the NVLAP accreditation.

Samples analyzed by EMSL Analytical, Inc. Carle Place, NY NYS ELAP 11469

Initial report from: 11/16/2019 08:54:40

061925574

# WSP

## ASBESTOS SURVEY DATA SHEET / CHAIN OF CUSTODY

PAGE 1 OF 3

PROJECT NO: 2043465.32.00

CLIENT: Peekskill City S.D.

PROJECT SITE: OAKSIDE E.S.

Project Manager: Marvin Luccioni

LOCATION(S) SURVEYED: Interior &amp; Exterior Classrooms

PROPOSED PROJECT: Upgrade Unit Ventilators

DATE(S) OF INSPECTION: 11-13-19

Inspector(s): L. Nevarez &amp; A. Cheskin

WSP  
TELEPHONE NO.: (914) 798-3710  
ADDRESS: 565 Taxter Road Suite 510, Elmsford, NY 10523

RESULTS TO: [marvin.luccioni@wsp.com](mailto:marvin.luccioni@wsp.com)

TURNAROUND TIME: ☐ 3 HR. ☒ 6 HR ☒ 24 HR  
☐ 48 HR. ☐ 72 HR. ☐ OTHER

HA	SAMPLE NO.	MATERIAL DESCRIPTION	SAMPLE LOCATION	APPROX. QUANTITY (LF/SF)	FIELD NOTES
01	01A	Mastic To 12"x12" Beige with Blue Spots FT	Room 210		
01	01B	Mastic To 12"x12" Beige with Blue Spots FT	Room 204		
01	01C	Mastic To 12"x12" Beige with Blue Spots FT	Room 212		
02	02A	12"x12" Beige with Blue Spots FT	Room 210		
02	02B	12"x12" Beige with Blue Spots FT	Room 204		
02	02C	12"x12" Beige with Blue Spots FT	Room 212		
03	03A	Mastic to Blue 6" Cove Base	Room 210		
03	03B	Mastic to Blue 6" Cove Base	Room 204		
03	03C	Mastic to Blue 6" Cove Base	Room 213		
04	04A	Blue 6" Cove Base	Room 210		
04	04B	Blue 6" Cove Base	Room 204		
04	04C	Blue 6" Cove Base	Room 213		

ANALYTICAL, INC.  
CARLE PLACE, NY  
19 NOV 15 AM 2:03

## CHAIN OF CUSTODY

Relinquished by:	(Sign)	(Date)	Relinquished by:	(Sign)	(Date)	(Time)
L. Nevarez	<i>[Signature]</i>	11-14-19				
Received by:	(Sign)	(Date)	Received by:	(Sign)	(Date)	(Time)
<i>[Signature]</i>	<i>[Signature]</i>	11-14-19				

T.N. General Notes: All inconclusive NOBs to be analyzed by TEM. Please stop at 1<sup>st</sup> positive in any homogeneous group.

*[Signature]* 11/16/19

*[Signature]* 11/15/19

*[Signature]* 11/15/19

061925574

	Louis Berger	<b>ASBESTOS SURVEY DATA SHEET / CHAIN OF CUSTODY</b>	PAGE 2 OF 3

PROJECT NO: 2043465.32.00

CLIENT: Peekskill City S.D.

PROJECT SITE: OAKSIDE E.S.

Project Manager: Marvin Luccioni

LOCATION(S) SURVEYED: Interior &amp; Exterior Classrooms

PROPOSED PROJECT: Upgrade Unit Ventilators

DATE(S) OF INSPECTION: 11-13-19

Inspector(s): L. Nevarez &amp; A. Cheskin



WSP  
 TELEPHONE NO.: (914) 798-3710  
 ADDRESS: 565 Taxter Road Suite 510, Elmsford, NY 10523

RESULTS TO: [marvin.luccioni@wsp.com](mailto:marvin.luccioni@wsp.com)
 TURNAROUND TIME: ☐ 3 HR. ☐ 6 HR ☒ 24 HR  
☐ 48 HR. ☐ 72 HR. ☐ OTHER

HA	SAMPLE NO.	MATERIAL DESCRIPTION	SAMPLE LOCATION	APPROX. QUANTITY (LF/SF)	FIELD NOTES
05	05A	Gypsum	Room 210		
05	05B	Gypsum	Room 204		
05	05C	Gypsum	Room 213		
06	06A	Joint Compound	Room 210		
06	06B	Joint Compound	Room 204		
06	06C	Joint Compound	Room 213		
07	07A	Exterior Brick Mortar	Exterior to Room 215		
07	07B	Exterior Brick Mortar	Exterior to Room 213		
07	07C	Exterior Brick Mortar	Exterior to Room 216		
08	08A	Exterior Louver Calking	Exterior to Room 215		
08	08B	Exterior Louver Calking	Exterior to Room 213		
09	09A	Wall Paper Over Gypsum	Room 210		

 ANALYTICAL, INC.  
 CARLE PLACE, NY  
 19 NOV 15 AM 2:03

## CHAIN OF CUSTODY

Relinquished by:	(Sign)	(Date)	(Time)	Relinquished by:	(Sign)	(Date)	(Time)
L. Nevarez		11-14-19	12:00				
Received by:	(Sign)	(Date)	(Time)	Received by:	(Sign)	(Date)	(Time)
K. N...		11-14-19	2:00				

 T.N. General Notes: All inconclusive NOBs to be analyzed by TEM. Please stop at 1<sup>st</sup> positive in any homogeneous group.

 11/16/19

 11/15/19

 11/15/19







**APPENDIX C:  
ASBESTOS BULK SAMPLE LOCATION DRAWINGS**



PEEKSKILL  
SCHOOL DISTRICT  
PEEKSKILL OAKSIDE  
ELEMENTARY SCHOOL

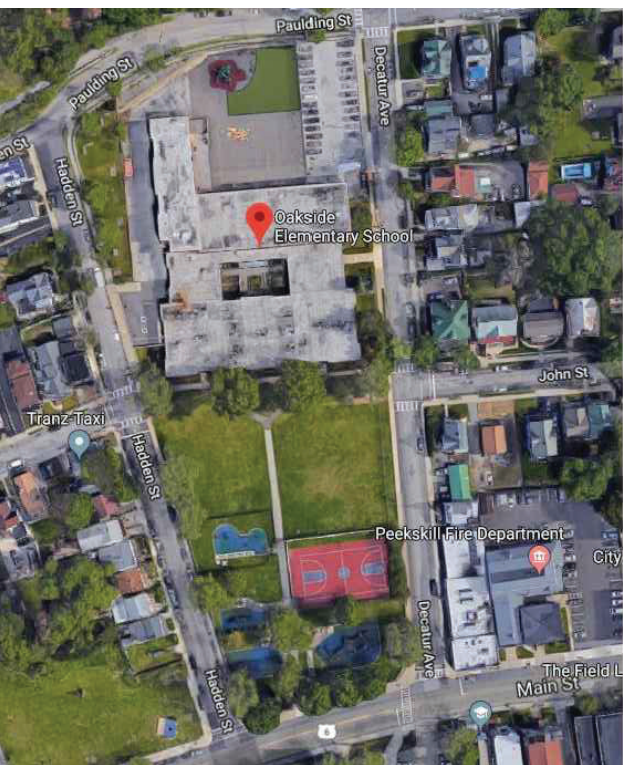
200 DECATOUR AVE  
PEEKSKILL, NY 10566

ENVIRONMENTAL CONSULTANT



565 Taxter Road  
Elmsford, NY 10523  
TEL 914.798.3710 FAX 212.363.4341 WWW.WSP.COM

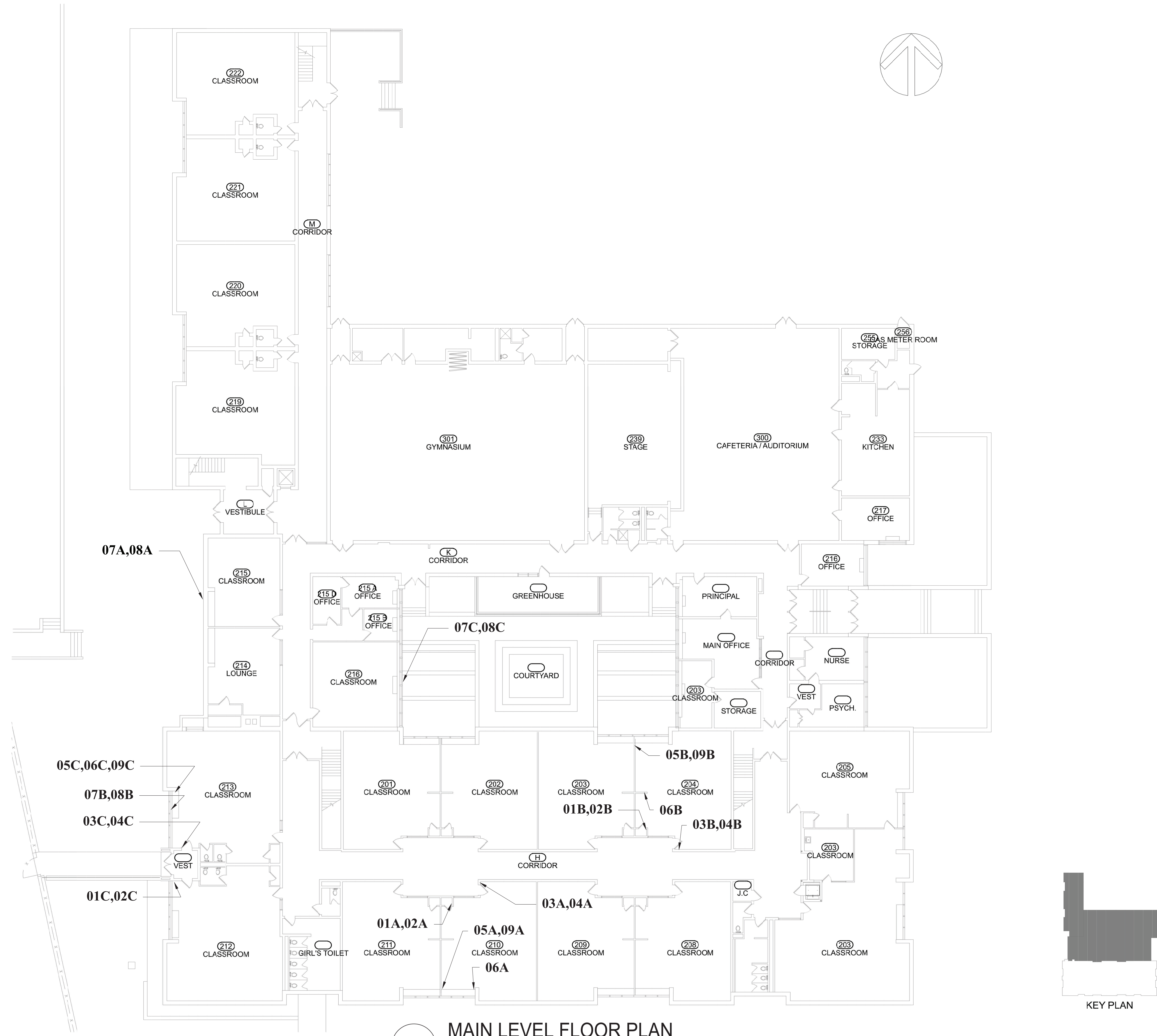
KEY PLAN:




No.	Date	Issue

**BULK SAMPLE LOCATIONS  
MAIN LEVEL FLOOR PLAN**

Job No. 2043465.32	Sheet No. 11-18-2019
Drawn by: J. PEREZ	<b>BSL001</b>
Checked by: M. LUCCIONI	
1 of 1	

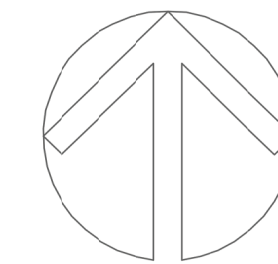
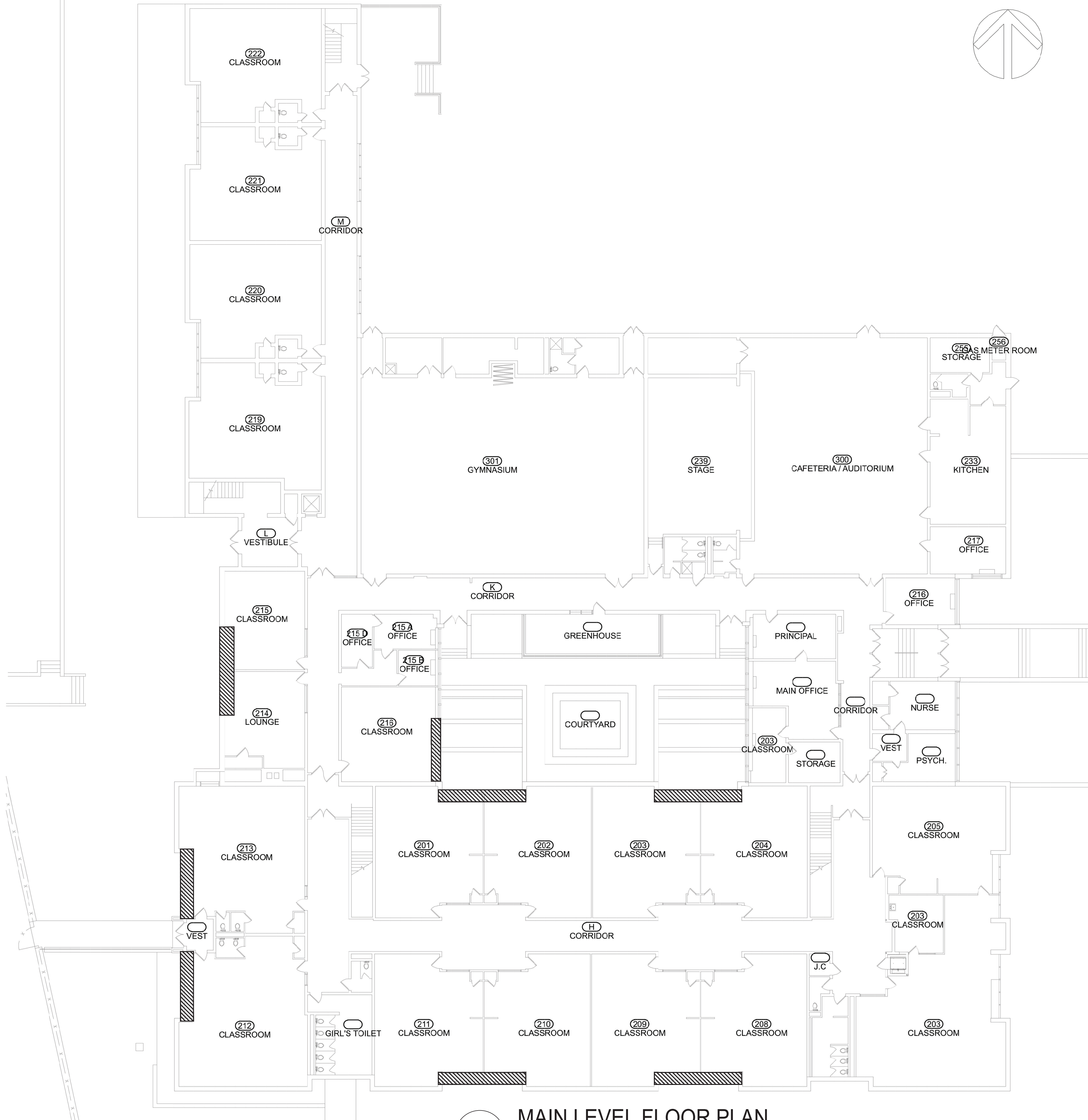


**1 MAIN LEVEL FLOOR PLAN**  
SCALE: NTS



**APPENDIX D:  
ASBESTOS CONTAINING MATERIALS LOCATION  
DRAWINGS**





**LEGEND**

 LOCATION OF CONFIRMED ASBESTOS CONTAINING JOINT COMPOUND AND EXTERIOR LOUVER CAULKING



KEY PLAN

**1** MAIN LEVEL FLOOR PLAN  
SCALE: NTS



**PEEKSKILL  
SCHOOL DISTRICT  
PEEKSKILL OAKSIDE  
ELEMENTARY SCHOOL**

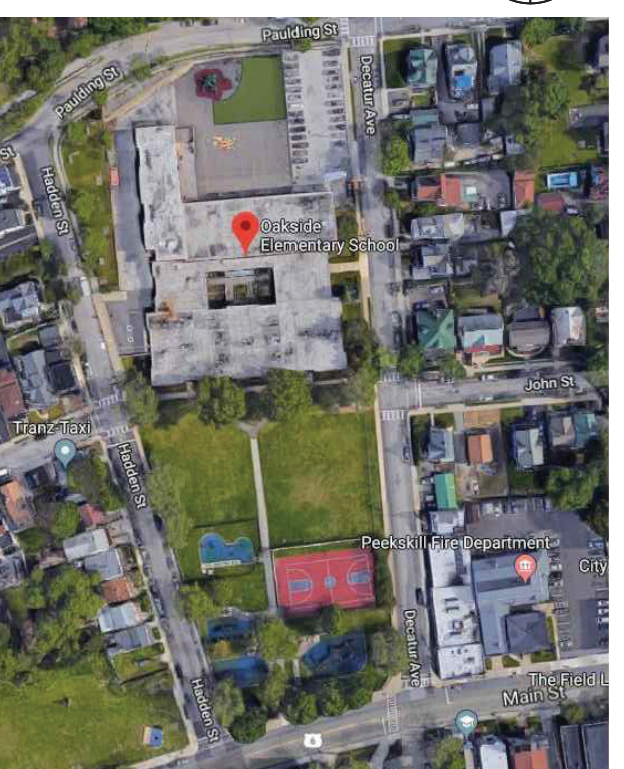
200 DECATOUR AVE  
PEEKSKILL, NY 10566

**ENVIRONMENTAL CONSULTANT**



565 Taxter Road  
Elmsford, NY 10523  
TEL. 914.798.3710 FAX 212.363.4341 WWW.WSP.COM

**KEY PLAN:**



No. Date Issue  
Sheet Title

**ASBESTOS CONTAINING  
MATERIALS  
MAIN LEVEL FLOOR PLAN**

Job No.  
2043465.32  
11-20-2019  
Drawn by:  
J. PEREZ  
Checked by:  
M. LUCCIONI

Sheet No.

**ACM001**

1 of 1



**APPENDIX E:  
PCB BULK SAMPLE FIELD DATA SHEETS  
WITH CHAIN OF CUSTODY & LABORATORY RESULTS**



**EMSL Analytical, Inc.**

200 Route 130 North, Cinnaminson, NJ 08077

Phone: (856) 303-2500 Fax: (856) 858-4571 Email: [EnvChemistry2@emsl.com](mailto:EnvChemistry2@emsl.com)

Attn:

**Marvin Luccioni  
Louis Berger U.S., Inc  
96 Morton Street  
8th floor  
New York, NY 10014**

Phone: (212) 612-7900

Fax:

11/22/2019

The following analytical report covers the analysis performed on samples submitted to EMSL Analytical, Inc. on 11/15/2019. The results are tabulated on the attached data pages for the following client designated project:

**2043465.32.00 Peekskill City S.D. Oakside E.S.**

The reference number for these samples is EMSL Order #011914649. Please use this reference when calling about these samples. If you have any questions, please do not hesitate to contact me at (856) 303-2500.

Approved By:

Phillip Worby, Environmental Chemistry  
Laboratory Director



The test results contained within this report meet the requirements of NELAP and/or the specific certification program that is applicable, unless otherwise noted.

NELAP Certifications: NJ 03036, NY 10872, PA 68-00367, CA ELAP 1877

The samples associated with this report were received in good condition unless otherwise noted. This report relates only to those items tested as received by the laboratory. The QC data associated with the sample results meet the recovery and precision requirements established by the NELAP, unless specifically indicated. All results for soil samples are reported on a dry weight basis, unless otherwise noted. This report may not be reproduced except in full and without written approval by EMSL Analytical, Inc.

**EMSL Analytical, Inc.**

200 Route 130 North, Cinnaminson, NJ 08077

Phone/Fax: (856) 303-2500 / (856) 858-4571

<http://www.EMSL.com>[EnvChemistry2@emsl.com](mailto:EnvChemistry2@emsl.com)

EMSL Order: 011914649

CustomerID: LBAP78

CustomerPO:

ProjectID:

Attn: **Marvin Luccioni**  
**Louis Berger U.S., Inc**  
**96 Morton Street**  
**8th floor**  
**New York, NY 10014**

Phone: (212) 612-7900  
Fax:  
Received: 11/15/19 2:00 PM

Project: 2043465.32.00 Peekskill City S.D. Oakside E.S.

**Analytical Results**

**Client Sample Description** 08A,B,C  
Exterior to Room 215, 213, 216 Louver  
Caulking

**Collected:** 11/13/2019 **Lab ID:** 011914649-0001

Method	Parameter	Result	RL	Units	Prep Date & Analyst	Analysis Date & Analyst
<b>GC-SVOA</b>						
3546/8082A	Aroclor-1016	ND D		22 mg/Kg	11/19/2019 AB	11/20/19 0:00 EH
3546/8082A	Aroclor-1221	ND D		22 mg/Kg	11/19/2019 AB	11/20/19 0:00 EH
3546/8082A	Aroclor-1232	ND D		22 mg/Kg	11/19/2019 AB	11/20/19 0:00 EH
3546/8082A	Aroclor-1242	ND D		22 mg/Kg	11/19/2019 AB	11/20/19 0:00 EH
3546/8082A	Aroclor-1248	ND D		22 mg/Kg	11/19/2019 AB	11/20/19 0:00 EH
3546/8082A	Aroclor-1254	240 D		22 mg/Kg	11/19/2019 AB	11/20/19 0:00 EH
3546/8082A	Aroclor-1260	ND D		22 mg/Kg	11/19/2019 AB	11/20/19 0:00 EH
3546/8082A	Aroclor-1262	ND D		22 mg/Kg	11/19/2019 AB	11/20/19 0:00 EH
3546/8082A	Aroclor-1268	440 D		22 mg/Kg	11/19/2019 AB	11/20/19 0:00 EH

**Definitions:**

MDL - method detection limit

J - Result was below the reporting limit, but at or above the MDL

ND - indicates that the analyte was not detected at the reporting limit

RL - Reporting Limit (Analytical)

D - Dilution



/Louis Berger

# PCB SURVEY DATA SHEET / CHAIN OF CUSTODY

**PROJECT NO: 2043465.32.00**

**CLIENT: Peekskill City S.D.**

**PROJECT SITE: OAKSIDE E.S.**

**Project Manager: Marvin Luccioni**

WSP

TELEPHONE NO.: (914) 798-3700  
ADDRESS: 565 Taxter Road, Elmsford, NY 10523

RESULTS TO: marvin.luccioni@wsp.com

TURNAROUND TIME: **5** -Day

011914649

**LOCATION(S) SURVEYED:** Exterior Classrooms

**PROPOSED PROJECT: Upgrade Unit Ventilators**

**DATE(S) OF INSPECTION: 11-13-19**

**Inspector(s):** L. Nevarez & A. Cheskin

[illegible]

19 NOV 15 AM 2:03  
CARLE PLACE, NY  
CARLE ANALYTICAL, INC.

## CHAIN OF CUSTODY

linguished by:

(Sign)

11-16  
(Date)

(Time)  
13:00

Relinquished by:

(Sign)

(Date \_\_\_\_\_)

(Time)

Relinquished by:

(Sign)

(Date)

(Time)

Received by:

(Sign)

(Date)

Time	...
...	...

Received by:

(Sign)

Date

(Time)	
--------	--

Received by:

(Sign)

(Date) 7/7

(Time)

**LAB INSTRUCTIONS:** create one (1) composite sample of each homogeneous material from equal mass portions (+ 5%) of the three (3) sub-samples for extraction and analysis via EPA Method 8062 and report the Aroclors listed (Arochlor 1016, Arochlor 1221, Arochlor 1232, Arochlor 1242, Arochlor 1248, Arochlor 1254, Arochlor 1260). The laboratory shall target a PCB detection limit of 1 ppm

40





**APPENDIX F:  
COMPANY LICENSE, PERSONNEL CERTIFICATIONS  
& LABORATORY ACCREDITATIONS**

**New York State – Department of Labor**

Division of Safety and Health  
License and Certificate Unit  
State Campus, Building 12  
Albany, NY 12240

**ASBESTOS HANDLING LICENSE**

Louis Berger, U.S., Inc.  
8th Floor  
96 Morton Street  
New York, NY 10014

FILE NUMBER: 19-132876  
LICENSE NUMBER: 132876  
LICENSE CLASS: RESTRICTED  
DATE OF ISSUE: 02/14/2019  
EXPIRATION DATE: 02/29/2020

Duly Authorized Representative – Craig Napolitano:

This license has been issued in accordance with applicable provisions of Article 30 of the Labor Law of New York State and of the New York State Codes, Rules and Regulations (12 NYCRR Part 56). It is subject to suspension or revocation for a (1) serious violation of state, federal or local laws with regard to the conduct of an asbestos project, or (2) demonstrated lack of responsibility in the conduct of any job involving asbestos or asbestos material.

This license is valid only for the contractor named above and this license or a photocopy must be prominently displayed at the asbestos project worksite. This license verifies that all persons employed by the licensee on an asbestos project in New York State have been issued an Asbestos Certificate, appropriate for the type of work they perform, by the New York State Department of Labor.



Eileen M. Franko, Director  
For the Commissioner of Labor



ANDREW B CHESKIN

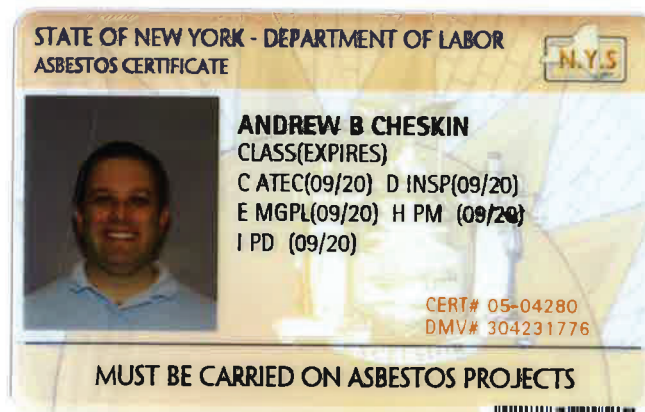
C/O LOUIS BERGER 96 MORTON ST 8TH FL  
NEW YORK NY 10014

Enclosed is your new card.

## NYS Department of Labor

The Department of Labor is happy to provide this improved card. We welcome your comments:  
[nysdol@labor.ny.gov](mailto:nysdol@labor.ny.gov) or call (518) 457-2735

YOUR NEW CARD





Department  
of Labor

LUIS A NEVAREZ

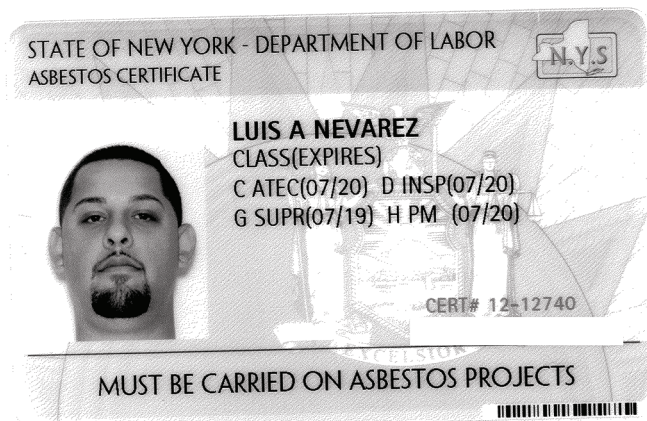
C/O LOUIS BERGER, 96 MORTON ST APT 8FL  
NEW YORK NY 10014

Enclosed is your new card.

## **NYS Department of Labor**

The Department of Labor is happy to provide this improved card. We welcome your comments:  
[nysdol@labor.ny.gov](mailto:nysdol@labor.ny.gov) or call (518) 457-2735

YOUR NEW CARD



**NEW YORK STATE DEPARTMENT OF HEALTH  
WADSWORTH CENTER**



**Expires 12:01 AM April 01, 2020  
Issued April 01, 2019**

**CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE**  
*Issued in accordance with and pursuant to section 502 Public Health Law of New York State*

**MR. DANIEL CLARKE  
EMSL ANALYTICAL, INC.  
528 MINEOLA AVE.  
CARLE PLACE, NY 11514**

**NY Lab Id No: 11469**

**is hereby APPROVED as an Environmental Laboratory for the category  
ENVIRONMENTAL ANALYSES SOLID AND HAZARDOUS WASTE  
All approved subcategories and/or analytes are listed below:**

**Miscellaneous**

Asbestos In Friable Material	Item 198.1 of Manual EPA 600/M4/82/020
Asbestos in Non-Friable Material-PLM	Item 198.6 of Manual (NOB by PLM)
Asbestos In Non-Friable Material-TEM	Item 198.4 of Manual
Asbestos-Vermiculite-Containing Material	Item 198.8 of Manual
Lead in Dust Wipes	EPA 7000B
Lead in Paint	EPA 7000B

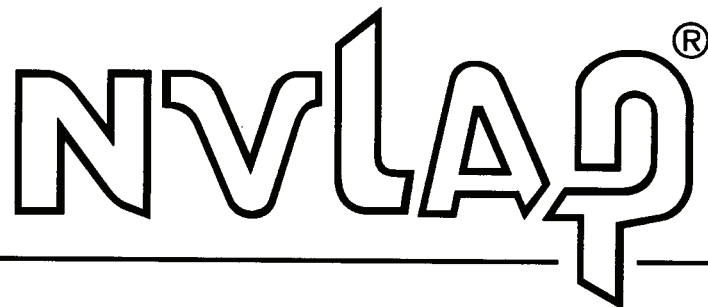
**Sample Preparation Methods**

EPA 3051A

**Serial No.: 59670**

Property of the New York State Department of Health. Certificates are valid only at the address shown, must be conspicuously posted, and are printed on secure paper. Continued accreditation depends on successful ongoing participation in the Program. Consumers are urged to call (518) 485-5570 to verify the laboratory's accreditation status.

United States Department of Commerce  
National Institute of Standards and Technology



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**Certificate of Accreditation to ISO/IEC 17025:2017**

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**NVLAP LAB CODE: 101048-10**

**EMSL Analytical, Inc.**  
Carle Place, NY

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

**Asbestos Fiber Analysis**

*This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017.  
This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality  
management system (refer to joint ISO-ILAC-IAF Communique dated January 2009).*

---

2019-07-01 through 2020-06-30

*Effective Dates*



For the National Voluntary Laboratory Accreditation Program

**SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017**

**EMSL Analytical, Inc.**  
528 Mineola Ave.  
Carle Place, NY 11514  
Daniel Clarke  
Phone: 516-997-7251  
Email: dclarke@emsl.com  
<http://www.emsl.com>

**ASBESTOS FIBER ANALYSIS**

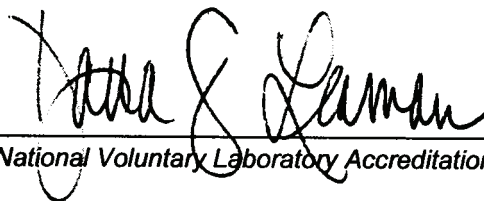
**NVLAP LAB CODE 101048-10**

**Bulk Asbestos Analysis**

<u><b>Code</b></u>	<u><b>Description</b></u>
18/A01	EPA -- 40 CFR Appendix E to Subpart E of Part 763, Interim Method of the Determination of Asbestos in Bulk Insulation Samples
18/A03	EPA 600/R-93/116: Method for the Determination of Asbestos in Bulk Building Materials

**Airborne Asbestos Analysis**

<u><b>Code</b></u>	<u><b>Description</b></u>
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.



*For the National Voluntary Laboratory Accreditation Program*





**APPENDIX G:  
PHOTOGRAPHIC DOCUMENTATION**



Photograph #1 – Typical Unit Ventilator installation associated with Non-ACM 12”x12” Beige with Blue Spots Floor Tile & Mastic, Non-ACM Blue 6” Cove Base & Mastic, Non-ACM Gypsum, Asbestos Containing Joint Compound and Non-ACM Wall Paper over Gypsum.



Photograph #2 – Typical Unit Ventilator Exterior Louver layout associated with Non-ACM  
Exterior Brick Mortar and Asbestos Containing Exterior Louver Caulking



Photograph #3 – Asbestos Containing Exterior Louver Caulking (also associated with exterior  
window frames)

# **FINAL REPORT OF ENVIRONMENTAL SERVICES**

*Performed at:*

**URIAH HILL ELEMENTARY SCHOOL  
980 PEMART AVENUE  
PEEKSKILL, NY 10566**

*Prepared for:*



**Peekskill City School District  
1031 Elm Street  
Peekskill, NY 10566**

*Prepared by:*



**565 Taxter Road, 5<sup>th</sup> Floor  
Elmsford, New York 10523  
Tel. (914) 798-3710  
Fax (914) 592-1734**

**Project No. 2043465.33  
Final Submission Date: November 20, 2019**



November 20, 2019

Mr. Carmine Crisci  
Director of Facilities, Operations and Maintenance  
Peekskill City School District  
1031 Elm Street  
Peekskill, New York 10566

**Subject: Final Report of Environmental Services  
Uriah Hill Elementary School  
980 Pemart Avenue  
Peekskill, NY 10566**

Dear Mr. Crisci:

Louis Berger (Berger), A WSP company, has completed a limited material inspection at Uriah Hill Elementary School located at 980 Pemart Avenue, Peekskill, NY. The limited inspection included visual observation, material sampling, and laboratory sample analysis of suspect Asbestos-Containing Materials (ACM) and Polychlorinated-Biphenyls (PCBs) as part of the school district's renovation for the Energy Performance Contract project at Uriah Hill ES.

The attached report presents descriptions and results of the material sampling procedures and visual analysis. Relevant general project information is provided, followed by our findings, assessments and recommendations. Laboratory analysis data and certifications are provided in the Appendices.

If you have any questions concerning this report or if we may be of further assistance to you, please contact us.

Sincerely,

**LOUIS BERGER, A WSP COMPANY**

A handwritten signature in blue ink, appearing to read 'CN', with a stylized flourish at the end.

Craig Napolitano, CHMM  
Vice President, Emergency Management & IH Services





# ***Final Report for Environmental Inspection Services***

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### **Appendices**

Appendix A: Asbestos Sample Analysis Results in Tabular Form

Appendix B: Asbestos Bulk Sample Field Data Sheets with Chain of Custody & Laboratory Results

Appendix C: Asbestos Bulk Sample Location Drawings

Appendix D: Asbestos Containing Materials Location Drawings

Appendix E: PCB Bulk Sample Field Data Sheets with Chain of Custody & Laboratory Results

Appendix F: Company License, Personnel Certifications & Laboratory Accreditations

Appendix G: Photographic Documentation



## ***Final Report for Environmental Inspection Services***

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### **1.0 EXECUTIVE SUMMARY**

Louis Berger (Berger), A WSP company, has completed a limited material inspection at Uriah Hill Elementary School located at 980 Pemart Avenue, Peekskill, NY. The limited inspection included visual observation, material sampling, and laboratory sample analysis of suspect Asbestos-Containing Materials (ACM) and Polychlorinated-Biphenyls (PCBs) as part of the school district's renovation for Energy Performance Contract project at Uriah Hill ES.

Drew Cheskin & Luis Nevarez of Berger performed the inspection on November 13, 2019. Mr. Cheskin (Cert# 05-04280) and Mr. Nevarez (Cert# 12-12740) are New York State Department of Labor (NYSDOL) Asbestos Inspectors.

The results of the visual inspection and bulk sample analysis determined that the following suspect ACM and PCB materials may be impacted by the proposed Energy Performance Contract project at Uriah Hill Elementary School.

#### **A. ASBESTOS-CONTAINING MATERIAL**

Analytical results of the bulk samples collected by Berger indicate that the following materials **contain asbestos** (greater than 1-percent).

- **Joint Compound**

Analytical results of the bulk samples collected indicate that the following materials **did not contain asbestos** (less than 1-percent);

- Gypsum
- 2x2 Ceiling Tile
- CMU Mortar
- Exterior Brick Mortar
- Exterior Window Frame Caulking

As per the 2019 AHERA, the following materials which may be affected by this scope of work **contain or are assumed to contain asbestos**;

- **Pipe Insulation (above ceiling tiles)**
- **Fitting Insulation (above ceiling tiles)**

#### **B. PCB-CONTAINING MATERIAL**

Analytical results of the bulk samples collected indicate that the following materials **contain PCB** (greater than 50 PPM).

- **None**





## ***Final Report for Environmental Inspection Services***

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Analytical results of the bulk samples collected indicate that the following materials **did not contain PCB** (less than 50 PPM);

- Exterior Window Frame Caulking

### **2.0 FIELD INSPECTION PROCEDURES AND SAMPLE ANALYSIS METHODS**

#### ***ASBESTOS-CONTAINING MATERIAL***

Guidelines used for the inspection were established by the Environmental Protection Agency (EPA) in the Guidance for Controlling Asbestos Containing Materials in Buildings, Office of Pesticides and Toxic Substances, Doc 560/5-85-024, and 40 CFR Part 763, Asbestos Hazard Emergency Response Act (AHERA).

Field information was organized in accordance with the AHERA methodology of homogenous area (HA). During the Inspection, reasonable effort was made to identify all locations and types of ACM materials associated with the scope of work. Sampling has included multiple samples of the same materials chosen at random. However, due to inconsistencies of a manufacturer's processes and the contractor's installation methods, materials of similar construction may contain various amounts of asbestos. Furthermore, some materials that were not originally specified to contain asbestos may in fact contain this mineral. For example, cementitious pipe insulation and plaster were frequently mixed with asbestos at the construction site for ease of application. Locating all asbestos materials can only be definitively achieved by conducting exploratory demolition and sampling every section of pipe insulation, fitting or valve covering, fireproofing, and other suspect ACM.

Bulk samples of suspect ACM are analyzed using polarized light microscopy (PLM) coupled with dispersion staining, as described in 40 CFR Part 763 and the National Emissions Standard for Hazardous Air Pollutants (NESHAPS). NESHAPS is the standard industry protocol for the determination of asbestos in building materials. A suspect material is immersed in a solution of known refractive index and subjected to illumination by polarized light. The color displays that result are compared to a standardized atlas whereby the specific variety of asbestos is determined. It should also be recognized that PLM is primarily a qualitative identification method whereby asbestos percentage, if any, is estimated. While EPA, New York State, and New York City regulations governing ACM consider materials containing greater than 1-percent as asbestos, accurately quantifying asbestos content below 5-percent has been shown to be unreliable.

The New York State Department of Health has recently revised the PLM Stratified Point Counting Method. The March 25<sup>th</sup>, 2011 method, "Polarized Light Microscopy Methods for Identifying and Quantifying Asbestos in Bulk Samples" can be found as Item 198.1 in the Environmental Laboratory Approval program (ELAP) Certification manual. Whereas the procedure of analysis for bulk samples that fall into the category of "Non-friable Organically Bound" (NOB) can be found in the March 25<sup>th</sup> 2011 method "Polarized-Light Microscope Method for Identifying and Quantifying Asbestos in Non-Friable Organically Bound Bulk Samples", Item 198.6 in the ELAP Certification Manual. This category includes any sample in a



## ***Final Report for Environmental Inspection Services***

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flexible to rigid asphalt or vinyl matrix (floor tiles, mastic, roofing shingles, roofing felt, etc.). These samples must be “ashed” in a muffle furnace at 480-degrees Celsius (to remove organic matrix), treated with acid (to remove any mineral carbonate), and filtered through a 0.4-micron polycarbonate filter before being analyzed by PLM. The sample must be weighted between each of these steps to track the percent loss of organic matrix.

ELAP has determined that analysis of NOB materials is not reliably performed by PLM. Therefore, if PLM analysis yields results of 1-percent asbestos or less, the result must be confirmed by TEM. For bulk samples that undergo TEM analysis, the March 25th, 2011 method “Transmission Electron Microscope Method for Identifying and Quantitating Asbestos in Non-Friable organically Bound Bulk Samples” must be used and can be found as Item 198.4 in the ELAP Certification Manual. ELAP certified laboratories must include the following statement with their PLM analysis results for each “negative” (1-percent or less asbestos) NOB sample: “Polarized-light microscopy is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Before this material can be considered or treated as non-ACM, confirmation must be made by quantitative transmission electron microscopy”.

All samples are initially analyzed by Polarized Light Microscopy in accordance with Item 198.1 and 198.6 of the ELAP Certification Manual. Samples which yield a negative PLM result and which are classified as a “non-friable” material, are then re-analyzed utilizing TEM methodology in accordance with Item 198.4 of the ELAP Certification Manual. The laboratory performing both these analysis procedures is EMSL located at 528 Mineola Ave, Carle Place, NY 11514. The laboratory has received accreditation from the following agencies:

- National Voluntary Laboratory Accreditation Program (Lab Code 101048-10)
- New York State Environmental Laboratory Approval Program (Lab No. 11469)
- American Industrial Hygiene Association Accredited Laboratory (Lab No. 102344)

### **POLYCHLORINATED BIPHENYLS (PCBs)**

PCBs belong to a broad family of man-made organic chemicals known as chlorinated hydrocarbons. PCBs were domestically manufactured from 1929 until their manufacture was banned in 1979. They have a range of toxicity and vary in consistency from thin, light-colored liquids to yellow or black waxy solids. Due to their non-flammability, chemical stability, high boiling point, and electrical insulating properties, PCBs were used in hundreds of industrial and commercial applications including electrical, heat transfer, and hydraulic equipment; as plasticizers in paints, plastics, and rubber products; in pigments, dyes, and carbonless copy paper; and many other industrial applications.

Although no longer commercially produced in the United States, PCBs may be present in products and materials produced before the 1979 PCB ban. Products that may contain PCBs



## ***Final Report for Environmental Inspection Services***

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include: Transformers and capacitors, Oil used in motors and hydraulic systems, Fluorescent light ballasts, Adhesives and tapes, Caulking, Plastics, etc.

The PCBs used in these products were chemical mixtures made up of a variety of individual chlorinated biphenyl components, known as congeners. Most commercial PCB mixtures are known in the United States by their industrial trade names. The most common trade name is aroclor.

Polychlorinated biphenyls (PCBs) are regulated pursuant to the United States Environmental Protection Agency Code of Federal Regulations (40 CFR Part 761), the Toxic Substances Control Act (TSCA – 15 U.S.C. 2605), New York State Department of Environmental Conservation 6NYCRR 370-376 and federal Occupational Safety and Health Administration (OSHA) 29CFR 1926 & 1910. These regulations require certain testing and reporting requirements to determine management, recycling and disposal options for PCBs.

### **3.0 INSPECTION SCOPE AND MATERIAL ASSESSMENT**

The areas inspected for ACM and PCB materials that may be impacted by the proposed Energy Performance Contract project at Uriah Hill Elementary School include:

- Rooms 8 & 9
- Exterior Façade/Windows associated with rooms 8 & 9

#### **A. ASBESTOS-CONTAINING MATERIAL**

Materials examined during the Berger inspection included:

- Gypsum
- Joint Compound
- 2x2 Ceiling Tile
- CMU Mortar
- Exterior Brick Mortar
- Exterior Window Frame Caulking
- **Pipe Insulation (above ceiling tiles)**
- **Fitting Insulation (above ceiling tiles)**
- **Ceiling Deck (non-suspect concrete)**
- **Silicone to Window Air Conditioners (non-suspect)**

#### **A. ASBESTOS-CONTAINING MATERIAL**

Analytical results of the bulk samples collected by Berger indicate that the following materials **contain asbestos** (greater than 1-percent).

- **Joint Compound**



## ***Final Report for Environmental Inspection Services***

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Analytical results of the bulk samples collected indicate that the following materials **did not contain asbestos** (less than 1-percent);

- Gypsum
- 2x2 Ceiling Tile
- CMU Mortar
- Exterior Brick Mortar
- Exterior Window Frame Caulking

As per the 2019 AHERA, the following materials which may be affected by the scope of work **contain or are assumed to contain asbestos**;

- **Pipe Insulation (above ceiling tiles)**
- **Fitting Insulation (above ceiling tiles)**

### ***B. PCB-CONTAINING MATERIAL***

Analytical results of the bulk samples collected indicate that the following materials **contain PCB** (greater than 50 PPM).

- **None**

Analytical results of the bulk samples collected indicate that the following materials **did not contain PCB** (less than 50 PPM);

- Exterior Window Frame Caulking



## Final Report for Environmental Inspection Services

### 4.0 INSPECTION RESULTS

#### A. ASBESTOS-CONTAINING MATERIAL

The asbestos inspection involved a thorough visual examination of all areas that may be impacted by the proposed Energy Performance Contract project at Uriah Hill Elementary School. The following suspect materials were sampled and analyzed for asbestos content by Berger:

4.1 Table 4.1 – Suspect Materials Inspected

HOMOGENOUS MATERIAL	MATERIAL	SAMPLE LOCATION	ASBESTOS CONTENT
01	Gypsum	Rooms 8 & 9	NAD
<b>02</b>	<b>Joint Compound</b>	<b>Rooms 8 &amp; 9</b>	<b>4.20% Chrysotile</b>
03	2x2 Ceiling Tile	Rooms 8 & 9	NAD
04	CMU Mortar	Rooms 8 & 9	NAD
05	Exterior Brick Mortar	Exterior Façade (at rooms 8 & 9)	NAD
06	Exterior Window Frame Caulking	Exterior Façade (at rooms 8 & 9)	NAD

**Bold = Positive for ACM**      NAD = No Asbestos Detected

#### 4.2 CONDITION AND FRIABILITY ASSESSMENT TABLE

For each inspection conducted, the inspector classifies ACM or Assumed ACM materials by friability and condition. This helps to determine the extent of damage in certain areas as well as the potential for further damage and Asbestos release due to disturbance of the material.

Table 4.2 – Condition and Friability Assessment

Material	Material Location	Quantity	Friability	Condition
Joint Compound	Rooms 8 & 9	20 SF <sup>1</sup>	Y	Good
Pipe Insulation	Rooms 8 & 9	40 LF <sup>1</sup>	Y	Good
Pipe Fittings	Rooms 8 & 9	15 LF <sup>1</sup>	Y	Good

Notes: All quantities in this assessment are estimations and should be confirmed by the abatement contractor should abatement be performed.

<sup>1</sup> Represents quantity which may potentially be affected by scope of work.

#### Condition Definitions:

**Good:** None/Minimal apparent damage to ACM

**Fair:** Up to 10% localized damage or up to 25% of the entire ACM is damaged

**Poor:** Over 10% localized damage or over 25% of the entire ACM is damaged



## ***Final Report for Environmental Inspection Services***

### **4.3 SAMPLE ANALYSIS TABLE**

Laboratory analysis results, in tabular form, are included in Appendix A.

#### ***B. PCB-CONTAINING MATERIAL***

The PCB Inspection involved a thorough visual examination of all areas that may be impacted by the proposed Energy Performance Contract project at Uriah Hill Elementary School. The following suspect materials were tested for PCB content:

<b>HOMOGENOUS MATERIAL</b>	<b>MATERIAL</b>	<b>SAMPLE LOCATION</b>	<b>PCB CONTENT (PPM)</b>
08	Exterior Window Frame Caulking	Exterior Façade (at rooms 8 & 9)	ND

**Bold = Positive for PCB**      ND = No PCB Detected

### **5.0 AREAS NOT ACCESSIBLE**

During the inspection the following areas were not accessible:

Spaces within Walls/Floors/Ceilings: No destructive sampling was performed on concealed spaces in walls to access plenum, chases etc. It should be assumed that asbestos containing materials may exist in these spaces. Any suspect materials encountered during work should be sampled for analysis before work continues.

Spaces within Building Envelope: No destructive sampling was performed to the building envelope. It should be assumed that asbestos containing materials may exist in these spaces. Any suspect materials encountered during work should be sampled for analysis before work continues.



## ***Final Report for Environmental Inspection Services***

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### **6.0 CONCLUSIONS AND RECOMMENDATIONS**

ACM materials have been identified in this inspection that may be impacted as part of the Energy Performance Contract project at Uriah Hill Elementary School. These materials, reported in Section 3.0 of this report, may require complete removal prior to the start of any renovations.

The inspection was conducted at the request of the Peekskill City School District to determine materials which may be impacted by the current scope of work as outlined in the drawings for Energy Performance Contract project at Uriah Hill Elementary School, as well as emails offering further clarification of the work. Should the scope of work change, further investigation may be warranted to accurately classify any additional ACM or PCB materials not identified in this inspection.

### **7.0 REPORT CERTIFICATIONS**

This report, and the supporting data, findings, conclusions, opinions, and recommendations it contains represent the result of Berger's efforts for the environmental inspection work for the Peekskill City School District.

Opinions and recommendations presented in this report apply to site conditions and features as they existed at the time of Berger's site visits, and those reasonably foreseeable. They cannot necessarily apply to conditions and features of which Berger is unaware and has not had the opportunity to evaluate.

The conclusions presented in this report are professional opinions solely upon Berger's visual observations of accessible areas, laboratory test data, and current regulatory requirements. These conclusions are intended exclusively for the purpose stated herein and the site indicated for the project indicated.

Prepared by:

---

Drew Cheskin  
NYS DOL Inspector

Reviewed by:

---

Craig Napolitano, CHMM  
Vice President, Emergency  
Management & IH Services





**APPENDIX A:  
ASBESTOS SAMPLE ANALYSIS RESULTS IN TABULAR FORM**



## ***Final Report For Environmental Inspection Services***

**APPENDIX A**  
**SAMPLE ANALYSIS RESULTS IN TABULAR FORM**  
**URIAH HILL ELEMENTARY SCHOOL**  
**980 PEMART AVE**  
**PEEKSKILL, NY 10566**

<b>Homogeneous Area No.</b>	<b>Sample No.</b>	<b>Material</b>	<b>Sample Location</b>	<b>PLM Result</b>	<b>TEM Result</b>
01	01A	Gypsum	Room 8	NAD	N/A
01	01B	Gypsum	Room 9	NAD	N/A
<b>02</b>	<b>02A</b>	<b>Joint Compound</b>	<b>Room 8</b>	<b>4.20% Chrysotile</b>	<b>N/A</b>
<b>02</b>	<b>02B</b>	<b>Joint Compound</b>	<b>Room 9</b>	<b>NA/PS</b>	<b>N/A</b>
03	03A	2x2 Ceiling Tile	Room 8	NAD	NAD
03	03B	2x2 Ceiling Tile	Room 9	NAD	NAD
04	04A	CMU Mortar	Room 8	NAD	N/A
04	04B	CMU Mortar	Room 9	NAD	N/A
05	05A	Exterior Brick Mortar	Exterior Façade	NAD	N/A
05	05B	Exterior Brick Mortar	Exterior Façade	NAD	N/A
06	06A	Exterior Window Frame Caulking	Exterior Façade	NAD	NAD
06	06B	Exterior Window Frame Caulking	Exterior Façade	NAD	NAD

**Bold = Positive for ACM**  
NAD = No Asbestos Detected

N/A = Not Applicable  
NA/PS = Not analyzed/ positive sample



**APPENDIX B:  
ASBESTOS BULK SAMPLE FIELD DATA SHEETS  
WITH CHAIN OF CUSTODY & LABORATORY RESULTS**



# EMSL Analytical, Inc.

528 Mineola Avenue Carle Place, NY 11514  
 Tel/Fax: (516) 997-7251 / (516) 997-7528  
<http://www.EMSL.com / carleplacelab@emsl.com>

**EMSL Order:** 061925573  
**Customer ID:** LBAP78  
**Customer PO:** 2043465.33.00  
**Project ID:**

**Attention:** Marvin Luccioni  
 Louis Berger U.S., Inc  
 96 Morton Street  
 8th floor  
 New York, NY 10014

**Phone:** (718) 730-2741

**Fax:**

**Received Date:** 11/15/2019 2:04 AM

**Analysis Date:** 11/15/2019 - 11/16/2019

**Collected Date:** 11/13/2019

**Project:** Peekskill City S.D., Proj. # 2043465.33.00, Uriah Hill E.S., Room's 8&9 Unit Ventilator Upgrade

## Test Report:Asbestos Analysis of Bulk Material

		Non-Asbestos				
Test	Analyzed Date	Color	Fibrous	Non-Fibrous		Asbestos
Sample ID	01-01A		Description	Room 8 - Gypsum		
	061925573-0001		Homogeneity	Heterogeneous		
PLM NYS 198.1 Friable	11/15/2019	Brown/ Gray	12.00% Cellulose	8.00% Ca Carbonate 75.00% Gypsum 5.00% Non-fibrous (other)		None Detected
PLM NYS 198.6 VCM						Not Analyzed
PLM NYS 198.6 NOB						Not Analyzed
TEM NYS 198.4 NOB						Not Analyzed
Sample ID	01-01B		Description	Room 9 - Gypsum		
	061925573-0002		Homogeneity	Heterogeneous		
PLM NYS 198.1 Friable	11/15/2019	Brown/ Gray	15.00% Cellulose	8.00% Ca Carbonate 70.00% Gypsum 7.00% Non-fibrous (other)		None Detected
PLM NYS 198.6 VCM						Not Analyzed
PLM NYS 198.6 NOB						Not Analyzed
TEM NYS 198.4 NOB						Not Analyzed
Sample ID	02-02A		Description	Room 8 - Joint Compound		
	061925573-0003		Homogeneity	Homogeneous		
PLM NYS 198.1 Friable	11/15/2019	Tan	None	60.00% Ca Carbonate 15.00% Mica 20.80% Non-fibrous (other)		4.20% Chrysotile
Tape and gypsum board layer present in sample, only joint compound analyzed.						
PLM NYS 198.6 VCM						Not Analyzed
PLM NYS 198.6 NOB						Not Analyzed
TEM NYS 198.4 NOB						Not Analyzed
Sample ID	02-02B		Description	Room 9 - Joint Compound		
	061925573-0004		Homogeneity			
PLM NYS 198.1 Friable	11/15/2019					Positive Stop (Not Analyzed)
PLM NYS 198.6 VCM						Not Analyzed
PLM NYS 198.6 NOB						Not Analyzed
TEM NYS 198.4 NOB						Not Analyzed
Sample ID	03-03A		Description	Room 8 - 2'x2' Ceiling Tile		
	061925573-0005		Homogeneity	Heterogeneous/Homogeneous		
PLM NYS 198.1 Friable						Not Analyzed
PLM NYS 198.6 VCM						Not Analyzed
PLM NYS 198.6 NOB	11/15/2019	Gray/ White	10.00% Min. Wool	90.00% Other		Inconclusive: None Detected
TEM NYS 198.4 NOB	11/16/2019	Gray/ White		100.00% Other		None Detected

Initial report from: 11/16/2019 02:22:44



# EMSL Analytical, Inc.

528 Mineola Avenue Carle Place, NY 11514

Tel/Fax: (516) 997-7251 / (516) 997-7528

<http://www.EMSL.com> / [carleplacelab@emsl.com](mailto:carleplacelab@emsl.com)

EMSL Order: 061925573

Customer ID: LBAP78

Customer PO: 2043465.33.00

Project ID:

## Test Report:Asbestos Analysis of Bulk Material

Test	Analyzed Date	Color	Non-Asbestos		Asbestos
			Fibrous	Non-Fibrous	
<b>Sample ID</b> 03-03B 061925573-0006		<b>Description</b> <b>Homogeneity</b>	Room 9 - 2'x2' Ceiling Tile Heterogeneous/Homogeneous		
<b>PLM NYS 198.1 Friable</b>					<b>Not Analyzed</b>
<b>PLM NYS 198.6 VCM</b>					<b>Not Analyzed</b>
<b>PLM NYS 198.6 NOB</b>	11/15/2019	Gray/ White	12.00% Min. Wool	88.00% Other	<b>Inconclusive: None Detected</b>
<b>TEM NYS 198.4 NOB</b>	11/16/2019	Gray/ White		100.00% Other	<b>None Detected</b>
<b>Sample ID</b> 04-04A 061925573-0007		<b>Description</b> <b>Homogeneity</b>	Room 8 - CMU Mortar Homogeneous		
<b>PLM NYS 198.1 Friable</b>	11/15/2019	Brown/ Gray/ White		25.00% Ca Carbonate 5.00% Mica 5.00% Non-fibrous (other) 65.00% Quartz	<b>None Detected</b>
<b>PLM NYS 198.6 VCM</b>					<b>Not Analyzed</b>
<b>PLM NYS 198.6 NOB</b>					<b>Not Analyzed</b>
<b>TEM NYS 198.4 NOB</b>					<b>Not Analyzed</b>
<b>Sample ID</b> 04-04B 061925573-0008		<b>Description</b> <b>Homogeneity</b>	Room 9 - CMU Mortar Homogeneous		
<b>PLM NYS 198.1 Friable</b>	11/15/2019	Brown/ Gray/ White		20.00% Ca Carbonate 3.00% Mica 7.00% Non-fibrous (other) 70.00% Quartz	<b>None Detected</b>
<b>PLM NYS 198.6 VCM</b>					<b>Not Analyzed</b>
<b>PLM NYS 198.6 NOB</b>					<b>Not Analyzed</b>
<b>TEM NYS 198.4 NOB</b>					<b>Not Analyzed</b>
<b>Sample ID</b> 05-05A 061925573-0009		<b>Description</b> <b>Homogeneity</b>	Exterior Facade - Exterior Brick Mortar Homogeneous		
<b>PLM NYS 198.1 Friable</b>	11/15/2019	Brown/ Gray		30.00% Ca Carbonate 5.00% Mica 65.00% Quartz	<b>None Detected</b>
<b>PLM NYS 198.6 VCM</b>					<b>Not Analyzed</b>
<b>PLM NYS 198.6 NOB</b>					<b>Not Analyzed</b>
<b>TEM NYS 198.4 NOB</b>					<b>Not Analyzed</b>
<b>Sample ID</b> 05-05B 061925573-0010		<b>Description</b> <b>Homogeneity</b>	Exterior Facade - Exterior Brick Mortar Homogeneous		
<b>PLM NYS 198.1 Friable</b>	11/15/2019	Brown/ Gray		25.00% Ca Carbonate 7.00% Mica 3.00% Non-fibrous (other) 65.00% Quartz	<b>None Detected</b>
<b>PLM NYS 198.6 VCM</b>					<b>Not Analyzed</b>
<b>PLM NYS 198.6 NOB</b>					<b>Not Analyzed</b>
<b>TEM NYS 198.4 NOB</b>					<b>Not Analyzed</b>

Initial report from: 11/16/2019 02:22:44



# EMSL Analytical, Inc.

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<http://www.EMSL.com> / [carleplacelab@emsl.com](mailto:carleplacelab@emsl.com)

EMSL Order: 061925573

Customer ID: LBAP78

Customer PO: 2043465.33.00

Project ID:

## Test Report:Asbestos Analysis of Bulk Material

Test	Analyzed Date	Color	Non-Asbestos		Asbestos
			Fibrous	Non-Fibrous	
Sample ID 06-06A 061925573-0011		Description Homogeneity	Exterior Facade - Exterior Window Frame Caulking Heterogeneous/Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	11/15/2019	Gray/ Red/ Black		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	11/16/2019	Gray/ Red/ Black		100.00% Other	None Detected
Sample ID 06-06B 061925573-0012		Description Homogeneity	Exterior Facade - Exterior Window Frame Caulking Heterogeneous/Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	11/15/2019	Gray/ Red/ Black		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	11/16/2019	Gray/ Red/ Black		100.00% Other	None Detected

Initial report from: 11/16/2019 02:22:44



## EMSL Analytical, Inc.

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EMSL Order: 061925573

Customer ID: LBAP78

Customer PO: 2043465.33.00

Project ID:

### Test Report: Asbestos Analysis of Bulk Material

The samples in this report were submitted to EMSL for analysis by Asbestos Analysis of Bulk Materials via NYS ELAP Approved Methods. The reference number for these samples is the EMSL Order ID above. Please use this reference number when calling about these samples.

#### Report Comments:

Sample Receipt Date: 11/15/2019

Sample Receipt Time: 2:04 AM

Analysis Completed Date: 11/15/2019

Analysis Completed Time: 10:02 AM

#### Analyst(s):

Tomas Montes De Oca PLM NYS 198.1 Friable (7)

Steve Juszczuk PLM NYS 198.6 NOB (4)

Keith McWilliams TEM NYS 198.4 NOB (4)

#### Samples reviewed and approved by:

Daniel Clarke, Asbestos Laboratory Manager  
or Other Approved Signatory

NOB = Non Friable Organically Bound N/A = Not Applicable VCM = Vermiculite Containing Material

-In New York State, TEM is currently the only method that can be used to determine if NOB materials can be considered or treated as non-asbestos containing.

All samples examined for the presence of vermiculite when analyzed via NYS 198.1.

-NYS Guidelines for Vermiculite containing samples are available at [http://www.wadsworth.org/labcert/elapcert/forms/VermiculiteInterimGuidance\\_Rev070913.pdf](http://www.wadsworth.org/labcert/elapcert/forms/VermiculiteInterimGuidance_Rev070913.pdf) EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. Samples were received in good condition unless otherwise noted.

This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government. This report may contain data that is not covered by the NVLAP accreditation.

Samples analyzed by EMSL Analytical, Inc. Carle Place, NY NYS ELAP 11469

Initial report from: 11/16/2019 02:22:44



061925573

<b>LOUIS BERGER</b>	<b>ASBESTOS SURVEY DATA SHEET/ CHAIN OF CUSTODY</b>	PAGE: 1 OF: 1
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<b>LB PROJ:</b> 2043465.33.00 <b>CLIENT:</b> Peekskill City S.D. <b>PROJECT SITE:</b> URIAH HILL E.S. <b>Project Manager:</b> Marvin Luccioni	<b>LOCATION(S) SURVEYED:</b> Room's 8 & 9 <b>PROPOSED PROJECT:</b> Unit Ventilator Upgrade <b>DATE(S) OF INSPECTION:</b> 11-13-19 <b>Inspector(s)</b> L. Nevarez & A. Cheskin	
--	--	--

LOUIS BERGER TELEPHONE NO. : (212) 612-7900 <b>FAX NO.: (212) 363-4341</b> ADDRESS: 565 Tarter Rd, 5th Floor, Elmsford, NY 10533			RESULTS TO: <b>Mluccioni@louisberger.com</b>	TURNAROUND TIME: <input type="checkbox"/> 4 HR. <input checked="" type="checkbox"/> 24 HRS. <input type="checkbox"/> 48 HRS. <input type="checkbox"/> 72 HRS.	
HA	SAMPLE NO.	MATERIAL DESCRIPTION	SAMPLE LOCATION	APPROX. QUANTITY (LF/SF)	FIELD NOTES
01	01A	Gypsum	Room 8		LABORATORY ANALYTICAL, INC. CARLE PLACE, NY 19 NOV 15 AM 2:04
01	01B	Gypsum	Room 9		
02	02A	Joint Compound	Room 8		
02	02B	Joint Compound	Room 9		
03	03A	2x2 Ceiling Tile	Room 8		
03	03B	2x2 Ceiling Tile	Room 9		
04	04A	CMU Mortar	Room 8		
04	04B	CMU Mortar	Room 9		
05	05A	Exterior Brick Mortar	Exterior Façade		
05	05B	Exterior Brick Mortar	Exterior Façade		
06	06A	Exterior window frame Caulking	Exterior Façade		
06	06B	Exterior window frame Caulking	Exterior Façade		

CHAIN OF CUSTODY					
Relinquished by: (print) L. Nevarez	(Sign)	11/14/19	Relinquished by: (print)	(Sign)	1/1
Received by: (print) L. Nevarez	(Sign)	11/15/19	Received by: (print)	(Sign)	1/1

GENERAL NOTES: All inconclusive NOBs to be analyzed by TEM. Please stop at 1st positive in any homogeneous group.

T.M. 11/15/19  
Luis Montes De Oca 11/15/19



**APPENDIX C:  
ASBESTOS BULK SAMPLE LOCATION DRAWINGS**



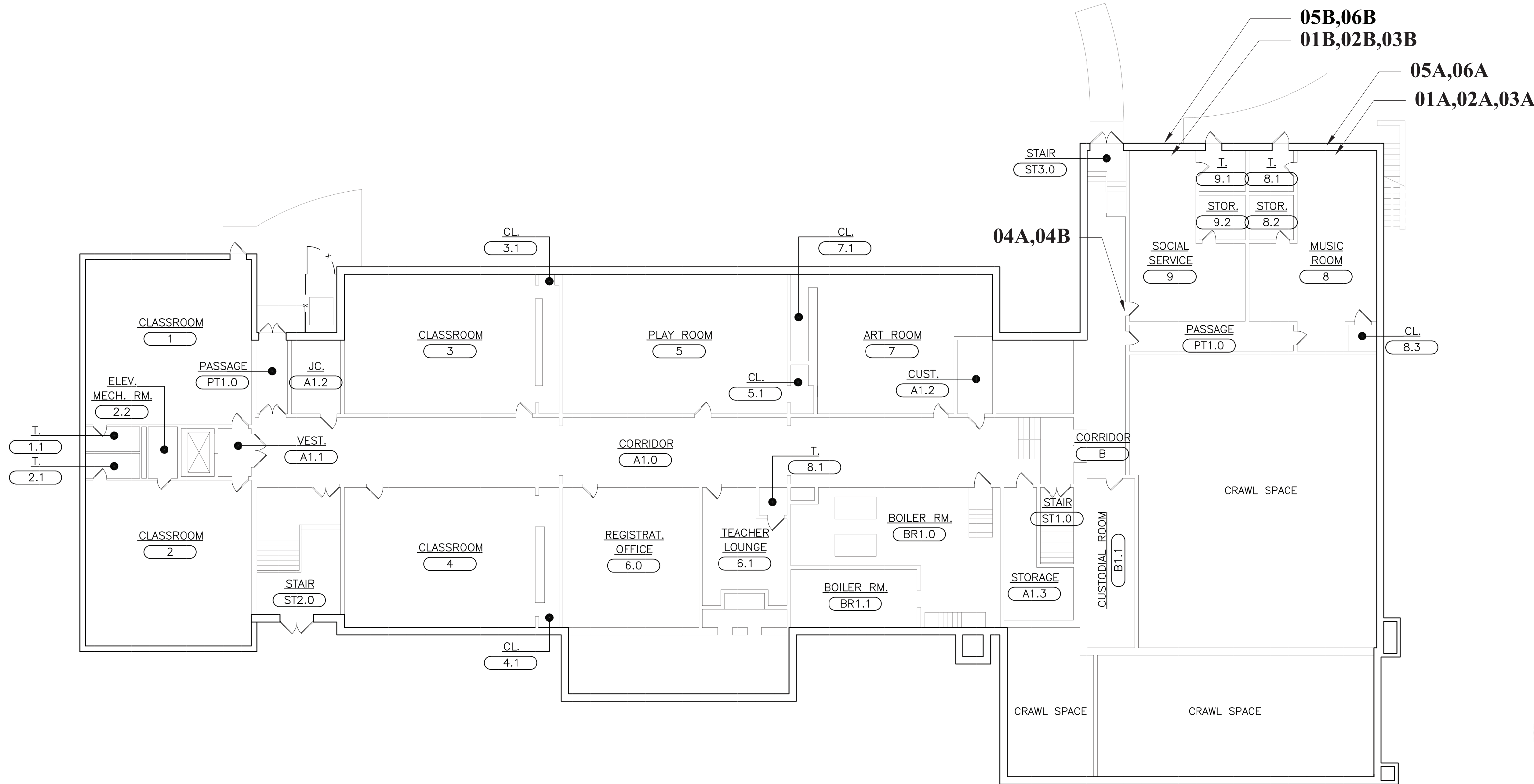
PEEKSKILL  
SCHOOL DISTRICT  
URIAH HILL  
ELEMENTARY SCHOOL

980 PEMART AVENUE  
PEEKSKILL, NY 10566

ENVIRONMENTAL CONSULTANT

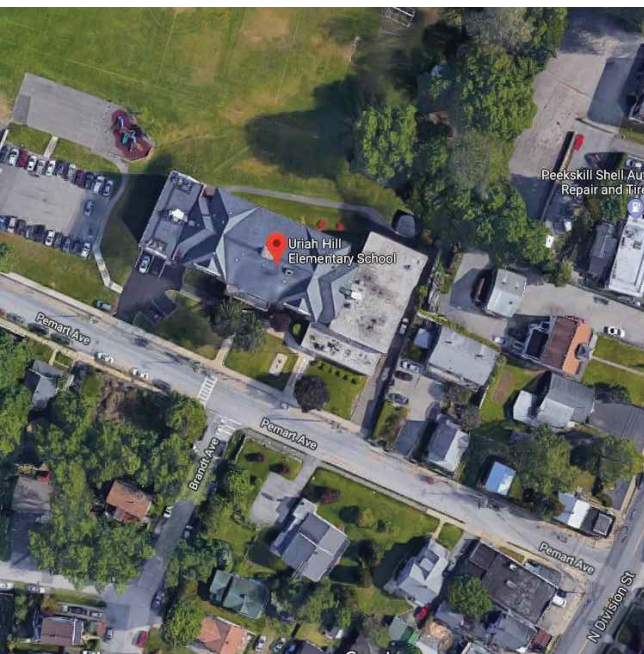


565 Taxter Road  
Elmsford, NY 10523  
TEL: 914.798.3710 FAX: 212.363.4341 WWW.WSP.COM



**1** BASEMENT FLOOR PLAN  
SCALE: NTS

KEY PLAN:




No.	Date	Issue

**BULK SAMPLE LOCATIONS  
BASEMENT FLOOR PLAN**

Job No. 2043465.33	Sheet No.
11-18-2019	<b>BSL001</b>
Drawn by: J. PEREZ	
Checked by: M. LUCCIONI	



**APPENDIX D:  
ASBESTOS CONTAINING MATERIALS LOCATION  
DRAWINGS**





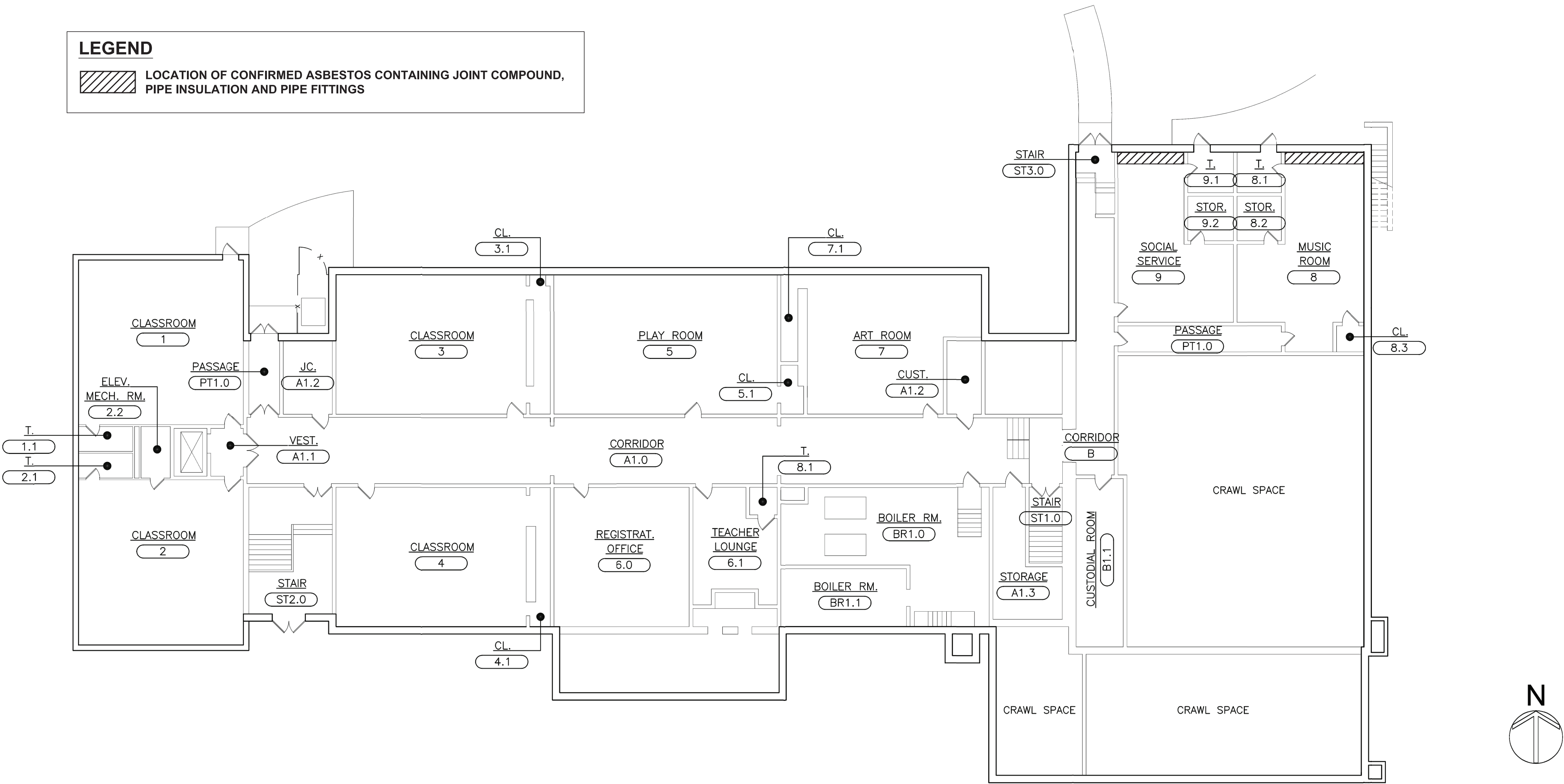
PEEKSKILL  
SCHOOL DISTRICT  
URIAH HILL  
ELEMENTARY SCHOOL  
980 PEMART AVENUE  
PEEKSKILL, NY 10566

ENVIRONMENTAL CONSULTANT



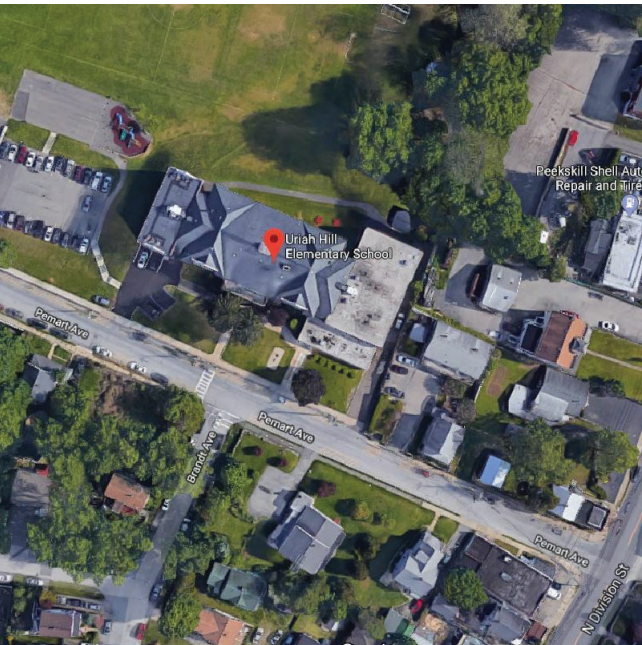
565 Taxter Road  
Elmsford, NY 10523  
TEL 914.798.3710 FAX 212.363.4341 WWW.WSP.COM

**LEGEND**  
 LOCATION OF CONFIRMED ASBESTOS CONTAINING JOINT COMPOUND,  
PIPE INSULATION AND PIPE FITTINGS



**1 BASEMENT FLOOR PLAN**  
SCALE: NTS

KEY PLAN:



No.	Date	Issue

Sheet Title

**ASBESTOS CONTAINING  
MATERIALS  
BASEMENT FLOOR PLAN**

Job No. 2043465.33	Sheet No.
11-20-2019	<b>ACM001</b>
Drawn by: J. PEREZ	
Checked by: M. LUCCIONI	



**APPENDIX E:  
PCB BULK SAMPLE FIELD DATA SHEETS  
WITH CHAIN OF CUSTODY & LABORATORY RESULTS**



**EMSL Analytical, Inc.**

200 Route 130 North, Cinnaminson, NJ 08077

Phone: (856) 303-2500 Fax: (856) 858-4571 Email: [EnvChemistry2@emsl.com](mailto:EnvChemistry2@emsl.com)

Attn:

**Marvin Luccioni  
Louis Berger U.S., Inc  
96 Morton Street  
8th floor  
New York, NY 10014**

11/22/2019

Phone: (212) 612-7900

Fax:

The following analytical report covers the analysis performed on samples submitted to EMSL Analytical, Inc. on 11/15/2019. The results are tabulated on the attached data pages for the following client designated project:

**2043465.33.00 Peekskill City S.D. Uriah Hill ES**

The reference number for these samples is EMSL Order #011914650. Please use this reference when calling about these samples. If you have any questions, please do not hesitate to contact me at (856) 303-2500.

Approved By:

Phillip Worby, Environmental Chemistry  
Laboratory Director



The test results contained within this report meet the requirements of NELAP and/or the specific certification program that is applicable, unless otherwise noted.

NELAP Certifications: NJ 03036, NY 10872, PA 68-00367, CA ELAP 1877

The samples associated with this report were received in good condition unless otherwise noted. This report relates only to those items tested as received by the laboratory. The QC data associated with the sample results meet the recovery and precision requirements established by the NELAP, unless specifically indicated. All results for soil samples are reported on a dry weight basis, unless otherwise noted. This report may not be reproduced except in full and without written approval by EMSL Analytical, Inc.



**EMSL Analytical, Inc.**

200 Route 130 North, Cinnaminson, NJ 08077

Phone/Fax: (856) 303-2500 / (856) 858-4571

<http://www.EMSL.com>[EnvChemistry2@emsl.com](mailto:EnvChemistry2@emsl.com)

EMSL Order: 011914650

CustomerID: LBAP78

CustomerPO:

ProjectID:

Attn: **Marvin Luccioni**  
**Louis Berger U.S., Inc**  
**96 Morton Street**  
**8th floor**  
**New York, NY 10014**

Phone: (212) 612-7900

Fax:

Received: 11/15/19 2:00 PM

Project: 2043465.33.00 Peekskill City S.D. Uriah Hill ES

**Analytical Results****Client Sample Description** 06 A,B,C**Collected:** 11/13/2019**Lab ID:** 011914650-0001

Exterior Façade@Room 9 and 8

Method	Parameter	Result	RL	Units	Prep Date & Analyst	Analysis Date & Analyst
<b>GC-SVOA</b>						
3546/8082A	Aroclor-1016	ND D	0.93	mg/Kg	11/19/2019 AB	11/20/19 0:00 EH
3546/8082A	Aroclor-1221	ND D	0.93	mg/Kg	11/19/2019 AB	11/20/19 0:00 EH
3546/8082A	Aroclor-1232	ND D	0.93	mg/Kg	11/19/2019 AB	11/20/19 0:00 EH
3546/8082A	Aroclor-1242	ND D	0.93	mg/Kg	11/19/2019 AB	11/20/19 0:00 EH
3546/8082A	Aroclor-1248	ND D	0.93	mg/Kg	11/19/2019 AB	11/20/19 0:00 EH
3546/8082A	Aroclor-1254	ND D	0.93	mg/Kg	11/19/2019 AB	11/20/19 0:00 EH
3546/8082A	Aroclor-1260	ND D	0.93	mg/Kg	11/19/2019 AB	11/20/19 0:00 EH
3546/8082A	Aroclor-1262	ND D	0.93	mg/Kg	11/19/2019 AB	11/20/19 0:00 EH
3546/8082A	Aroclor-1268	ND D	0.93	mg/Kg	11/19/2019 AB	11/20/19 0:00 EH

**Definitions:**

MDL - method detection limit

J - Result was below the reporting limit, but at or above the MDL

ND - indicates that the analyte was not detected at the reporting limit

RL - Reporting Limit (Analytical)

D - Dilution

TURNAROUND TIME: **5**-Day

011914650

**Inspector(s)**: L. Nevarez & A. Cheskin

[illegible]

FBI  
LABORATORY

NOV 15 AM 2:03  
CARLE PLACE, NY  
FBI ANALYTICAL INC.

## CHAIN OF CUSTODY

Time

Time	Temperature	Pressure	Flow Rate	Concentration	Volume	Mass	Energy	Power	Efficiency	Accuracy	Precision	Resolution	Sensitivity	Specificity	Reliability	Reproducibility	Stability	Robustness	Flexibility	Scalability	Portability	Interoperability	Compatibility	Integration	Automation	Control	Monitoring	Logging	Reporting	Alerting	Notification	Interface	Usability	Learnability	Memorability	Performance	Throughput	Latency	Bandwidth	Uptime	Availability	Reliability	Security	Privacy	Compliance	Documentation	Support	Training	Onboarding	Migration	Upgrade	Deployment	Configuration	Customization	Extensibility	Modularity	Reusability	Scalability	Flexibility	Adaptability	Resilience	Disaster Recovery	Business Continuity	Compliance	Regulation	Standards	Best Practices	Lessons Learned	Continuous Improvement	Feedback Loop	Customer Satisfaction	Net Promoter Score	Churn Rate	Retention Rate	Engagement Rate	Conversion Rate	ROI	Profitability	Growth	Innovation	Leadership	Teamwork	Collaboration	Communication	Transparency	Accountability	Ownership	Empowerment	Autonomy	Flexibility	Adaptability	Resilience	Disaster Recovery	Business Continuity	Compliance	Regulation	Standards	Best Practices	Lessons Learned	Continuous Improvement	Feedback Loop	Customer Satisfaction	Net Promoter Score	Churn Rate	Retention Rate	Engagement Rate	Conversion Rate	ROI	Profitability	Growth	Innovation	Leadership	Teamwork	Collaboration	Communication	Transparency	Accountability	Ownership	Empowerment	Autonomy	Flexibility	Adaptability	Resilience	Disaster Recovery	Business Continuity	Compliance	Regulation	Standards	Best Practices	Lessons Learned	Continuous Improvement	Feedback Loop	Customer Satisfaction	Net Promoter Score	Churn Rate	Retention Rate	Engagement Rate	Conversion 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Rate	ROI	Profitability	Growth	Innovation	Leadership	Teamwork	Collaboration	Communication	Transparency	Accountability	Ownership	Empowerment	Autonomy	Flexibility	Adaptability	Resilience	Disaster Recovery	Business Continuity	Compliance	Regulation	Standards	Best Practices	Lessons Learned	Continuous Improvement	Feedback Loop	Customer Satisfaction	Net Promoter Score	Churn Rate	Retention Rate	Engagement Rate	Conversion Rate	ROI	Profitability	Growth	Innovation	Leadership	Teamwork	Collaboration	Communication	Transparency	Accountability	Ownership	Empowerment	Autonomy	Flexibility	Adaptability	Resilience	Disaster Recovery	Business Continuity	Compliance	Regulation	Standards	Best Practices	Lessons Learned	Continuous Improvement	Feedback Loop	Customer Satisfaction	Net Promoter Score	Churn Rate	Retention Rate	Engagement Rate	Conversion Rate	ROI	Profitability	Growth	Innovation	Leadership	Teamwork	Collaboration	Communication	Transparency	Accountability	Ownership	Empowerment	Autonomy	Flexibility	Adaptability	Resilience	Disaster Recovery	Business Continuity	Compliance	Regulation	Standards	Best Practices	Lessons Learned	Continuous Improvement	Feedback Loop	Customer Satisfaction	Net Promoter Score	Churn Rate	Retention Rate	Engagement Rate	Conversion Rate	ROI	Profitability	Growth	Innovation	Leadership	Teamwork	Collaboration	Communication	Transparency	Accountability	Ownership	Empowerment	Autonomy	Flexibility	Adaptability	Resilience	Disaster Recovery	Business Continuity	Compliance	Regulation	Standards	Best Practices	Lessons Learned	Continuous Improvement	Feedback Loop	Customer Satisfaction	Net Promoter Score	Churn Rate	Retention Rate	Engagement Rate	Conversion Rate	ROI	Profitability	Growth	Innovation	Leadership	Teamwork	Collaboration	Communication	Transparency	Accountability	Ownership	Empowerment	Autonomy	Flexibility	Adaptability	Resilience	Disaster Recovery	Business Continuity	Compliance	Regulation	Standards	Best Practices	Lessons Learned	Continuous Improvement	Feedback Loop	Customer Satisfaction	Net Promoter Score	Churn Rate	Retention Rate	Engagement Rate	Conversion Rate	ROI	Profitability	Growth	Innovation	Leadership	Teamwork	Collaboration	Communication	Transparency	Accountability	Ownership	Empowerment	Autonomy	Flexibility	Adaptability	Resilience	Disaster Recovery	Business Continuity	Compliance	Regulation	Standards	Best Practices	Less
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**LAB INSTRUCTIONS:** create one (1) composite sample of each homogeneous material from equal mass portions (+ 5%) of the three (3) sub-samples for extraction and analysis via EPA Method 8082 and report the Aroclors listed (Aroclor 1016, Aroclor 1221, Aroclor 1232, Aroclor 1242, Aroclor 1248, Aroclor 1254, Aroclor 1260). The laboratory shall target a PCB detection limit of 1 ppm. *110*



**APPENDIX F:  
COMPANY LICENSE, PERSONNEL CERTIFICATIONS  
& LABORATORY ACCREDITATIONS**

**New York State – Department of Labor**

Division of Safety and Health  
License and Certificate Unit  
State Campus, Building 12  
Albany, NY 12240

**ASBESTOS HANDLING LICENSE**

Louis Berger, U.S., Inc.  
8th Floor  
96 Morton Street  
New York, NY 10014

FILE NUMBER: 19-132876  
LICENSE NUMBER: 132876  
LICENSE CLASS: RESTRICTED  
DATE OF ISSUE: 02/14/2019  
EXPIRATION DATE: 02/29/2020

Duly Authorized Representative – Craig Napolitano:

This license has been issued in accordance with applicable provisions of Article 30 of the Labor Law of New York State and of the New York State Codes, Rules and Regulations (12 NYCRR Part 56). It is subject to suspension or revocation for a (1) serious violation of state, federal or local laws with regard to the conduct of an asbestos project, or (2) demonstrated lack of responsibility in the conduct of any job involving asbestos or asbestos material.

This license is valid only for the contractor named above and this license or a photocopy must be prominently displayed at the asbestos project worksite. This license verifies that all persons employed by the licensee on an asbestos project in New York State have been issued an Asbestos Certificate, appropriate for the type of work they perform, by the New York State Department of Labor.



Eileen M. Franko, Director  
For the Commissioner of Labor



ANDREW B CHESKIN

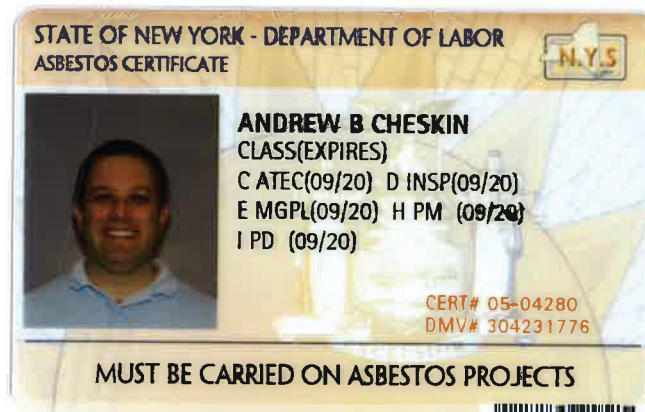
C/O LOUIS BERGER 96 MORTON ST 8TH FL  
NEW YORK NY 10014

Enclosed is your new card.

## NYS Department of Labor

The Department of Labor is happy to provide this improved card. We welcome your comments:  
[nysdol@labor.ny.gov](mailto:nysdol@labor.ny.gov) or call (518) 457-2735

YOUR NEW CARD







Department  
of Labor

LUIS A NEVAREZ

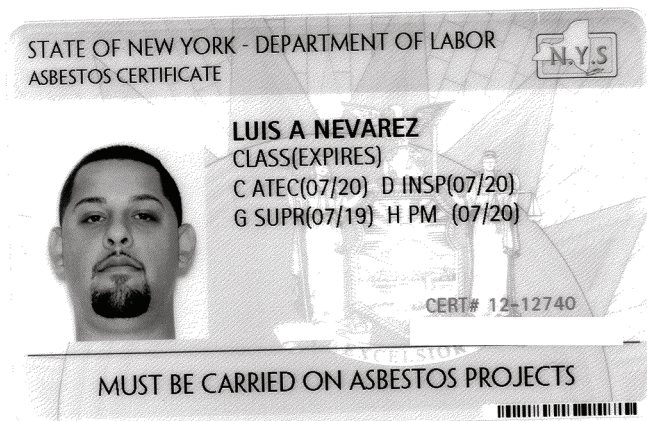
C/O LOUIS BERGER, 96 MORTON ST APT 8FL  
NEW YORK NY 10014

Enclosed is your new card.

## NYS Department of Labor

The Department of Labor is happy to provide this improved card. We welcome your comments:  
[nysdol@labor.ny.gov](mailto:nysdol@labor.ny.gov) or call (518) 457-2735

YOUR NEW CARD



**NEW YORK STATE DEPARTMENT OF HEALTH  
WADSWORTH CENTER**



**Expires 12:01 AM April 01, 2020  
Issued April 01, 2019**

**CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE**  
*Issued in accordance with and pursuant to section 502 Public Health Law of New York State*

**MR. DANIEL CLARKE  
EMSL ANALYTICAL, INC.  
528 MINEOLA AVE.  
CARLE PLACE, NY 11514**

**NY Lab Id No: 11469**

**is hereby APPROVED as an Environmental Laboratory for the category  
ENVIRONMENTAL ANALYSES SOLID AND HAZARDOUS WASTE  
All approved subcategories and/or analytes are listed below:**

**Miscellaneous**

Asbestos In Friable Material	Item 198.1 of Manual EPA 600/M4/82/020
Asbestos in Non-Friable Material-PLM	Item 198.6 of Manual (NOB by PLM)
Asbestos In Non-Friable Material-TEM	Item 198.4 of Manual
Asbestos-Vermiculite-Containing Material	Item 198.8 of Manual
Lead in Dust Wipes	EPA 7000B
Lead in Paint	EPA 7000B

**Sample Preparation Methods**

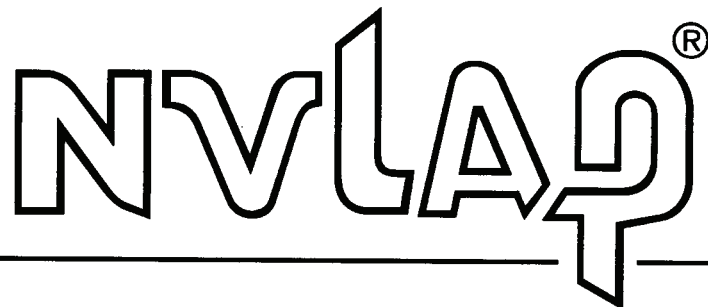
EPA 3051A

**Serial No.: 59670**

Property of the New York State Department of Health. Certificates are valid only at the address shown, must be conspicuously posted, and are printed on secure paper. Continued accreditation depends on successful ongoing participation in the Program. Consumers are urged to call (518) 485-5570 to verify the laboratory's accreditation status.



United States Department of Commerce  
National Institute of Standards and Technology



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**Certificate of Accreditation to ISO/IEC 17025:2017**

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**NVLAP LAB CODE: 101048-10**

**EMSL Analytical, Inc.**  
Carle Place, NY

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

**Asbestos Fiber Analysis**

*This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017.  
This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality  
management system (refer to joint ISO-ILAC-IAF Communique dated January 2009).*

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2019-07-01 through 2020-06-30

*Effective Dates*



*Dana S. Luman*

---

For the National Voluntary Laboratory Accreditation Program

**SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017**

**EMSL Analytical, Inc.**  
528 Mineola Ave.  
Carle Place, NY 11514  
Daniel Clarke  
Phone: 516-997-7251  
Email: dclarke@emsl.com  
<http://www.emsl.com>

**ASBESTOS FIBER ANALYSIS**

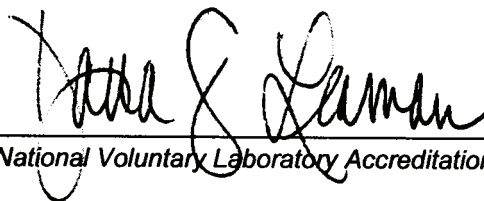
**NVLAP LAB CODE 101048-10**

**Bulk Asbestos Analysis**

<u><b>Code</b></u>	<u><b>Description</b></u>
18/A01	EPA -- 40 CFR Appendix E to Subpart E of Part 763, Interim Method of the Determination of Asbestos in Bulk Insulation Samples
18/A03	EPA 600/R-93/116: Method for the Determination of Asbestos in Bulk Building Materials

**Airborne Asbestos Analysis**

<u><b>Code</b></u>	<u><b>Description</b></u>
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.



*For the National Voluntary Laboratory Accreditation Program*



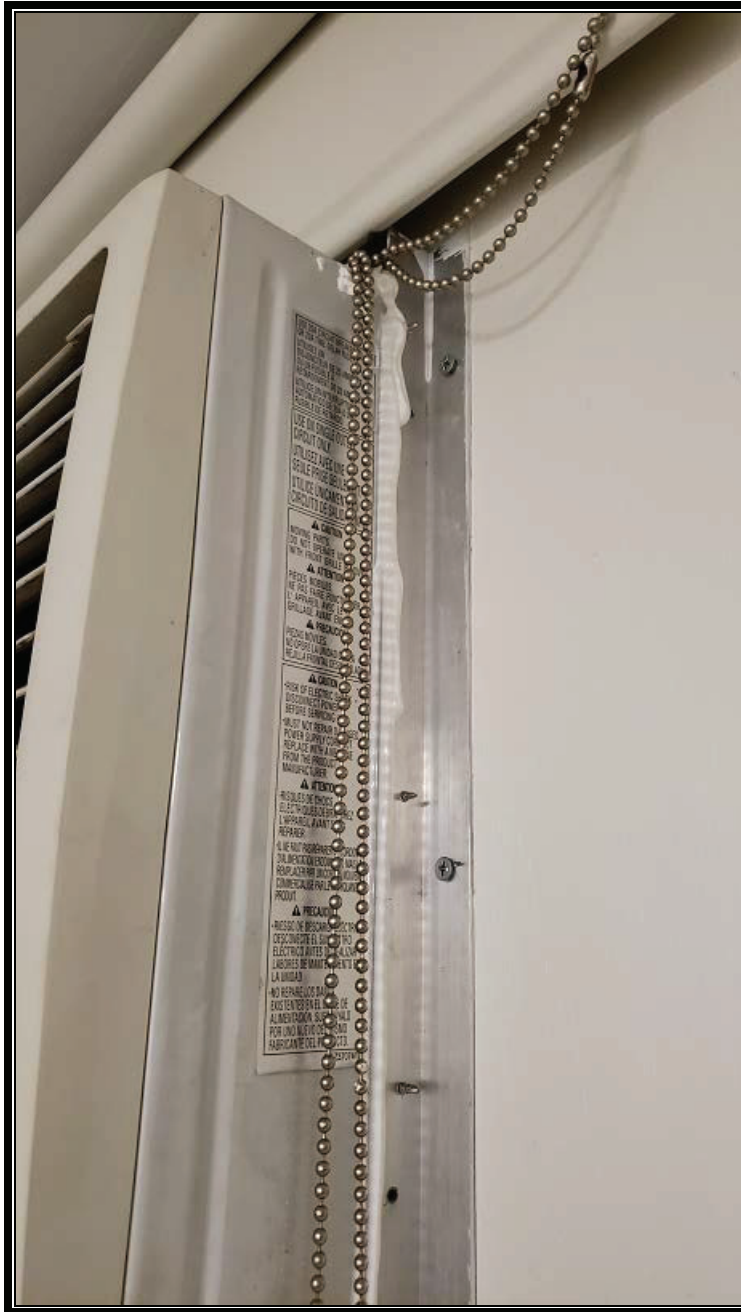
**APPENDIX G:  
PHOTOGRAPHIC DOCUMENTATION**



Photograph #1 – Existing installed Window Air Conditioning Unit in room 8  
(identical to room 9)



Photograph #2 – Non-ACM Gypsum, Asbestos Containing Joint Compound, Non-ACM 2x2 Ceiling Tile, Non-ACM CMU Mortar, Asbestos Containing Pipe Insulation, Asbestos Containing Pipe Fittings and Non-Suspect Concrete Ceiling Deck.



Photograph #3 – Non-Suspect Silicone to Window Air Conditioners





Photograph #4 – Non-ACM Exterior Brick Mortar and Non-ACM Exterior Window Frame  
Caulking

# **FINAL REPORT OF ENVIRONMENTAL SERVICES**

*Performed at:*

**WOODSIDE ELEMENTARY SCHOOL  
612 DEPEW STREET  
PEEKSKILL, NY**

*Prepared for:*



**Peekskill City School District  
1031 Elm Street  
Peekskill, NY 10566**

*Prepared by:*



**565 Taxter Road, 5<sup>th</sup> Floor  
Elmsford, New York 10523**

**Tel. (914) 798-3710**

**Fax (914) 592-1734**

**Project No. 2043465.34**

**Final Submission Date: November 20, 2019**





November 20, 2019

Mr. Carmine Crisci  
Director of Facilities, Operations and Maintenance  
Peekskill City School District  
1031 Elm Street  
Peekskill, New York 10566

**Subject: Final Report of Environmental Services  
Woodside Elementary School  
612 Depew Street  
Peekskill, NY**

Dear Mr. Crisci:

Louis Berger (Berger), A WSP company, has completed a limited material inspection at Woodside Elementary School located at 612 Depew Street, Peekskill, NY. The limited inspection included visual observation, material sampling, and laboratory sample analysis of suspect Asbestos-Containing Materials (ACM) as part of the school district's renovation for HDG Project: 203 at Woodside Elementary School.

The attached report presents descriptions and results of the material sampling procedures and visual analysis. Relevant general project information is provided, followed by our findings, assessments and recommendations. Laboratory analysis data and certifications are provided in the Appendices.

If you have any questions concerning this report or if we may be of further assistance to you, please contact us.

Sincerely,

**LOUIS BERGER, A WSP COMPANY**

A handwritten signature in blue ink, appearing to read 'CN' or 'Craig Napolitano', with a stylized flourish at the end.

Craig Napolitano, CHMM  
Vice President, Emergency Management & IH Services



# ***Final Report for Environmental Inspection Services***

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<b>2.0 FIELD INSPECTION PROCEDURES AND SAMPLE ANALYSIS METHODS .....</b>	<b>3</b>
<b>3.0 INSPECTION SCOPE AND MATERIAL ASSESSMENT .....</b>	<b>5</b>
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### **Appendices**

Appendix A: Asbestos Sample Analysis Results in Tabular Form

Appendix B: Asbestos Bulk Sample Field Data Sheets with Chain of Custody & Laboratory Results

Appendix C: Asbestos Bulk Sample Location Drawings

Appendix D: Asbestos Containing Materials Location Drawings

Appendix E: Company License, Personnel Certifications & Laboratory Accreditations



## ***Final Report for Environmental Inspection Services***

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### **1.0 EXECUTIVE SUMMARY**

Louis Berger (Berger), A WSP company, has completed a limited material inspection at Woodside Elementary School located at 612 Depew Street, Peekskill, NY. The limited inspection included visual observation, material sampling, and laboratory sample analysis of suspect Asbestos-Containing Materials (ACM) as part of the school district's renovation for HDG Project: 203 at Woodside Elementary School.

Marvin Luccioni & Luis Nevarez of Berger performed the inspection on November 12, 2019. Mr. Luccioni (Cert# 03-11021) and Mr. Nevarez (Cert# 12-12740) are New York State Department of Labor (NYSDOL) Asbestos Inspectors.

The results of the visual inspection and bulk sample analysis determined that the following suspect ACM materials may be impacted by the proposed HDG Project: 203 at Woodside Elementary School.

#### **ASBESTOS-CONTAINING MATERIAL**

Analytical results of the bulk samples collected by Berger on 11/12/19 indicate that the following materials **contain asbestos** (greater than 1-percent).

- **Joint Compound associated with Gypsum Board, Beige**
- **Gypsum Board, Gray (Contaminated ACM)**
- **12"x12" Brown Floor Tiles (Bottom, Contaminated ACM, Only in Room 11)**
- **Mastic associated with 12"x12" White Floor Tiles, Black (Top)**
- **12"x12" White Floor Tiles (Top, Contaminated ACM)**
- **Mastic associated with 12"x12" Light Green Floor Tiles, Yellow/Black**
- **12"x12" Light Green Floor Tiles (Contaminated ACM)**
- **Exterior Window Frame/Louver Caulking, Brown**

The following materials are **assumed to contain asbestos**.

- **Built-up Roofing System (Multiple Layers)**

Analytical results of the bulk samples collected by Berger on 11/12/19 indicate that the following materials **did not contain asbestos** (less than 1-percent);

- **2'x2' Fissure Ceiling Tiles, White**
- **2'x4' Fissure Ceiling Tiles, White**
- **Interior Window Sill Mortar, Gray**
- **Interior Window Sill Sealant, Brown/Dark Gray**
- **Cementitious Ceiling, Gray**
- **Canvas associated with Cementitious Ceiling, White**



## ***Final Report for Environmental Inspection Services***

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- Sealant to Fiberglass Pipe Insulation, White
- Cinderblock Mortar, Gray
- 4" Black Cove Base, Yellow Mastic associated with 12"x12" Green Floor Tiles, Yellow
- 12"x12" Green Floor Tiles
- Mastic associated with 12"x12" Brown Floor Tiles, Black (Bottom)
- Mastic associated with 12"x12" Tan Floor Tiles, Yellow
- 12"x12" Tan Floor Tiles
- Mastic associated with 12"x12" Beige Floor Tiles, Black
- 12"x12" Beige Floor Tiles
- Mastic associated with 12"x12" Brown Speckled Floor Tiles
- 12"x12" Brown Speckled Floor Tiles
- 12"x12" Red Floor Tiles
- Exterior Brick Mortar, Gray



## ***Final Report for Environmental Inspection Services***

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### **2.0 FIELD INSPECTION PROCEDURES AND SAMPLE ANALYSIS METHODS**

#### ***ASBESTOS-CONTAINING MATERIAL***

Guidelines used for the inspection were established by the Environmental Protection Agency (EPA) in the Guidance for Controlling Asbestos Containing Materials in Buildings, Office of Pesticides and Toxic Substances, Doc 560/5-85-024, and 40 CFR Part 763, Asbestos Hazard Emergency Response Act (AHERA).

Field information was organized in accordance with the AHERA methodology of homogenous area (HA). During the Inspection, reasonable effort was made to identify all locations and types of ACM materials associated with the scope of work. Sampling has included multiple samples of the same materials chosen at random. However, due to inconsistencies of a manufacturer's processes and the contractor's installation methods, materials of similar construction may contain various amounts of asbestos. Furthermore, some materials that were not originally specified to contain asbestos may in fact contain this mineral. For example, cementitious pipe insulation and plaster were frequently mixed with asbestos at the construction site for ease of application. Locating all asbestos materials can only be definitively achieved by conducting exploratory demolition and sampling every section of pipe insulation, fitting or valve covering, fireproofing, and other suspect ACM.

Bulk samples of suspect ACM are analyzed using polarized light microscopy (PLM) coupled with dispersion staining, as described in 40 CFR Part 763 and the National Emissions Standard for Hazardous Air Pollutants (NESHAPS). NESHAPS is the standard industry protocol for the determination of asbestos in building materials. A suspect material is immersed in a solution of known refractive index and subjected to illumination by polarized light. The color displays that result are compared to a standardized atlas whereby the specific variety of asbestos is determined. It should also be recognized that PLM is primarily a qualitative identification method whereby asbestos percentage, if any, is estimated. While EPA, New York State, and New York City regulations governing ACM consider materials containing greater than 1-percent as asbestos, accurately quantifying asbestos content below 5-percent has been shown to be unreliable.

The New York State Department of Health has recently revised the PLM Stratified Point Counting Method. The March 25<sup>th</sup>, 2011 method, "Polarized Light Microscopy Methods for Identifying and Quantifying Asbestos in Bulk Samples" can be found as Item 198.1 in the Environmental Laboratory Approval program (ELAP) Certification manual. Whereas the procedure of analysis for bulk samples that fall into the category of "Non-friable Organically Bound" (NOB) can be found in the March 25<sup>th</sup> 2011 method "Polarized-Light Microscope Method for Identifying and Quantifying Asbestos in Non-Friable Organically Bound Bulk Samples", Item 198.6 in the ELAP Certification Manual. This category includes any sample in a flexible to rigid asphalt or vinyl matrix (floor tiles, mastic, roofing shingles, roofing felt, etc.). These samples must be "ashed" in a muffle furnace at 480-degrees Celsius (to remove organic matrix), treated with acid (to remove any mineral carbonate), and filtered through a 0.4-micron polycarbonate filter before being analyzed by PLM. The sample must be weighted between each of these steps to track the percent loss of organic matrix.



## ***Final Report for Environmental Inspection Services***

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ELAP has determined that analysis of NOB materials is not reliably performed by PLM. Therefore, if PLM analysis yields results of 1-percent asbestos or less, the result must be confirmed by TEM. For bulk samples that undergo TEM analysis, the March 25th, 2011 method "Transmission Electron Microscope Method for Identifying and Quantitating Asbestos in Non-Friable organically Bound Bulk Samples" must be used and can be found as Item 198.4 in the ELAP Certification Manual. ELAP certified laboratories must include the following statement with their PLM analysis results for each "negative" (1-percent or less asbestos) NOB sample: "Polarized-light microscopy is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Before this material can be considered or treated as non-ACM, confirmation must be made by quantitative transmission electron microscopy".

All samples are initially analyzed by Polarized Light Microscopy in accordance with Item 198.1 and 198.6 of the ELAP Certification Manual. Samples which yield a negative PLM result and which are classified as a "non-friable" material, are then re-analyzed utilizing TEM methodology in accordance with Item 198.4 of the ELAP Certification Manual. The laboratory performing both these analysis procedures is EMSL located at 528 Mineola Ave, Carle Place, NY 11514. The laboratory has received accreditation from the following agencies:

- National Voluntary Laboratory Accreditation Program (Lab Code 101048-10)
- New York State Environmental Laboratory Approval Program (Lab No. 11469)
- American Industrial Hygiene Association Accredited Laboratory (Lab No. 102344)



## ***Final Report for Environmental Inspection Services***

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### **3.0 INSPECTION SCOPE AND MATERIAL ASSESSMENT**

The areas inspected for ACM materials that may be impacted by the proposed HDG Project: 203 at Woodside Elementary School include:

- Throughout Interior
- Exterior
- Roof

#### **ASBESTOS-CONTAINING MATERIAL**

Materials examined during the Berger inspection included:

- Joint Compound associated with Gypsum Board, Beige
- Gypsum Board, Gray (Contaminated ACM)
- 12"x12" Brown Floor Tiles (Bottom, Contaminated ACM)
- Mastic associated with 12"x12" White Floor Tiles, Black (Top)
- 12"x12" White Floor Tiles (Top, Contaminated ACM)
- Mastic associated with 12"x12" Light Green Floor Tiles, Yellow/Black
- 12"x12" Light Green Floor Tiles (Contaminated ACM)
- Exterior Window Frame/Louver Caulking, Brown
- 2'x2' Fissure Ceiling Tiles, White
- 2'x4' Fissure Ceiling Tiles, White
- Interior Window Sill Mortar, Gray
- Interior Window Sill Sealant, Brown/Dark Gray
- Cementitious Ceiling, Gray
- Canvas associated with Cementitious Ceiling, White
- Sealant to Fiberglass Pipe Insulation, White
- Cinderblock Mortar, Gray
- 4" Black Cove Base, Yellow Mastic associated with 12"x12" Green Floor Tiles, Yellow
- 12"x12" Green Floor Tiles
- Mastic associated with 12"x12" Brown Floor Tiles, Black (Bottom)
- Mastic associated with 12"x12" Tan Floor Tiles, Yellow
- 12"x12" Tan Floor Tiles
- Mastic associated with 12"x12" Beige Floor Tiles, Black
- 12"x12" Beige Floor Tiles
- Mastic associated with 12"x12" Brown Speckled Floor Tiles
- 12"x12" Brown Speckled Floor Tiles
- 12"x12" Red Floor Tiles
- Exterior Brick Mortar, Gray





## ***Final Report for Environmental Inspection Services***

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Analytical results of the bulk samples collected by Berger on 11/12/19 indicate that the following materials **contain asbestos** (greater than 1-percent).

- **Joint Compound associated with Gypsum Board, Beige**
- **Gypsum Board, Gray (Contaminated ACM)**
- **12"x12" Brown Floor Tiles (Bottom, Contaminated ACM, Only in Room 11)**
- **Mastic associated with 12"x12" White Floor Tiles, Black (Top)**
- **12"x12" White Floor Tiles (Top, Contaminated ACM)**
- **Mastic associated with 12"x12" Light Green Floor Tiles, Yellow/Black**
- **12"x12" Light Green Floor Tiles (Contaminated ACM)**
- **Exterior Window Frame/Louver Caulking, Brown**

The following materials are **assumed to contain asbestos**.

- **Built-up Roofing System (Multiple Layers)**

Analytical results of the bulk samples collected by Berger on 11/12/19 indicate that the following materials **did not contain asbestos** (less than 1-percent);

- 2'x2' Fissure Ceiling Tiles, White
- 2'x4' Fissure Ceiling Tiles, White
- Interior Window Sill Mortar, Gray
- Interior Window Sill Sealant, Brown/Dark Gray
- Cementitious Ceiling, Gray
- Canvas associated with Cementitious Ceiling, White
- Sealant to Fiberglass Pipe Insulation, White
- Cinderblock Mortar, Gray
- 4" Black Cove Base, Yellow Mastic associated with 12"x12" Green Floor Tiles, Yellow
- 12"x12" Green Floor Tiles
- Mastic associated with 12"x12" Brown Floor Tiles, Black (Bottom)
- Mastic associated with 12"x12" Tan Floor Tiles, Yellow
- 12"x12" Tan Floor Tiles
- Mastic associated with 12"x12" Beige Floor Tiles, Black
- 12"x12" Beige Floor Tiles
- Mastic associated with 12"x12" Brown Speckled Floor Tiles
- 12"x12" Brown Speckled Floor Tiles
- 12"x12" Red Floor Tiles
- Exterior Brick Mortar, Gray



## ***Final Report for Environmental Inspection Services***

### **4.0 INSPECTION RESULTS**

#### **A. ASBESTOS-CONTAINING MATERIAL**

The asbestos inspection involved a thorough visual examination of all areas that may be impacted by the proposed HDG Project: 203 at Woodside Elementary School. The following suspect materials were sampled and analyzed for asbestos content by Berger:

**4.1 Table 4.1 – Suspect Materials Inspected**

<b>HOMOGENOUS MATERIAL</b>	<b>MATERIAL</b>	<b>SAMPLE LOCATION</b>	<b>ASBESTOS CONTENT</b>
<b>01</b>	<b>Joint Compound associated with Gypsum Board, Beige</b>	<b>Rooms 16 through 24</b>	<b>4.00% Chrysotile</b>
<b>02</b>	<b>Gypsum Board, Gray</b>	<b>Rooms 16 through 24</b>	<b>Contaminated ACM</b>
<b>03</b>	2'x2' Fissure Ceiling Tiles, White	Throughout Interior	NAD
<b>04</b>	2'x4' Fissure Ceiling Tiles, White	Throughout Interior	NAD
<b>05</b>	Interior Window Sill Mortar, Gray	Throughout Interior	NAD
<b>06</b>	Interior Window Sill Sealant, Brown/Dark Gray	Throughout Interior	<1% Anthophyllite
<b>07</b>	Cementitious Ceiling, Gray	Throughout Interior	NAD
<b>08</b>	Canvas associated with Cementitious Ceiling, White	Throughout Interior	NAD
<b>09</b>	Sealant to Fiberglass Pipe Insulation, White	Throughout Interior	NAD
<b>10</b>	Cinderblock Mortar, Gray	Throughout Interior	NAD
<b>11</b>	4" Black Cove Base, Yellow	Throughout Interior	NAD
<b>12</b>	Mastic associated with 12"x12" Green Floor Tiles, Yellow	Room 21	<1% Chrysotile
<b>13</b>	12"x12" Green Floor Tiles	Room 21	
<b>14</b>	Mastic associated with 12"x12" Brown Floor Tiles, Black (Bottom)	Rooms 11, 13, 15, 22 & 24	<1% Chrysotile
<b>15</b>	<b>12"x12" Brown Floor Tiles (Bottom)</b>	<b>Rooms 11, 13, 15, 22 &amp; 24 (Found beneath White Floor Tiles in Room 11)</b>	<b>NAD (Contaminated ACM only in Room 11)</b>
<b>16</b>	<b>Mastic associated with 12"x12" White Floor Tiles, Black (Top)</b>	<b>Rooms 8, 9, 10, 12, 14, 20 &amp; 21</b>	<b>1.2% Chrysotile</b>
<b>17</b>	<b>12"x12" White Floor Tiles (Top)</b>	<b>Rooms 8, 9, 10, 12, 14, 20 &amp; 21</b>	<b>Contaminated ACM</b>
<b>18</b>	<b>Mastic associated with 12"x12" Light Green Floor Tiles, Yellow/Black</b>	<b>Room 6</b>	<b>4.00% Chrysotile</b>



## Final Report for Environmental Inspection Services

HOMOGENOUS MATERIAL	MATERIAL	SAMPLE LOCATION	ASBESTOS CONTENT
19	12"x12" Light Green Floor Tiles	Room 6	Contaminated ACM
20	Mastic associated with 12"x12" Tan Floor Tiles, Yellow	Room 23	NAD
21	12"x12" Tan Floor Tiles	Room 23	NAD
22	Mastic associated with 12"x12" Beige Floor Tiles, Black	Rooms 1 through 5 & 16 through 19	NAD
23	12"x12" Beige Floor Tiles	Rooms 1 through 5 & 16 through 19	NAD
24	Mastic associated with 12"x12" Brown Speckled Floor Tiles, Black	Rooms 11, 13, 15, 22 & 24	<1% Chrysotile
25	12"x12" Brown Speckled Floor Tiles	Rooms 11, 13, 15, 22 & 24	NAD
26	12"x12" Red Floor Tiles	Rooms 22 & 24	NAD
27	Exterior Brick Mortar, Gray	Exterior Facade	NAD
28	Exterior Window Frame/Louver Caulking, Brown	Exterior Facade	2.00% Chrysotile

**Bold = Positive for ACM**      NAD = No Asbestos Detected

### 4.2 CONDITION AND FRIABILITY ASSESSMENT TABLE

For each inspection conducted, the inspector classifies ACM or Assumed ACM materials by friability and condition. This helps to determine the extent of damage in certain areas as well as the potential for further damage and Asbestos release due to disturbance of the material.

**Table 4.2 – Condition and Friability Assessment**

Material	Material Location	Quantity	Friability	Condition
Joint Compound, Beige & Gypsum Board, Gray	Rooms 16 through 24	900 SF	Friable	Fair
Pipe Insulation	Rooms 11, 14, 15, 17, 19 through 24	244 LF	Friable	Good
12"x12" Brown Floor Tiles (Bottom)	Rooms 8 through 12, 14, 20 & 21	7,450 SF	Non-Friable	Good
Mastic associated with 12"x12" White Floor Tiles, Black (Top)			Non-Friable	Good
12"x12" White Floor Tiles (Top)			Non-Friable	Good
Mastic associated with 12"x12" Light Green Floor Tiles, Yellow/Black	Room 6	1,550 SF	Non-Friable	Good



## ***Final Report for Environmental Inspection Services***

Material	Material Location	Quantity	Friability	Condition
12"x12" Light Green Floor Tiles			Non-Friable	Good
Exterior Window Frame/Louver Caulking, Brown	Exterior Facade	60 LF	Non-Friable	Good

Note: All quantities are estimates and should be confirmed by contractor during walkthrough.

### **Condition Definitions:**

**Good:** None/Minimal apparent damage to ACM

**Fair:** Up to 10% localized damage or up to 25% of the entire ACM is damaged

**Poor:** Over 10% localized damage or over 25% of the entire ACM is damaged

### **4.3 SAMPLE ANALYSIS TABLE**

Laboratory analysis results, in tabular form, are included in Appendix A.

### **5.0 AREAS NOT ACCESSIBLE**

During the inspection the following areas were not accessible:

Spaces within Walls/Floors/Ceilings: No destructive sampling was performed on concealed spaces in walls to access plenum, chases etc. It should be assumed that asbestos containing materials may exist in these spaces. Any suspect materials encountered during work should be sampled for analysis before work continues.

Spaces within Building Envelope: No destructive sampling was performed to the building envelope. It should be assumed that asbestos containing materials may exist in these spaces. Any suspect materials encountered during work should be sampled for analysis before work continues.

### **6.0 CONCLUSIONS AND RECOMMENDATIONS**

ACM materials have been identified in this inspection that may be impacted as part of the HDG Project: 203 at Woodside Elementary School. These materials, reported in Section 3.0 of this report, may require complete removal prior to the start of any renovations.

The inspection was conducted at the request of the Peekskill City School District to determine materials which may be impacted by the current scope of work as outlined in the drawings for HDG Project: 203 at Woodside Elementary School, as well as emails offering further clarification of the work. Should the scope of work change, further investigation may be warranted to accurately classify any additional ACM materials not identified in this inspection.



## ***Final Report for Environmental Inspection Services***

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### **7.0 REPORT CERTIFICATIONS**

This report, and the supporting data, findings, conclusions, opinions, and recommendations it contains represent the result of Berger's efforts for the environmental inspection work for the Peekskill City School District.

Opinions and recommendations presented in this report apply to site conditions and features as they existed at the time of Berger's site visits, and those reasonably foreseeable. They cannot necessarily apply to conditions and features of which Berger is unaware and has not had the opportunity to evaluate.

The conclusions presented in this report are professional opinions solely upon Berger's visual observations of accessible areas, laboratory test data, and current regulatory requirements. These conclusions are intended exclusively for the purpose stated herein and the site indicated for the project indicated.

Prepared by:

A handwritten signature in blue ink, appearing to read 'Drew Cheskin', written over a horizontal line.

Drew Cheskin  
NYS DOL Inspector

Reviewed by:

A handwritten signature in blue ink, appearing to read 'Craig Napolitano', written over a horizontal line.

Craig Napolitano, CHMM  
Vice President, Emergency  
Management & IH Services



**APPENDIX A:  
ASBESTOS SAMPLE ANALYSIS RESULTS IN TABULAR FORM**



## Final Report For Environmental Inspection Services

### APPENDIX A SAMPLE ANALYSIS RESULTS IN TABULAR FORM WOODSIDE ELEMENTARY SCHOOL 612 DEPEW STREET PEEKSKILL, NY

Homogeneous Area No.	Sample No.	Material	Sample Location	PLM Result	TEM Result
01	01	<b>Joint Compound associated with Gypsum Board, Beige</b>	Room 19	4.00% Chrysotile	--
01	02	<b>Joint Compound associated with Gypsum Board, Beige</b>	Room 16	NA/PS	--
02	03	<b>Gypsum Board, Gray</b>	Room 19	NAD	--
02	04	<b>Gypsum Board, Gray</b>	Room 16	NAD	--
03	05	2'x2' Fissure Ceiling Tiles, White	Room 5	NAD	NAD
03	06	2'x2' Fissure Ceiling Tiles, White	Room 3	NAD	NAD
04	07	2'x4' Fissure Ceiling Tiles, White	Room 23	NAD	NAD
04	08	2'x4' Fissure Ceiling Tiles, White	Room 16	NAD	NAD
05	09	Interior Window Sill Mortar, Gray	Room 9	NAD	--
05	10	Interior Window Sill Mortar, Gray	Room 5	NAD	--
06	11	Interior Window Sill Sealant, Brown/Dark Gray	Room 9	NAD	NAD
06	12	Interior Window Sill Sealant, Brown/Dark Gray	Room 5	<1% Anthophyllite	<1% Anthophyllite
07	13	Cementitious Ceiling, Gray	Room 6	NAD	--
07	14	Cementitious Ceiling, Gray	Basement	NAD	--
08	15	Canvas associated with Cementitious Ceiling, White	Room 6	NAD	NAD
08	16	Canvas associated with Cementitious Ceiling, White	Basement	NAD	NAD
09	17	Sealant to Fiberglass Pipe Insulation, White	Room 6	NAD	NAD

**Bold = Positive for ACM**  
NAD = No Asbestos Detected

N/A = Not Applicable  
NA/PS = Not analyzed/ positive sample





## Final Report For Environmental Inspection Services

Homogeneous Area No.	Sample No.	Material	Sample Location	PLM Result	TEM Result
09	18	Sealant to Fiberglass Pipe Insulation, White	Basement	NAD	NAD
10	19	Cinderblock Mortar, Gray	Room 2	NAD	--
10	20	Cinderblock Mortar, Gray	Room 11	NAD	--
11	21	4" Black Cove Base, Yellow	Room 3	NAD	NAD
11	22	4" Black Cove Base, Yellow	Room 20	NAD	NAD
12	23	Mastic associated with 12"x12" Green Floor Tiles, Yellow	Room 21	<1% Chrysotile	<1% Chrysotile
12	24	Mastic associated with 12"x12" Green Floor Tiles, Yellow	Room 21	NAD	NAD
13	25	12"x12" Green Floor Tiles	Room 21	NAD	NAD
13	26	12"x12" Green Floor Tiles	Room 21	NAD	NAD
14	27	Mastic associated with 12"x12" Brown Floor Tiles, Black (Bottom)	Room 14	<1% Chrysotile	<1% Chrysotile
14	28	Mastic associated with 12"x12" Brown Floor Tiles, Black (Bottom)	Room 11	<1% Chrysotile	<1% Chrysotile
<b>15</b>	<b>29</b>	<b>12"x12" Brown Floor Tiles (Bottom)</b>	<b>Room 14</b>	<b>NAD</b>	<b>NAD</b>
<b>15</b>	<b>30</b>	<b>12"x12" Brown Floor Tiles (Bottom)</b>	<b>Room 11</b>	<b>NAD</b>	<b>NAD</b>
<b>16</b>	<b>31</b>	<b>Mastic associated with 12"x12" White Floor Tiles, Black (Top)</b>	<b>Room 14</b>	<b>1.2% Chrysotile</b>	<b>NA/PS</b>
<b>16</b>	<b>32</b>	<b>Mastic associated with 12"x12" White Floor Tiles, Black (Top)</b>	<b>Room 11</b>	<b>NA/PS</b>	<b>NA/PS</b>
<b>17</b>	<b>33</b>	<b>12"x12" White Floor Tiles (Top)</b>	<b>Room 14</b>	<b>NAD</b>	<b>NAD</b>
<b>17</b>	<b>34</b>	<b>12"x12" White Floor Tiles (Top)</b>	<b>Room 11</b>	<b>NAD</b>	<b>NAD</b>
<b>18</b>	<b>35</b>	<b>Mastic associated with 12"x12" Light Green Floor Tiles, Yellow/Black</b>	<b>Room 6</b>	<b>NAD</b>	<b>NAD</b>
<b>18</b>	<b>36</b>	<b>Mastic associated with 12"x12" Light Green Floor Tiles, Yellow/Black</b>	<b>Room 6</b>	<b>4.00% Chrysotile</b>	<b>NA/PS</b>
<b>19</b>	<b>37</b>	<b>12"x12" Light Green Floor Tiles</b>	<b>Room 6</b>	<b>Contaminated ACM</b>	<b>Contaminated ACM</b>
<b>19</b>	<b>38</b>	<b>12"x12" Light Green Floor Tiles</b>	<b>Room 6</b>	<b>Contaminated ACM</b>	<b>Contaminated ACM</b>

**Bold = Positive for ACM**  
NAD = No Asbestos Detected

N/A = Not Applicable  
NA/PS = Not analyzed/ positive sample



## Final Report For Environmental Inspection Services

Homogeneous Area No.	Sample No.	Material	Sample Location	PLM Result	TEM Result
20	39	Mastic associated with 12"x12" Tan Floor Tiles, Yellow	Room 23	NAD	NAD
20	40	Mastic associated with 12"x12" Tan Floor Tiles, Yellow	Room 23	NAD	NAD
21	41	12"x12" Tan Floor Tiles	Room 23	NAD	NAD
21	42	12"x12" Tan Floor Tiles	Room 23	NAD	NAD
22	43	Mastic associated with 12"x12" Beige Floor Tiles, Black	Room 16	NAD	NAD
22	44	Mastic associated with 12"x12" Beige Floor Tiles, Black	Room 17	NAD	NAD
23	45	12"x12" Beige Floor Tiles	Room 16	NAD	NAD
23	46	12"x12" Beige Floor Tiles	Room 17	NAD	NAD
24	47	Mastic associated with 12"x12" Brown Speckled Floor Tiles, Black	Room 22	<1% Chrysotile	NAD
24	48	Mastic associated with 12"x12" Brown Speckled Floor Tiles, Black	Room 24	NAD	NAD
25	49	12"x12" Brown Speckled Floor Tiles	Room 22	NAD	NAD
25	50	12"x12" Brown Speckled Floor Tiles	Room 24	NAD	NAD
26	51	12"x12" Red Floor Tiles	Room 22	NAD	NAD
26	52	12"x12" Red Floor Tiles	Room 24	NAD	NAD
27	53	Exterior Brick Mortar, Gray	Exterior Room 4	NAD	--
27	54	Exterior Brick Mortar, Gray	Exterior Room 18	NAD	--
28	55	<b>Exterior Window Frame/Louver Caulking, Brown</b>	<b>Exterior Room 4</b>	<b>2.00% Chrysotile</b>	<b>NA/PS</b>
28	56	<b>Exterior Window Frame/Louver Caulking, Brown</b>	<b>Exterior Room 18</b>	<b>NA/PS</b>	<b>NA/PS</b>

**Bold = Positive for ACM**  
NAD = No Asbestos Detected

N/A = Not Applicable  
NA/PS = Not analyzed/ positive sample



**APPENDIX B:  
ASBESTOS BULK SAMPLE FIELD DATA SHEETS  
WITH CHAIN OF CUSTODY & LABORATORY RESULTS**



# EMSL Analytical, Inc.

528 Mineola Avenue Carle Place, NY 11514  
 Tel/Fax: (516) 997-7251 / (516) 997-7528  
<http://www.EMSL.com / carleplacelab@emsl.com>

**EMSL Order:** 061925571  
**Customer ID:** LBAP78  
**Customer PO:** 2043465.34  
**Project ID:**

**Attention:** Marvin Luccioni  
 Louis Berger U.S., Inc  
 96 Morton Street  
 8th floor  
 New York, NY 10014

**Phone:** (718) 730-2741

**Fax:**

**Received Date:** 11/15/2019 2:04 AM

**Analysis Date:** 11/15/2019 - 11/16/2019

**Collected Date:** 11/15/2019

**Project:** Peekskill S.O. Woodside ES @ 612 Depew St, Peekskill, NY, Throughout Interior Unit Ventilator Renovation,  
 LB Proj. #2043465.34

## Test Report:Asbestos Analysis of Bulk Material

		Non-Asbestos				
Test	Analyzed Date	Color	Fibrous	Non-Fibrous	Asbestos	
Sample ID	01-01	Description	Room 19 - Joint Compound assoc w./ Gypsum Board - Beige			
	061925571-0001	Homogeneity	Homogeneous			
PLM NYS 198.1 Friable	11/15/2019	Tan	None	75.00% Ca Carbonate 5.00% Mica 16.00% Non-fibrous (other)	4.00% Chrysotile	
PLM NYS 198.6 VCM					Not Analyzed	
PLM NYS 198.6 NOB					Not Analyzed	
TEM NYS 198.4 NOB					Not Analyzed	
Sample ID	01-02	Description	Room 16 - Joint Compound assoc w./ Gypsum Board - Beige			
	061925571-0002	Homogeneity				
PLM NYS 198.1 Friable	11/15/2019				Positive Stop (Not Analyzed)	
PLM NYS 198.6 VCM					Not Analyzed	
PLM NYS 198.6 NOB					Not Analyzed	
TEM NYS 198.4 NOB					Not Analyzed	
Sample ID	02-03	Description	Room 19 - Gypsum Board - Gray			
	061925571-0003	Homogeneity	Heterogeneous			
PLM NYS 198.1 Friable	11/15/2019	Brown/ Gray	8.00% Cellulose	37.00% Ca Carbonate 50.00% Gypsum 5.00% Non-fibrous (other)	None Detected	
PLM NYS 198.6 VCM					Not Analyzed	
PLM NYS 198.6 NOB					Not Analyzed	
TEM NYS 198.4 NOB					Not Analyzed	
Sample ID	02-04	Description	Room 16 - Gypsum Board - Gray			
	061925571-0004	Homogeneity	Heterogeneous			
PLM NYS 198.1 Friable	11/15/2019	Brown	6.00% Cellulose	24.00% Ca Carbonate 65.00% Gypsum 5.00% Non-fibrous (other)	None Detected	
PLM NYS 198.6 VCM					Not Analyzed	
PLM NYS 198.6 NOB					Not Analyzed	
TEM NYS 198.4 NOB					Not Analyzed	
Sample ID	03-05	Description	Room 05 - 2'x2' Fissure Ceiling Tiles - White			
	061925571-0005	Homogeneity	Homogeneous			
PLM NYS 198.1 Friable					Not Analyzed	
PLM NYS 198.6 VCM					Not Analyzed	
PLM NYS 198.6 NOB	11/16/2019	Gray	11.00% Min. Wool	89.00% Other	Inconclusive: None Detected	
TEM NYS 198.4 NOB	11/16/2019	Gray		100.00% Other	None Detected	

Initial report from: 11/16/2019 12:15:00



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EMSL Order: 061925571

Customer ID: LBAP78

Customer PO: 2043465.34

Project ID:

## Test Report: Asbestos Analysis of Bulk Material

		Non-Asbestos			
Test	Analyzed Date	Color	Fibrous	Non-Fibrous	Asbestos
Sample ID 03-06 061925571-0006		Description	Room 03 - 2'x2' Fissure Ceiling Tiles - White		
		Homogeneity	Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	11/16/2019	Gray	15.00% Min. Wool	85.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	11/16/2019	Gray		100.00% Other	None Detected
Sample ID 04-07 061925571-0007		Description	Room 23 - 2'x4' Fisher Ceiling Tiles - White		
		Homogeneity	Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	11/16/2019	Gray	8.50% Min. Wool	91.50% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	11/16/2019	Gray		100.00% Other	None Detected
Sample ID 04-08 061925571-0008		Description	Room 16 - 2'x4' Fisher Ceiling Tiles - White		
		Homogeneity	Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	11/16/2019	Gray	8.70% Min. Wool	91.30% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	11/16/2019	Gray		100.00% Other	None Detected
Sample ID 05-09 061925571-0009		Description	Room 9 - Interior Window Sill Mortar - Gray		
		Homogeneity	Homogeneous		
PLM NYS 198.1 Friable	11/15/2019	Tan		15.00% Ca Carbonate 10.00% Non-fibrous (other) 75.00% Quartz	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 05-10 061925571-0010		Description	Room 5 - Interior Window Sill Mortar - Gray		
		Homogeneity	Homogeneous		
PLM NYS 198.1 Friable	11/15/2019	Tan		25.00% Ca Carbonate 15.00% Gypsum 5.00% Non-fibrous (other) 55.00% Quartz	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 06-11 061925571-0011		Description	Room 9 - Interior Window Sill Sealant - Brown/Dark Gray		
		Homogeneity	Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	11/16/2019	Brown		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	11/16/2019	Brown	None	100.00% Other	<1% Anthophyllite

Initial report from: 11/16/2019 12:15:00



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EMSL Order: 061925571

Customer ID: LBAP78

Customer PO: 2043465.34

Project ID:

## Test Report: Asbestos Analysis of Bulk Material

Test	Analyzed Date	Color	Non-Asbestos		Asbestos
			Fibrous	Non-Fibrous	
<b>Sample ID</b> 06-12 061925571-0012		<b>Description</b>	Room 5 - Interior Window Sill Sealant - Brown/Dark Gray		
		<b>Homogeneity</b>	Homogeneous		
<b>PLM NYS 198.1 Friable</b>					<b>Not Analyzed</b>
<b>PLM NYS 198.6 VCM</b>					<b>Not Analyzed</b>
<b>PLM NYS 198.6 NOB</b>	11/16/2019	Brown		100.00% Other	<b>Inconclusive: None Detected</b>
<b>TEM NYS 198.4 NOB</b>	11/16/2019	Brown	None	100.00% Other	<b>&lt;1% Anthophyllite</b>
<b>Sample ID</b> 07-13 061925571-0013		<b>Description</b>	Room 6 - Cementitious Ceiling - Gray		
		<b>Homogeneity</b>	Homogeneous		
<b>PLM NYS 198.1 Friable</b>	11/15/2019	Gray		25.00% Ca Carbonate 15.00% Gypsum 5.00% Non-fibrous (other) 55.00% Quartz	<b>None Detected</b>
<b>PLM NYS 198.6 VCM</b>					<b>Not Analyzed</b>
<b>PLM NYS 198.6 NOB</b>					<b>Not Analyzed</b>
<b>TEM NYS 198.4 NOB</b>					<b>Not Analyzed</b>
<b>Sample ID</b> 07-14 061925571-0014		<b>Description</b>	Basement Open Area - Cementitious Ceiling - Gray		
		<b>Homogeneity</b>	Homogeneous		
<b>PLM NYS 198.1 Friable</b>	11/15/2019	Gray		15.00% Ca Carbonate 5.00% Gypsum 25.00% Non-fibrous (other) 55.00% Quartz	<b>None Detected</b>
<b>PLM NYS 198.6 VCM</b>					<b>Not Analyzed</b>
<b>PLM NYS 198.6 NOB</b>					<b>Not Analyzed</b>
<b>TEM NYS 198.4 NOB</b>					<b>Not Analyzed</b>
<b>Sample ID</b> 08-15 061925571-0015		<b>Description</b>	Room 6 - Canvas associated w./ Cementitious Ceiling - White		
		<b>Homogeneity</b>	Homogeneous		
<b>PLM NYS 198.1 Friable</b>					<b>Not Analyzed</b>
<b>PLM NYS 198.6 VCM</b>					<b>Not Analyzed</b>
<b>PLM NYS 198.6 NOB</b>	11/16/2019	Brown/ White		100.00% Other	<b>Inconclusive: None Detected</b>
<b>TEM NYS 198.4 NOB</b>	11/16/2019	Brown/ White		100.00% Other	<b>None Detected</b>
<b>Sample ID</b> 08-16 061925571-0016		<b>Description</b>	Basement Open Area - Canvas associated w./ Cementitious Ceiling - White		
		<b>Homogeneity</b>	Homogeneous		
<b>PLM NYS 198.1 Friable</b>					<b>Not Analyzed</b>
<b>PLM NYS 198.6 VCM</b>					<b>Not Analyzed</b>
<b>PLM NYS 198.6 NOB</b>	11/16/2019	Brown/ White		100.00% Other	<b>Inconclusive: None Detected</b>
<b>TEM NYS 198.4 NOB</b>	11/16/2019	Brown/ White		100.00% Other	<b>None Detected</b>
<b>Sample ID</b> 09-17 061925571-0017		<b>Description</b>	Room 6 - Sealant to Fiberglass Pipe Insulation - White		
		<b>Homogeneity</b>	Homogeneous		
<b>PLM NYS 198.1 Friable</b>					<b>Not Analyzed</b>
<b>PLM NYS 198.6 VCM</b>					<b>Not Analyzed</b>
<b>PLM NYS 198.6 NOB</b>	11/16/2019	White/ Yellow	4.40% Glass	95.60% Other	<b>Inconclusive: None Detected</b>
<b>TEM NYS 198.4 NOB</b>	11/16/2019	White/ Yellow		100.00% Other	<b>None Detected</b>

Initial report from: 11/16/2019 12:15:00



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**EMSL Order:** 061925571  
**Customer ID:** LBAP78  
**Customer PO:** 2043465.34  
**Project ID:**

## Test Report: Asbestos Analysis of Bulk Material

Test	Analyzed Date	Color	Non-Asbestos		Asbestos
			Fibrous	Non-Fibrous	
<b>Sample ID</b> 09-18 061925571-0018		<b>Description</b>	Basement Open Area - Sealant to Fiberglass Pipe Insulation - White		
		<b>Homogeneity</b>	Homogeneous		
<b>PLM NYS 198.1 Friable</b>					<b>Not Analyzed</b>
<b>PLM NYS 198.6 VCM</b>					<b>Not Analyzed</b>
<b>PLM NYS 198.6 NOB</b>	11/16/2019	White/ Yellow	4.10% Glass	95.90% Other	<b>Inconclusive: None Detected</b>
<b>TEM NYS 198.4 NOB</b>	11/16/2019	White/ Yellow		100.00% Other	<b>None Detected</b>
<b>Sample ID</b> 10-19 061925571-0019		<b>Description</b>	Room 2 - Cinder Block Mortar - Gray		
		<b>Homogeneity</b>	Homogeneous		
<b>PLM NYS 198.1 Friable</b>	11/15/2019	Gray		25.00% Ca Carbonate 15.00% Gypsum 5.00% Non-fibrous (other) 55.00% Quartz	<b>None Detected</b>
<b>PLM NYS 198.6 VCM</b>					<b>Not Analyzed</b>
<b>PLM NYS 198.6 NOB</b>					<b>Not Analyzed</b>
<b>TEM NYS 198.4 NOB</b>					<b>Not Analyzed</b>
<b>Sample ID</b> 10-20 061925571-0020		<b>Description</b>	Room 11 - Cinder Block Mortar - Gray		
		<b>Homogeneity</b>	Homogeneous		
<b>PLM NYS 198.1 Friable</b>	11/15/2019	Gray		25.00% Ca Carbonate 15.00% Gypsum 5.00% Non-fibrous (other) 55.00% Quartz	<b>None Detected</b>
<b>PLM NYS 198.6 VCM</b>					<b>Not Analyzed</b>
<b>PLM NYS 198.6 NOB</b>					<b>Not Analyzed</b>
<b>TEM NYS 198.4 NOB</b>					<b>Not Analyzed</b>
<b>Sample ID</b> 11-21 061925571-0021A		<b>Description</b>	Room 3 - 4" Black Cove Base Mastic - Yellow		
		<b>Homogeneity</b>	Homogeneous		
<b>PLM NYS 198.1 Friable</b>					<b>Not Analyzed</b>
<b>PLM NYS 198.6 VCM</b>					<b>Not Analyzed</b>
<b>PLM NYS 198.6 NOB</b>	11/16/2019	Yellow		100.00% Other	<b>Inconclusive: None Detected</b>
<b>TEM NYS 198.4 NOB</b>	11/16/2019	Yellow		100.00% Other	<b>None Detected</b>
<b>Sample ID</b> 11-22 061925571-0022A		<b>Description</b>	Room 20 - 4" Black Cove Base Mastic - Yellow		
		<b>Homogeneity</b>	Homogeneous		
<b>PLM NYS 198.1 Friable</b>					<b>Not Analyzed</b>
<b>PLM NYS 198.6 VCM</b>					<b>Not Analyzed</b>
<b>PLM NYS 198.6 NOB</b>	11/16/2019	Yellow		100.00% Other	<b>Inconclusive: None Detected</b>
<b>TEM NYS 198.4 NOB</b>	11/16/2019	Yellow		100.00% Other	<b>None Detected</b>
<b>Sample ID</b> 12-23 061925571-0023		<b>Description</b>	Room 21 - Mastic assoc. w./ 12" x12" Green Floor Tiles - Yellow		
		<b>Homogeneity</b>	Homogeneous		
<b>PLM NYS 198.1 Friable</b>					<b>Not Analyzed</b>
<b>PLM NYS 198.6 VCM</b>					<b>Not Analyzed</b>
<b>PLM NYS 198.6 NOB</b>	11/16/2019	Green	None	100.00% Other	<b>Inconclusive : &lt;1% Chrysotile</b>
<b>TEM NYS 198.4 NOB</b>	11/16/2019	Green	None	100.00% Other	<b>&lt;1% Chrysotile</b>

Initial report from: 11/16/2019 12:15:00





# EMSL Analytical, Inc.

528 Mineola Avenue Carle Place, NY 11514

Tel/Fax: (516) 997-7251 / (516) 997-7528

<http://www.EMSL.com> / [carleplacelab@emsl.com](mailto:carleplacelab@emsl.com)

EMSL Order: 061925571

Customer ID: LBAP78

Customer PO: 2043465.34

Project ID:

## Test Report: Asbestos Analysis of Bulk Material

Test	Analyzed Date	Color	Non-Asbestos		Asbestos
			Fibrous	Non-Fibrous	
Sample ID 12-24 061925571-0024		Description Homogeneity	Room 21 - Mastic assoc. w./ 12" x12" Green Floor Tiles - Yellow Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	11/16/2019	Green		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	11/16/2019	Green		100.00% Other	None Detected
Sample ID 13-25 061925571-0025		Description Homogeneity	Room 21 - 12" x 12" Green Floor Tiles Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	11/16/2019	Brown		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	11/16/2019	Brown		100.00% Other	None Detected
Sample ID 13-26 061925571-0026		Description Homogeneity	Room 21 - 12" x 12" Green Floor Tiles Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	11/16/2019	Brown		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	11/16/2019	Brown		100.00% Other	None Detected
Sample ID 14-27 061925571-0027		Description Homogeneity	Room 14 - Mastic assoc w./ 9" x 9" Brown Floor Tiles - Black (Bottom) Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	11/16/2019	Tan	None	100.00% Other	Inconclusive : <1% Chrysotile
TEM NYS 198.4 NOB	11/16/2019	Tan	None	100.00% Other	<1% Chrysotile
Sample ID 14-28 061925571-0028		Description Homogeneity	Room 11 - Mastic assoc w./ 9" x 9" Brown Floor Tiles - Black (Bottom) Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	11/16/2019	Tan	None	100.00% Other	Inconclusive : <1% Chrysotile
TEM NYS 198.4 NOB	11/16/2019	Tan	None	100.00% Other	<1% Chrysotile
Sample ID 15-29 061925571-0029		Description Homogeneity	Room 14 - 9" x 9" Brown Floor Tiles (Bottom) Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	11/16/2019	Black		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	11/16/2019	Black		100.00% Other	None Detected

Initial report from: 11/16/2019 12:15:00



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EMSL Order: 061925571

Customer ID: LBAP78

Customer PO: 2043465.34

Project ID:

## Test Report: Asbestos Analysis of Bulk Material

Test	Analyzed Date	Color	Non-Asbestos		Asbestos
			Fibrous	Non-Fibrous	
Sample ID 15-30 061925571-0030		Description Homogeneity	Room 11 - 9" x 9" Brown Floor Tiles (Bottom) Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	11/16/2019	Black		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	11/16/2019	Black		100.00% Other	None Detected
Sample ID 16-31 061925571-0031		Description Homogeneity	Room 14 - Mastic assoc w./ 12" x 12" White Floor Tiles - Black (Top) Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	11/16/2019	Gray	None	98.80% Other	1.20% Chrysotile
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 16-32 061925571-0032		Description Homogeneity	Room 11 - Mastic assoc w./ 12" x 12" White Floor Tiles - Black (Top) Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	11/16/2019				Positive Stop (Not Analyzed)
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 17-33 061925571-0033		Description Homogeneity	Room 14 - 12" x 12" White Floor Tiles (Top) Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	11/16/2019	Black		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	11/16/2019	Black		100.00% Other	None Detected
Sample ID 17-34 061925571-0034		Description Homogeneity	Room 11 - 12" x 12" White Floor Tiles (Top) Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	11/16/2019	Black		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	11/16/2019	Black		100.00% Other	None Detected
Sample ID 18-35 061925571-0035		Description Homogeneity	Room 6 - Mastic assoc w./ 12" x12" Light Green Floor Tiles - Yellow/Black Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	11/16/2019				Insufficient Material
TEM NYS 198.4 NOB	11/16/2019				Insufficient Material

Initial report from: 11/16/2019 12:15:00



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EMSL Order: 061925571

Customer ID: LBAP78

Customer PO: 2043465.34

Project ID:

## Test Report: Asbestos Analysis of Bulk Material

Test	Analyzed Date	Color	Non-Asbestos		Asbestos
			Fibrous	Non-Fibrous	
<b>Sample ID</b> 18-36 061925571-0036		<b>Description</b> <b>Homogeneity</b>	Room 6 - Mastic assoc w./ 12" x12" Light Green Floor Tiles - Yellow/Black Homogeneous		
<b>PLM NYS 198.1 Friable</b>					<b>Not Analyzed</b>
<b>PLM NYS 198.6 VCM</b>					<b>Not Analyzed</b>
<b>PLM NYS 198.6 NOB</b>	11/16/2019	Gray	None	96.00% Other	<b>4.00% Chrysotile</b>
<b>TEM NYS 198.4 NOB</b>	11/16/2019				<b>Not Analyzed</b>
<b>Sample ID</b> 19-37 061925571-0037		<b>Description</b> <b>Homogeneity</b>	Room 6 - 12" x12" Light Green Floor Tiles		
<b>PLM NYS 198.1 Friable</b>					<b>Not Analyzed</b>
<b>PLM NYS 198.6 VCM</b>					<b>Not Analyzed</b>
<b>PLM NYS 198.6 NOB</b>	11/16/2019				<b>Not Analyzed</b>
Sample not analyzed as per client instructions					
<b>TEM NYS 198.4 NOB</b>	11/16/2019				<b>Not Analyzed</b>
<b>Sample ID</b> 19-38 061925571-0038		<b>Description</b> <b>Homogeneity</b>	Room 6 - 12" x12" Light Green Floor Tiles		
<b>PLM NYS 198.1 Friable</b>					<b>Not Analyzed</b>
<b>PLM NYS 198.6 VCM</b>					<b>Not Analyzed</b>
<b>PLM NYS 198.6 NOB</b>	11/16/2019				<b>Not Analyzed</b>
Sample not analyzed as per client instructions					
<b>TEM NYS 198.4 NOB</b>	11/16/2019				<b>Not Analyzed</b>
<b>Sample ID</b> 20-39 061925571-0039		<b>Description</b> <b>Homogeneity</b>	Room 23 - Mastic assoc w./ 12" x12" Tan Floor Tiles - Yellow Homogeneous		
<b>PLM NYS 198.1 Friable</b>					<b>Not Analyzed</b>
<b>PLM NYS 198.6 VCM</b>					<b>Not Analyzed</b>
<b>PLM NYS 198.6 NOB</b>	11/16/2019	Tan		100.00% Other	<b>Inconclusive: None Detected</b>
<b>TEM NYS 198.4 NOB</b>	11/16/2019	Tan		100.00% Other	<b>None Detected</b>
<b>Sample ID</b> 20-40 061925571-0040		<b>Description</b> <b>Homogeneity</b>	Room 23 - Mastic assoc w./ 12" x12" Tan Floor Tiles - Yellow Homogeneous		
<b>PLM NYS 198.1 Friable</b>					<b>Not Analyzed</b>
<b>PLM NYS 198.6 VCM</b>					<b>Not Analyzed</b>
<b>PLM NYS 198.6 NOB</b>	11/16/2019	Tan		100.00% Other	<b>Inconclusive: None Detected</b>
<b>TEM NYS 198.4 NOB</b>	11/16/2019	Tan		100.00% Other	<b>None Detected</b>
<b>Sample ID</b> 21-41 061925571-0041		<b>Description</b> <b>Homogeneity</b>	Room 23 - 12" x12" Tan Floor Tiles Homogeneous		
<b>PLM NYS 198.1 Friable</b>					<b>Not Analyzed</b>
<b>PLM NYS 198.6 VCM</b>					<b>Not Analyzed</b>
<b>PLM NYS 198.6 NOB</b>	11/16/2019	Yellow		100.00% Other	<b>Inconclusive: None Detected</b>
<b>TEM NYS 198.4 NOB</b>	11/16/2019	Yellow		100.00% Other	<b>None Detected</b>

Initial report from: 11/16/2019 12:15:00



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EMSL Order: 061925571

Customer ID: LBAP78

Customer PO: 2043465.34

Project ID:

## Test Report: Asbestos Analysis of Bulk Material

Test	Analyzed Date	Color	Non-Asbestos		Asbestos
			Fibrous	Non-Fibrous	
Sample ID 21-42 061925571-0042		Description Homogeneity	Room 23 - 12" x12" Tan Floor Tiles Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	11/16/2019	Yellow		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	11/16/2019	Yellow		100.00% Other	None Detected
Sample ID 22-43 061925571-0043		Description Homogeneity	Room 16 - Mastic assoc w./ 12" x12" Beige Floor Tiles - Black Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	11/16/2019	Beige		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	11/16/2019	Beige		100.00% Other	None Detected
Sample ID 22-44 061925571-0044		Description Homogeneity	Room 17 - Mastic assoc w./ 12" x12" Beige Floor Tiles - Black Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	11/16/2019	Beige		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	11/16/2019	Beige		100.00% Other	None Detected
Sample ID 23-45 061925571-0045		Description Homogeneity	Room 16 - 12" x12" Beige Floor Tiles Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	11/16/2019	Black		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	11/16/2019	Black		100.00% Other	None Detected
Sample ID 23-46 061925571-0046		Description Homogeneity	Room 17 - 12" x12" Beige Floor Tiles Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	11/16/2019	Black		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	11/16/2019	Black		100.00% Other	None Detected
Sample ID 24-47 061925571-0047		Description Homogeneity	Room 22 - Mastic assoc w./ 12" x12" Brown Speckled Floor Tiles - Black Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	11/16/2019	Brown	None	100.00% Other	Inconclusive : <1% Chrysotile
TEM NYS 198.4 NOB	11/16/2019	Brown		100.00% Other	None Detected

Initial report from: 11/16/2019 12:15:00



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EMSL Order: 061925571

Customer ID: LBAP78

Customer PO: 2043465.34

Project ID:

## Test Report: Asbestos Analysis of Bulk Material

		Non-Asbestos			
Test	Analyzed Date	Color	Fibrous	Non-Fibrous	Asbestos
Sample ID 24-48 061925571-0048		Description	Room 24 - Mastic assoc w./ 12" x12" Brown Speckled Floor Tiles - Black		
		Homogeneity	Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	11/16/2019	Brown	<1.00% Fibrous (other)	100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	11/16/2019	Brown		100.00% Other	None Detected
Sample ID 25-49 061925571-0049		Description	Room 22 - 12" x12" Brown Speckled Floor Tiles		
		Homogeneity	Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	11/16/2019	Black		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	11/16/2019	Black		100.00% Other	None Detected
Sample ID 25-50 061925571-0050		Description	Room 24 - 12" x12" Brown Speckled Floor Tiles		
		Homogeneity	Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	11/16/2019	Black		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	11/16/2019	Black		100.00% Other	None Detected
Sample ID 26-51 061925571-0051		Description	Room 22 - 12" x12" Red Floor Tiles		
		Homogeneity	Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	11/16/2019	Red		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	11/16/2019	Red		100.00% Other	None Detected
Sample ID 26-52 061925571-0052		Description	Room 24 - 12" x12" Red Floor Tiles		
		Homogeneity	Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	11/16/2019	Red		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	11/16/2019	Red		100.00% Other	None Detected
Sample ID 27-53 061925571-0053		Description	Exterior 4 - Exterior Brick Mortar - Gray		
		Homogeneity	Homogeneous		
PLM NYS 198.1 Friable	11/15/2019	Gray		25.00% Ca Carbonate 10.00% Gypsum 10.00% Non-fibrous (other) 55.00% Quartz	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed

Initial report from: 11/16/2019 12:15:00



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EMSL Order: 061925571

Customer ID: LBAP78

Customer PO: 2043465.34

Project ID:

## Test Report: Asbestos Analysis of Bulk Material

Test	Analyzed Date	Color	Non-Asbestos		Asbestos
			Fibrous	Non-Fibrous	
Sample ID 27-54 061925571-0054		Description Homogeneity	Exterior 18 - Exterior Brick Mortar - Gray Homogeneous		
PLM NYS 198.1 Friable	11/15/2019	Gray		25.00% Ca Carbonate 10.00% Gypsum 10.00% Non-fibrous (other) 55.00% Quartz	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 28-55 061925571-0055		Description Homogeneity	Exterior 11 - Exterior Window Frame/ Louver Caulking - Brown Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	11/16/2019	Brown	None	98.00% Other	2.00% Chrysotile
TEM NYS 198.4 NOB	11/16/2019				Not Analyzed
Sample ID 28-56 061925571-0056		Description Homogeneity	Exterior 15 - Exterior Window Frame/ Louver Caulking - Brown		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	11/16/2019				Positive Stop (Not Analyzed)
TEM NYS 198.4 NOB	11/16/2019				Not Analyzed

Initial report from: 11/16/2019 12:15:00



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EMSL Order: 061925571

Customer ID: LBAP78

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Project ID:

### Test Report: Asbestos Analysis of Bulk Material

The samples in this report were submitted to EMSL for analysis by Asbestos Analysis of Bulk Materials via NYS ELAP Approved Methods. The reference number for these samples is the EMSL Order ID above. Please use this reference number when calling about these samples.

#### Report Comments:

Sample Receipt Date: 11/15/2019

Sample Receipt Time: 2:04 AM

Analysis Completed Date: 11/15/2019

Analysis Completed Time: 10:00 AM

#### Analyst(s):

Erick Rosa PLM NYS 198.1 Friable (9)

Erick Rosa PLM NYS 198.6 NOB (20)

Rosemary Ortega TEM NYS 198.4 NOB (20)

Steve Juszczuk PLM NYS 198.1 Friable (2)

Tomas Montes De Oca PLM NYS 198.6 NOB (19)

Soaiful Islam TEM NYS 198.4 NOB (16)

#### Samples reviewed and approved by:

Daniel Clarke, Asbestos Laboratory Manager  
or Other Approved Signatory

NOB = Non Friable Organically Bound N/A = Not Applicable VCM = Vermiculite Containing Material

-In New York State, TEM is currently the only method that can be used to determine if NOB materials can be considered or treated as non-asbestos containing.

All samples examined for the presence of vermiculite when analyzed via NYS 198.1.

-NYS Guidelines for Vermiculite containing samples are available at [http://www.wadsworth.org/labcert/elapcert/forms/VermiculiteInterimGuidance\\_Rev070913.pdf](http://www.wadsworth.org/labcert/elapcert/forms/VermiculiteInterimGuidance_Rev070913.pdf) EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. Samples were received in good condition unless otherwise noted.

This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government. This report may contain data that is not covered by the NVLAP accreditation.

Samples analyzed by EMSL Analytical, Inc. Carle Place, NY NYS ELAP 11469

Initial report from: 11/16/2019 12:15:00



061925571

OrderID: 061925571



LOUIS BERGER

## ASBESTOS SURVEY DATA SHEET/ CHAIN OF CUSTODY

PAGE 1 OF 5

LB PROJ 2043465.34

CLIENT: PEEKSKILL S.O.

PROJECT SITE: WOODSIDE ES. @ 612 DEFEW ST., PEEKSKILL NY

Project Manager: M. Muccioni

LOCATION(S) SURVEYED: THROUGHOUT INTERIOR

PROPOSED PROJECT: UNIT VENTILATOR RENOVATION

DATE(S) OF INSPECTION: 11/12/19

Inspector(s) M. Muccioni &amp; L. NEJAREZ

LOUIS BERGER

TELEPHONE NO.: (212) 612-7900 FAX NO.: (212) 363-4341

ADDRESS: 98 Morton Street, 8 Floor, New York, NY 10014

RESULTS TO:

M. Muccioni @ louisberger.com

TURNAROUND TIME:

☐ 4 HRS. ☒ 24 HRS. ☐ 48 HRS. ☐ 72 HRS.

HA	SAMPLE NO.	MATERIAL DESCRIPTION	SAMPLE LOCATION	APPROX. QUANTITY (LF/SF)	FIELD NOTES
01	01	JOINT COMPOUND ASSOC. w/ GYPSUM BOARD, BEIGE	Room 19		STOP @ 1 <sup>st</sup> POSITIVE
↓	02	↓	16		↓
02	03	GYPSUM BOARD, GRAY	19		
↓	04	↓	16		↓
03	05	2x2 FISSURE CEILING TILES, WHITE	05		
↓	06	↓	03		
04	07	2x4 FISHER CEILING TILES, WHITE	23		
↓	08	↓	16		
05	09	INTERIOR WINDOW SILL MORTAR, GRAY	9		
↓	10	↓	5		
06	11	INTERIOR WINDOW SILL SEALANT, BROWN/DARK GRAY	9		
↓	12	↓	5		

## CHAIN OF CUSTODY

Relinquished by (print) M. Muccioni	(Sign)	11/14/19	AM/PM	Relinquished by (print)	(Sign)	11/14/19	AM/PM	Relinquished by (print)	(Sign)	11/14/19	AM/PM
Received by (print) L. Nejarez	(Sign)	11/17/19	2:28 PM	Received by (print)	(Sign)	11/17/19	AM/PM	Received by (print)	(Sign)	11/17/19	AM/PM

Lorena Montalvo 11/16/19

11/15/19

J. 11/15/19 6:20 PM

GENERAL NOTES: All inconclusive NOBs to be analyzed by TEM. Please stop at 1st positive in any homogeneous group.

11.16.19

061925571

OrderID: 061925571

LOUIS BERGER		ASBESTOS SURVEY DATA SHEET/ CHAIN OF CUSTODY				PAGE 2 OF 5	
LB PROJ <u>2043465.34</u>		LOCATION(S) SURVEYED: <u>THROUGHOUT INTERIOR</u>					
CLIENT: <u>PEEKSKILL S.O.</u>		PROPOSED PROJECT: <u>UNIT VENTILATOR RENOVATION</u>					
PROJECT SITE: <u>WOODSLOE ES. @ 612 DEFEW ST., PEEKSKILL NY</u>		DATE(S) OF INSPECTION: <u>11/12/19</u>					
Project Manager: _____		Inspector(s) <u>M. Muccioni &amp; L. NEVAREZ</u>					
LOUIS BERGER TELEPHONE NO.: (212) 612-7900 FAX NO.: (212) 363-4341 ADDRESS: 98 Morton Street, 8 Floor, New York, NY 10014		RESULTS TO: <u>M. Muccioni @ Louis Berger.com</u>		TURNAROUND TIME: <input type="checkbox"/> 4 HR. <input checked="" type="checkbox"/> 24 HRS. <input type="checkbox"/> 48 HRS. <input type="checkbox"/> 72 HRS.			
HA	SAMPLE NO.	MATERIAL DESCRIPTION	SAMPLE LOCATION		APPROX. QUANTITY (LF/SF)	FIELD NOTES	
07	13	CEMENTITIOUS CEILING, GRAY	Room 6			STOP @ 1ST POSITIVE	
↓	14	↓	BASEMENT OPEN AREA			↓	
08	15	CANVAS ASSOC. w/ CEMENTITIOUS CEILING, WHITE	Room 6				
↓	16	↓	BASEMENT OPEN AREA				
09	17	SEALANT TO FIBERGLASS PIPE INSULATION, WHITE	Room 6				
↓	18	↓	BASEMENT OPEN AREA				
10	19	CINDER BLOCK MORTAR, GRAY	Room 2				
↓	20	↓	11				
11	21	4" BLACK COVE BASE MASTIC, YELLOW	3				
↓	22	↓	20				
12	23	MASTIC ASSOC. w/ 12x12 GREEN FLOOR TILES, YELLOW	21				
↓	24	↓	↓				
CHAIN OF CUSTODY							
Relinquished by: (print) <u>M. Muccioni</u>	(Sign) <u>[Signature]</u>	<u>11/14/19</u>	AM/PM	Relinquished by: (print) _____	(Sign) _____	____/____/____	AM/PM
Received by: (print) <u>[Signature]</u>	(Sign) <u>[Signature]</u>	<u>11/15/19</u>	AM/PM	Received by: (print) _____	(Sign) _____	____/____/____	AM/PM

GENERAL NOTES: All inconclusive NOBs to be analyzed by TEM. Please stop at 1st positive in any homogeneous group.

Tomás Martínez de Oca 11/16/19

[Signature] 11/16/19

[Signature] 11.16.19

[Signature]

11/15/19

[Signature] 11/15/19

PEER REVIEWED  
CARLE PLACE, NY

19 NOV 15 AM 2:04

061925571

OrderID: 061925571



LOUIS BERGER

## ASBESTOS SURVEY DATA SHEET/ CHAIN OF CUSTODY

PAGE 3 OF 5

LB PROJ 2043465.34

CLIENT: PEEKSKILL S.O.

PROJECT SITE: WOODBORO ES. @ 612 DEFEW ST., PEEKSKILL NY

Project Manager:

LOCATION(S) SURVEYED: THROUGHOUT INTERIOR

PROPOSED PROJECT: UNIT VENTILATOR RENOVATION

DATE(S) OF INSPECTION: 11/12/19

Inspector(s) M. MUCCIONI &amp; L. NEVAREZ

LOUIS BERGER

TELEPHONE NO.: (212) 612-7900 FAX NO.: (212) 363-4341

ADDRESS: 98 Morton Street, 8 Floor, New York, NY 10014

RESULTS TO:

MUCCIONI@LOUISBERGER.COM

TURNAROUND TIME:

☐ 4 HR. ☒ 24 HRS. ☐ 48 HRS. ☐ 72 HRS.

HA

SAMPLE  
NO.

MATERIAL DESCRIPTION

SAMPLE LOCATION

APPROX.  
QUANTITY  
(LF/SF)

FIELD NOTES

13

25

12x12 GREEN FLOOR TILES

Room 21

↓

26

↓

↓

14

27

MASTIC ASSOC. w/ 9x9 BROWN  
FLOOR TILES, BLACK (BOT)

14

↓

28

↓

11

15

29

9x9 BROWN FLOOR TILES (BOT)

14

↓

30

↓

11

16

31

MASTIC ASSOC. w/ 12x12 WHITE  
FLOOR TILES, BLACK (TOP)

14

↓

32

↓

11

17

33

12x12 WHITE FLOOR TILES (TOP)

14

↓

34

↓

11

18

35

MASTIC ASSOC. w/ 12x12 LIGHT  
GREEN FLOOR TILES, YELLOW/BLACK

6

↓

36

↓

↓

## CHAIN OF CUSTODY

Relinquished by: (print) M. MUCCIONI	(Sign)	11/14/19	AM/PM	Relinquished by: (print)	(Sign)	11	AM/PM	Relinquished by: (print)	(Sign)	11	AM/PM
Received by: (print) K. K.	(Sign)	11/15/19	AM/PM	Received by: (print)	(Sign)	11	AM/PM	Received by: (print)	(Sign)	11	AM/PM

Tomas Montano De Oca 11/16/19

R. R. 11/16/19

11.16.19

11/15/19

J. J. 11/16/19

GENERAL NOTES: All inconclusive NOBs to be analyzed by TEM. Please stop at 1st positive in any homogeneous group.

061925571

OrderID: 061925571

<b>LB PROJ</b> <u>2043465.34</u> <b>CLIENT:</b> <u>PEEKSKILL S.O.</u> <b>PROJECT SITE:</b> <u>WOODSIDE ES. @ 612 DEFEW ST., PEEKSKILL NY</u> <b>Project Manager:</b> _____	<b>LOCATION(S) SURVEYED:</b> <u>THROUGHOUT INTERIOR</u> <b>PROPOSED PROJECT:</b> <u>UNIT VENTILATOR RENOVATION</u> <b>DATE(S) OF INSPECTION:</b> <u>11/12/19</u> <b>Inspector(s)</b> <u>M. Muccioni &amp; L. NEVAREZ</u>
---	---

LOUIS BERGER TELEPHONE NO.: (212) 612-7900 <b>FAX NO.: (212) 363-4341</b> ADDRESS: 98 Morton Street, 8 Floor, New York, NY 10014	<b>RESULTS TO:</b> _____ <u>M. Muccioni @ Louis Berger.com</u>
--	---

HA	SAMPLE NO.	MATERIAL DESCRIPTION	SAMPLE LOCATION	APPROX. QUANTITY (LF/SF)	FIELD NOTES
19	37	12x12 LIGHT GREEN FLOOR TILES	Room 6		Do NOT ANALYZE IF SAMPLES 35236 ARE POSITIVE STOP @ 1st POSITIVE
↓	38	↓	↓		
20	39	MASTIC ASSOC. w/ 12x12 TAN FLOOR TILES, YELLOW	23		
↓	40	↓	↓		
21	41	12x12 TAN FLOOR TILES			
↓	42	↓	↓		STOP @ 1st POSITIVE
22	43	MASTIC ASSOC. w/ 12x12 BEIGE FLOOR TILES, BLACK	16		
↓	44	↓	17		
23	45	12x12 BEIGE FLOOR TILES	16		
↓	46	↓	17		
24	47	MASTIC ASSOC. w/ 12x12 BROWN SPECKLED FLOOR TILES, BLACK	22		
↓	48	↓	24		

CHAIN OF CUSTODY											
Relinquished by: (print) <u>M. Muccioni</u>	(Sign) <u>[Signature]</u>	Date: <u>11/14/19</u>	AM/PM	Relinquished by: (print) _____	(Sign) _____	Date: <u>11/15/19</u>	AM/PM	Relinquished by: (print) _____	(Sign) _____	Date: _____	AM/PM
Received by: (print) <u>Kurt</u>	(Sign) <u>[Signature]</u>	Date: <u>11/15/19</u>	AM/PM	Received by: (print) _____	(Sign) _____	Date: _____	AM/PM	Received by: (print) _____	(Sign) _____	Date: _____	AM/PM


**GENERAL NOTES:** All inconclusive NOBs to be analyzed by TEM. Please stop at 1st positive in any homogeneous group.

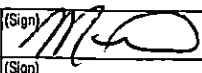
[Signature] 11/15/19  
[Signature] 11/16/19  
[Signature] 11/18/19

Page 4 of 5

061925571

OrderID: 061925571

 LOUIS BERGER		<b>ASBESTOS SURVEY DATA SHEET/ CHAIN OF CUSTODY</b>				PAGE <u>5</u> OF <u>5</u>	
LB PROJ <u>2043465.34</u> CLIENT: <u>PEEKSKILL S.O.</u>		LOCATION(S) SURVEYED: <u>THROUGHOUT INTERIOR</u> PROPOSED PROJECT: <u>UNIT VENTILATOR RENOVATION</u> DATE(S) OF INSPECTION: <u>11/12/19</u> Inspector(s) <u>M. Muccioni &amp; L. NEVAREZ</u>					
PROJECT SITE: <u>WOODSIDE ES. @ 612 DEFEW ST., PEEKSKILL NY</u> Project Manager: _____		RESULTS TO: _____ <u>M. Muccioni @ Louis Berger.com</u>					
LOUIS BERGER TELEPHONE NO.: (212) 612-7900 FAX NO.: (212) 363-4341 ADDRESS: 98 Morton Street, 8 Floor, New York, NY 10014		TURNAROUND TIME: <input type="checkbox"/> 4 HR. <input checked="" type="checkbox"/> 24 HRS. <input type="checkbox"/> 48 HRS. <input type="checkbox"/> 72 HRS.					
HA	SAMPLE NO.	MATERIAL DESCRIPTION	SAMPLE LOCATION	APPROX. QUANTITY (LF/SF)	FIELD NOTES		
25	49	12x12 BROWN SPECKLED FLOOR TILES	Room 22		STORE 1st POSITIVE IF SAMPLES 47 & 48 ARE POSITIVE  19 NOV 15 AM 2:04 ST. ANTHONY'S L.I.N.C. CARLE PLACE, NY		
↓	50	↓	24				
26	51	12x12 RED FLOOR TILES	22				
↓	52	↓	24				
27	53	EXTERIOR BRICK MORTAR, GRAY	EXTERIOR 4				
↓	54	↓	18				
28	55	EXTERIOR WINDOW FRAME / LOUVER CAULKING, BROWN	11				
↓	56	↓	15				

CHAIN OF CUSTODY											
Relinquished by: (print) <u>M. Muccioni</u>	(Sign) 	<u>11/14/19</u>	AM/PM	Relinquished by: (print) _____	(Sign) _____	<u>11</u>	AM/PM	Relinquished by: (print) _____	(Sign) _____	<u>11</u>	AM/PM
Received by: (print) _____	(Sign) _____	<u>11</u>	AM/PM	Received by: (print) _____	(Sign) _____	<u>11</u>	AM/PM	Received by: (print) _____	(Sign) _____	<u>11</u>	AM/PM

GENERAL NOTES: All inconclusive NOBs to be analyzed by TEM. Please stop at 1st positive in any homogeneous group.

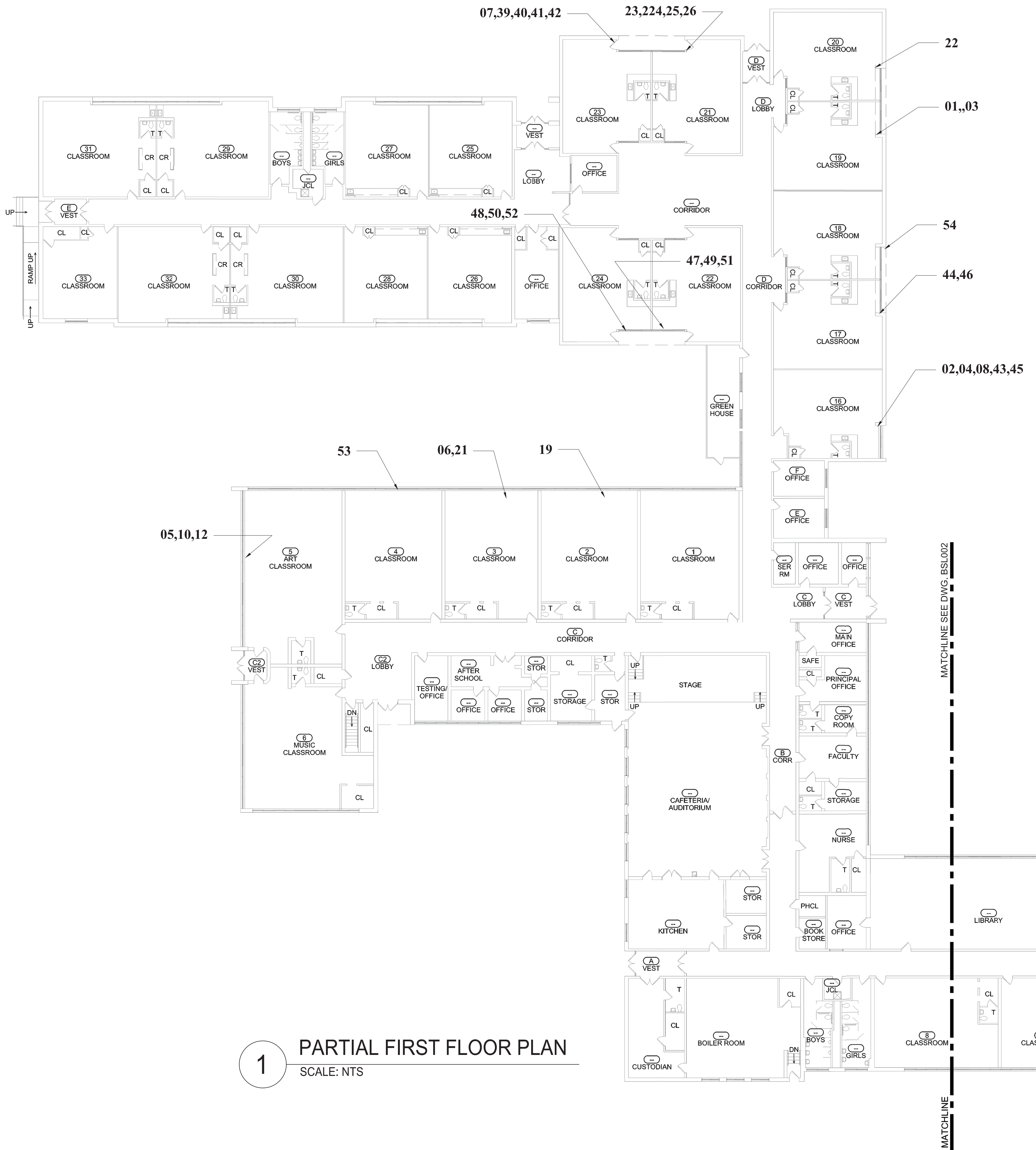
James Monteforte 11/16/19  
Ramirez 11/16/19  
Crane 11/15/19  
11/15/19 622

Page 5 of 5

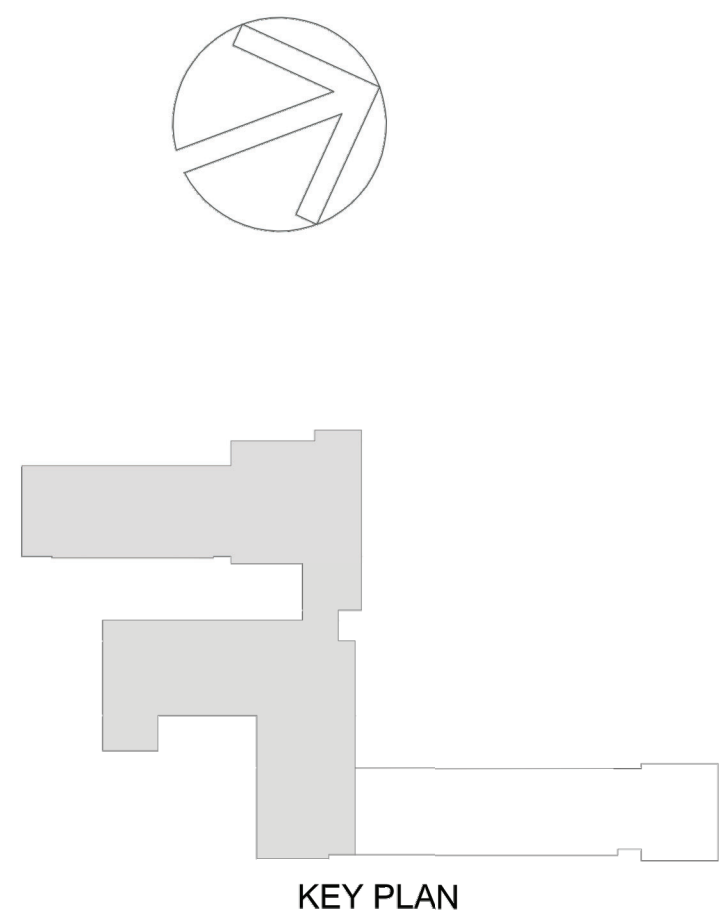


**APPENDIX C:  
ASBESTOS BULK SAMPLE LOCATION DRAWINGS**





1 PARTIAL FIRST FLOOR PLAN  
SCALE: NTS



PEEKSKILL  
SCHOOL DISTRICT  
PEEKSKILL WOODSIDE  
ELEMENTARY SCHOOL

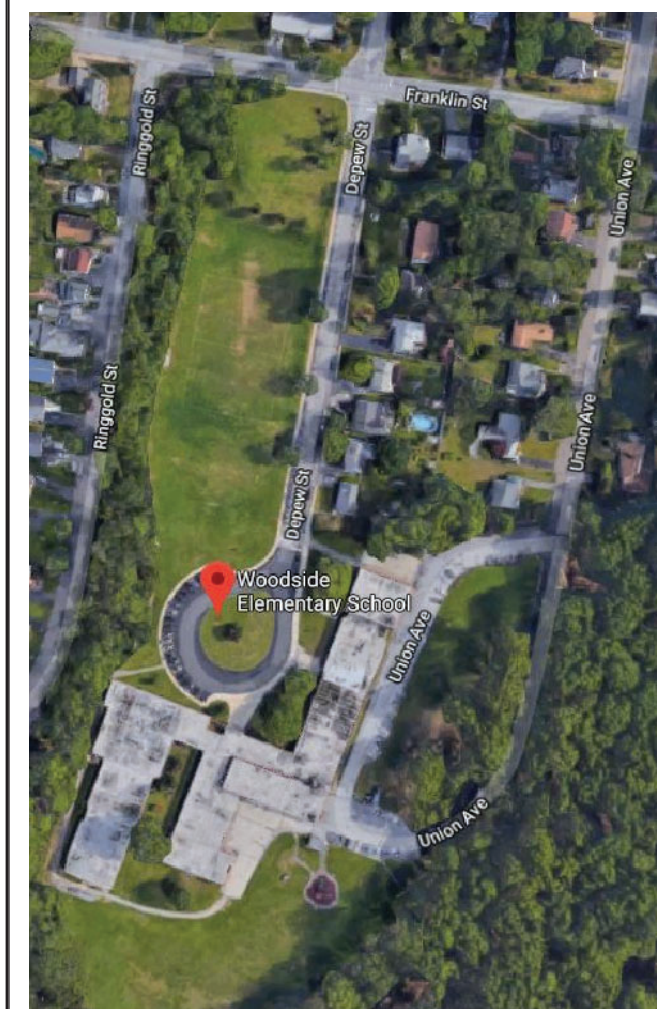
612 DEPEW STREET  
PEEKSKILL, NY 10566

ENVIRONMENTAL CONSULTANT



565 Taxter Road  
Elmsford, NY 10523  
TEL. 914.798.3710 FAX 212.363.4341 WWW.WSP.COM

KEY PLAN:




No. Date Issue

Sheet Title

BULK SAMPLE LOCATIONS  
PARTIAL FIRST FLOOR PLAN

Job No. 2043465.34	Sheet No.
11-18-2019	
Drawn by: J. PEREZ	
Checked by: M. LUCCIONI	

BSL001





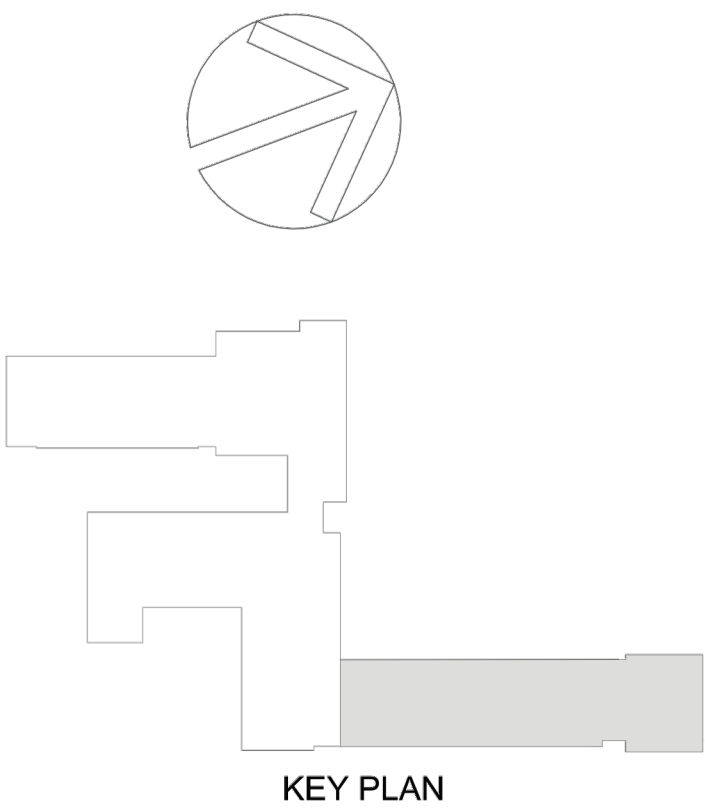
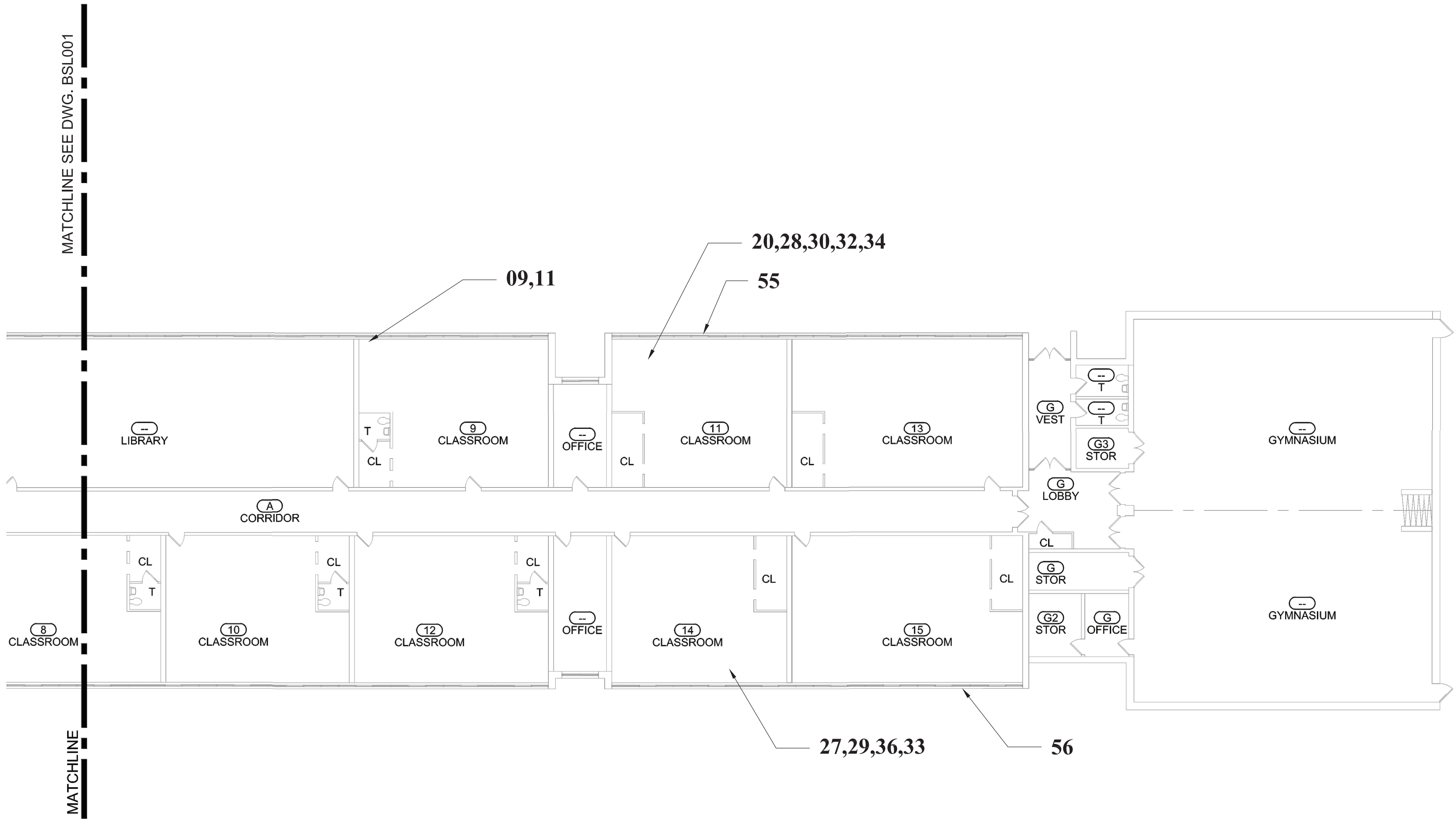
PEEKSKILL  
SCHOOL DISTRICT  
PEEKSKILL WOODSIDE  
ELEMENTARY SCHOOL

612 DEPEW STREET  
PEEKSKILL, NY 10566

ENVIRONMENTAL CONSULTANT

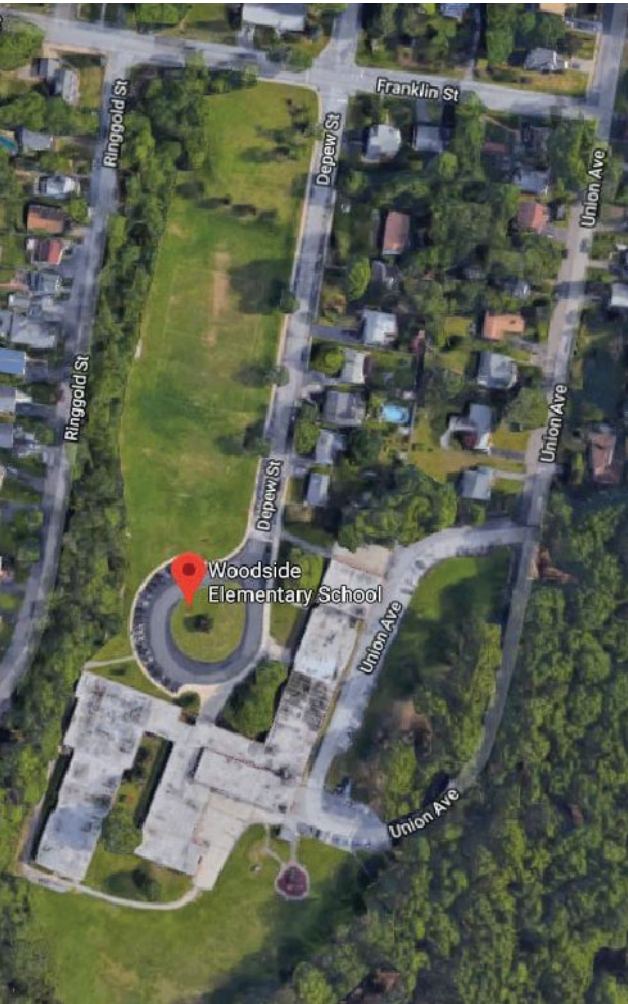


565 Taxter Road  
Elmsford, NY 10523  
TEL. 914.798.3710 FAX 212.363.4341 WWW.WSP.COM



1 PARTIAL FIRST FLOOR PLAN  
SCALE: NTS

KEY PLAN:



No.	Date	Issue

Sheet Title

BULK SAMPLE LOCATIONS  
PARTIAL FIRST FLOOR PLAN

Job No.  
2043465.34  
Drawn by:  
J. PEREZ  
Checked by:  
M. LUCCIONI

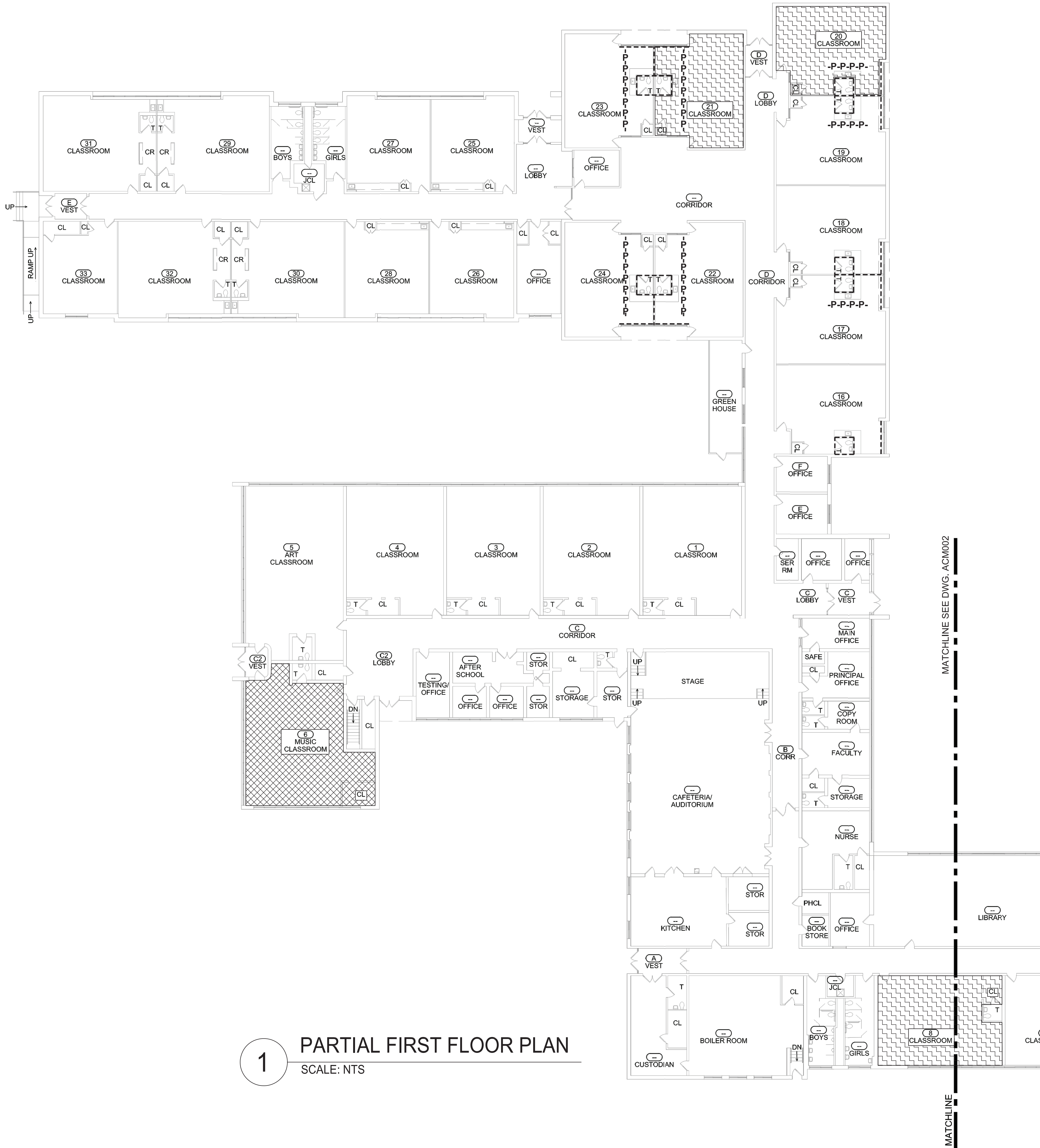
Sheet No.

11-18-2019  
BSL002



**APPENDIX D:  
ASBESTOS CONTAINING MATERIALS LOCATION  
DRAWINGS**





1 PARTIAL FIRST FLOOR PLAN  
SCALE: NTS

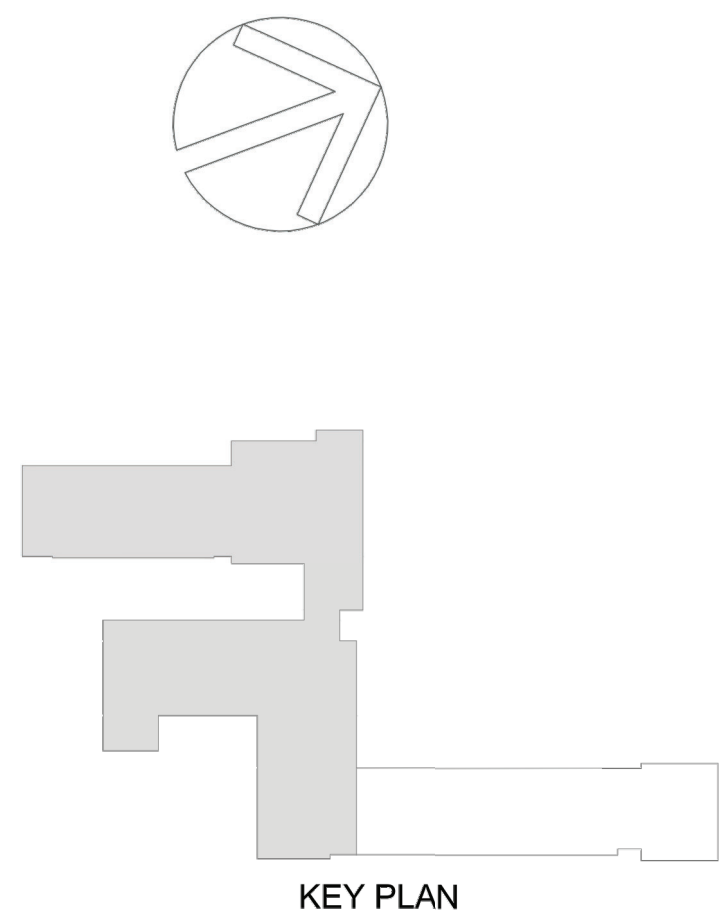
**LEGEND**


LOCATION OF CONFIRMED ASBESTOS CONTAINING JOINT COMPOUND, BEIGE & CONTAMINATED GYPSUM BOARD, GRAY.


LOCATION OF CONFIRMED ASBESTOS CONTAINING MASTIC ASSOCIATED WITH 12" X 12" LIGHT GREEN FLOOR TILES & CONTAMINATED 12" X 12" LIGHT GREEN FLOOR TILES.

LOCATION OF CONFIRMED ASBESTOS CONTAINING MASTIC ASSOCIATED WITH 12" X 12", BLACK & CONTAMINATED 12" X 12" WHITE FLOOR TILES.


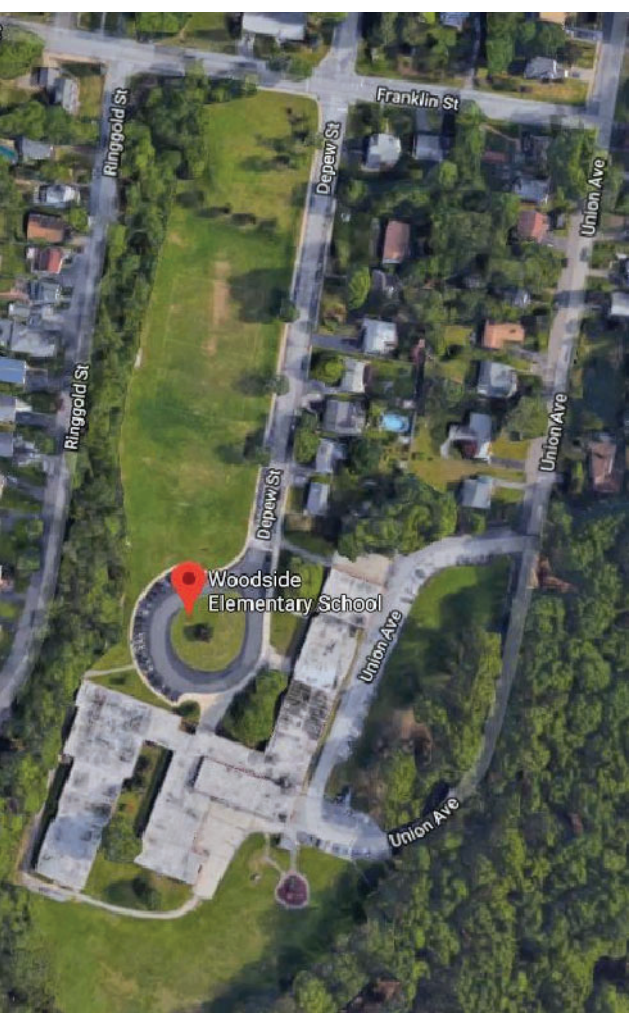
**-P-P-P-P-** LOCATION OF CONFIRMED ASBESTOS CONTAINING PIPE INSULATION ABOVE CEILING.



  
**PEEKSKILL CITY SCHOOLS**  
**PEEKSKILL SCHOOL DISTRICT**  
**PEEKSKILL WOODSIDE ELEMENTARY SCHOOL**  
612 DEPEW STREET  
PEEKSKILL, NY 10566

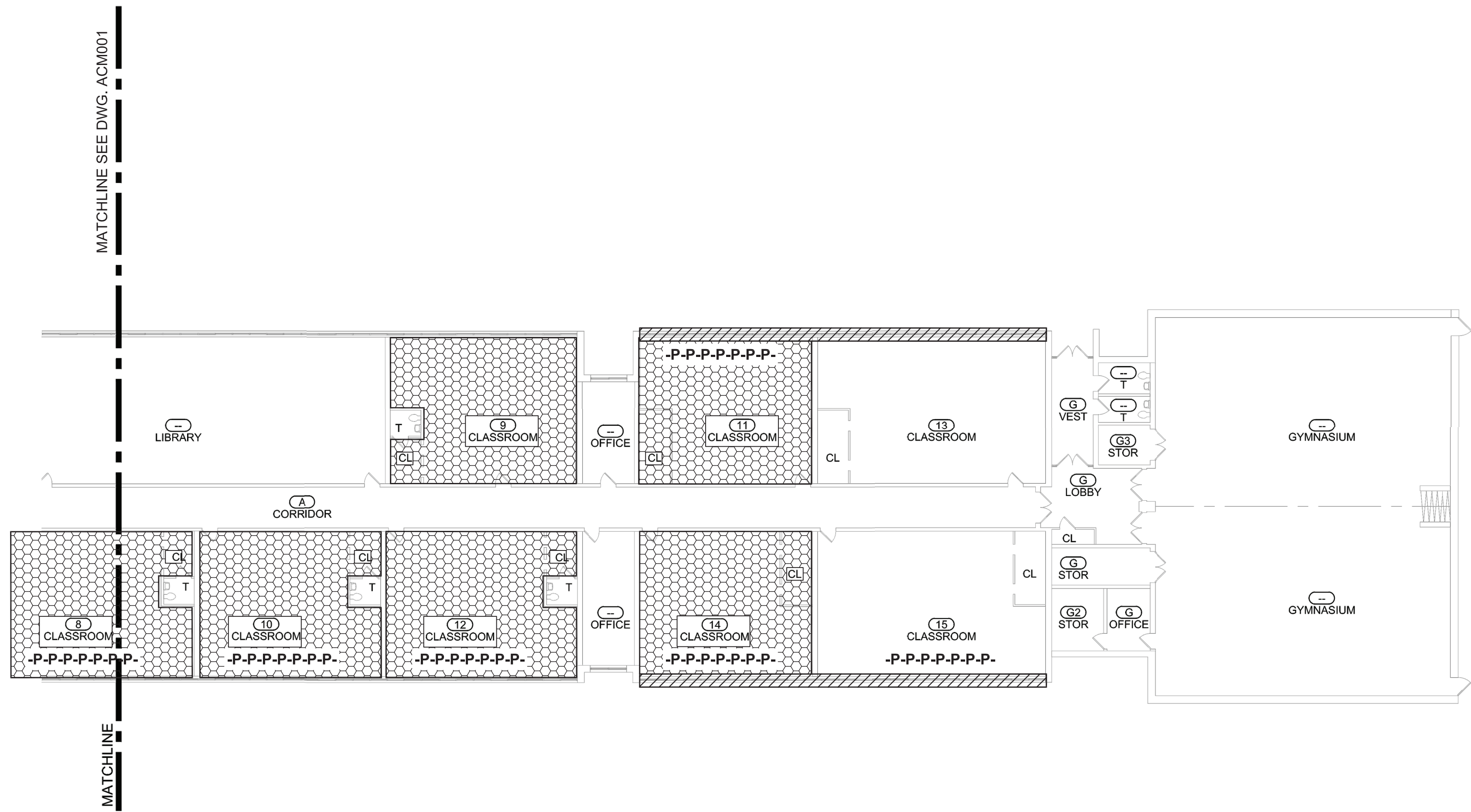
**ENVIRONMENTAL CONSULTANT**  
  
565 Taxter Road  
Elmsford, NY 10523  
TEL. 914.798.3710 FAX 212.363.4341 WWW.WSP.COM

**KEY PLAN:**

No.	Date	Issue
Sheet Title		
<b>ASBESTOS CONTAINING MATERIALS PARTIAL FIRST FLOOR PLAN</b>		
Job No. 2043465.34	Sheet No.	
11-21-2019	<b>ACM001</b>	
Drawn by: J. PEREZ	1 of 2	
Checked by: M. LUCCIONI		





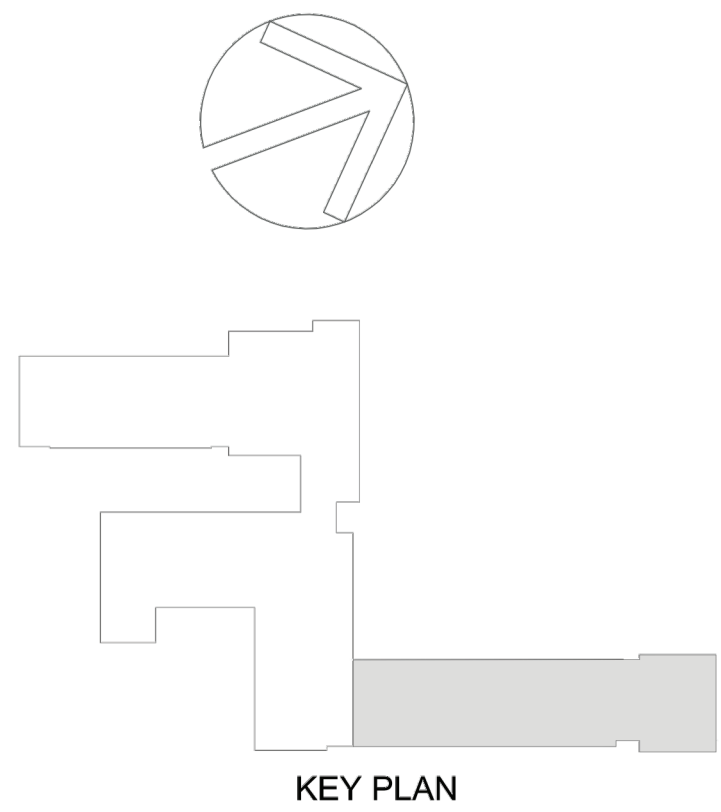
1 PARTIAL FIRST FLOOR PLAN  
SCALE: NTS


**LEGEND**

LOCATION OF CONFIRMED ASBESTOS CONTAINING MASTIC ASSOCIATED WITH 12" X 12" WHITE FLOOR TILES, BLACK & CONTAMINATED 12" X 12" WHITE FLOOR TILES & 12" X 12" BROWN FLOOR TILES (BOTTOM).

LOCATION OF CONFIRMED ASBESTOS CONTAINING WINDOW FRAME/ LOUVER CAULKING, BROWN.

**-P-P-P-P-** LOCATION OF CONFIRMED ASBESTOS CONTAINING PIPE INSULATION ABOVE CEILING.






PEEKSKILL  
SCHOOL DISTRICT  
PEEKSKILL WOODSIDE  
ELEMENTARY SCHOOL

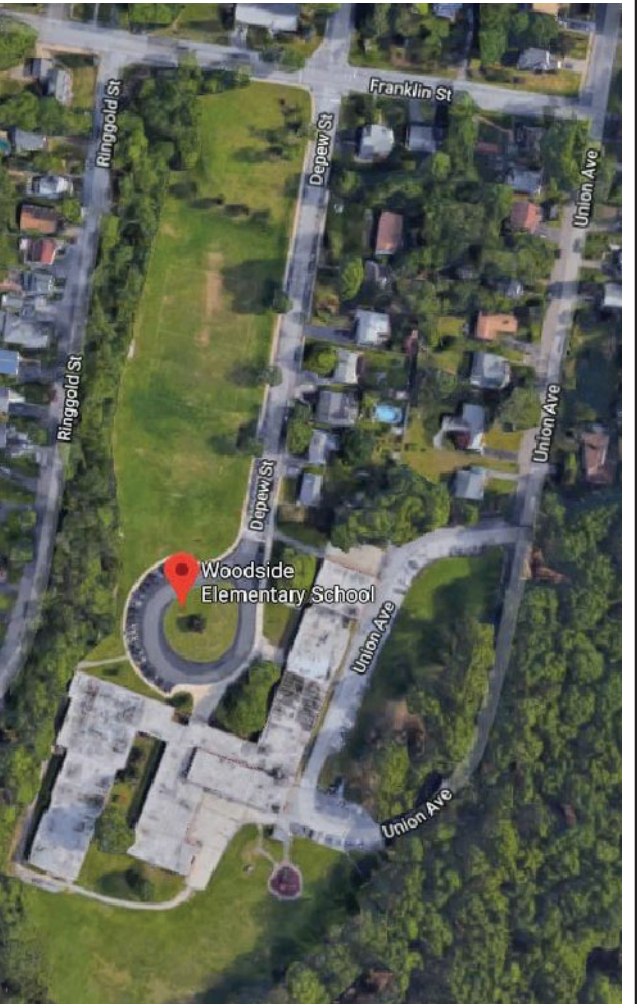
612 DEPEW STREET  
PEEKSKILL, NY 10566

ENVIRONMENTAL CONSULTANT



565 Taxter Road  
Elmsford, NY 10523  
TEL. 914.798.3710 FAX 212.363.4341 WWW.WSP.COM

KEY PLAN:



No.	Date	Issue
Sheet Title		
ASBESTOS CONTAINING MATERIALS PARTIAL FIRST FLOOR PLAN		
Job No. 2043465.34	Sheet No.	
11-21-2019	ACM002	
Drawn by: J. PEREZ		
Checked by: M. LUCCIONI		
		2 of 2



***Final Report of Environmental Inspection Services***

---

**APPENDIX E:  
COMPANY LICENSE, PERSONNEL CERTIFICATIONS  
& LABORATORY ACCREDITATIONS**

**New York State – Department of Labor**

Division of Safety and Health  
License and Certificate Unit  
State Campus, Building 12  
Albany, NY 12240

**ASBESTOS HANDLING LICENSE**

Louis Berger, U.S., Inc.  
8th Floor  
96 Morton Street  
New York, NY 10014

FILE NUMBER: 19-132876  
LICENSE NUMBER: 132876  
LICENSE CLASS: RESTRICTED  
DATE OF ISSUE: 02/14/2019  
EXPIRATION DATE: 02/29/2020

Duly Authorized Representative – Craig Napolitano:

This license has been issued in accordance with applicable provisions of Article 30 of the Labor Law of New York State and of the New York State Codes, Rules and Regulations (12 NYCRR Part 56). It is subject to suspension or revocation for a (1) serious violation of state, federal or local laws with regard to the conduct of an asbestos project, or (2) demonstrated lack of responsibility in the conduct of any job involving asbestos or asbestos material.

This license is valid only for the contractor named above and this license or a photocopy must be prominently displayed at the asbestos project worksite. This license verifies that all persons employed by the licensee on an asbestos project in New York State have been issued an Asbestos Certificate, appropriate for the type of work they perform, by the New York State Department of Labor.



Eileen M. Franko, Director  
For the Commissioner of Labor

STATE OF NEW YORK - DEPARTMENT OF LABOR  
ASBESTOS CERTIFICATE



**MARVIN LUCCIONI**  
CLASS(EXPIRES)  
C ATEC(02/20) D INSP(02/20)  
H PM (02/20) I PD (02/20)

CERT# 03-11021  
DMV# 992503906

**MUST BE CARRIED ON ASBESTOS PROJECTS**

ALWAYS WEAR YOUR SEATBELT





Department  
of Labor

LUIS A NEVAREZ

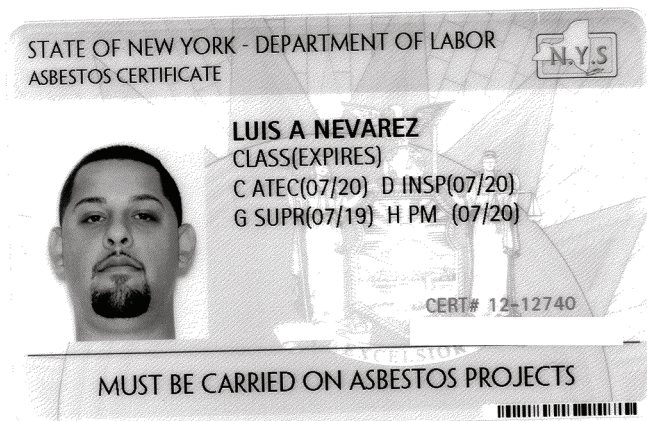
C/O LOUIS BERGER, 96 MORTON ST APT 8FL  
NEW YORK NY 10014

Enclosed is your new card.

## NYS Department of Labor

The Department of Labor is happy to provide this improved card. We welcome your comments:  
[nysdol@labor.ny.gov](mailto:nysdol@labor.ny.gov) or call (518) 457-2735

YOUR NEW CARD



United States Department of Commerce  
National Institute of Standards and Technology



---

**Certificate of Accreditation to ISO/IEC 17025:2017**

---

**NVLAP LAB CODE: 101048-10**

**EMSL Analytical, Inc.**  
Carle Place, NY

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

**Asbestos Fiber Analysis**

*This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017.  
This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality  
management system (refer to joint ISO-ILAC-IAF Communique dated January 2009).*

---

2019-07-01 through 2020-06-30

*Effective Dates*



---

For the National Voluntary Laboratory Accreditation Program



**SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017**

**EMSL Analytical, Inc.**  
528 Mineola Ave.  
Carle Place, NY 11514  
Daniel Clarke  
Phone: 516-997-7251  
Email: dclarke@emsl.com  
<http://www.emsl.com>

**ASBESTOS FIBER ANALYSIS**

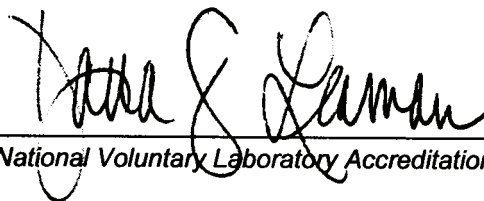
**NVLAP LAB CODE 101048-10**

**Bulk Asbestos Analysis**

<u><b>Code</b></u>	<u><b>Description</b></u>
18/A01	EPA -- 40 CFR Appendix E to Subpart E of Part 763, Interim Method of the Determination of Asbestos in Bulk Insulation Samples
18/A03	EPA 600/R-93/116: Method for the Determination of Asbestos in Bulk Building Materials

**Airborne Asbestos Analysis**

<u><b>Code</b></u>	<u><b>Description</b></u>
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.

  
\_\_\_\_\_  
For the National Voluntary Laboratory Accreditation Program

PRJ 201 Oakside Elementary  
PRJ 202 Uriah Hill School  
PRJ 203 Woodside School  
PRJ 204 Middle School

SED 66-15-00-01-0-005-020  
SED 66-15-00-01-0-007-014  
SED 66-15-00-01-0-008-017  
SED 66-15-00-01-0-014-005

## SECTION 011000 – SUMMARY OF WORK

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Section Includes:

1. Project information.
2. Work covered by Contract Documents.
3. Work by Owner.
4. Owner-furnished products.
5. Access to site.
6. Coordination with occupants.
7. Work restrictions.
8. Time Completion and Sequence of Operations
9. Delays and Extension of Time.
10. Protection of Work
11. Construction Separation Enclosures.
12. Coordination with Lead Coatings.
13. Coordination with Asbestos Exposure.
14. Specification Formats and Conventions
15. Contract Documents
16. OSHA Ten Hour Bill Requirements

- B. Related Requirements:

1. Section 015000 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

#### 1.3 PROJECT INFORMATION

- A. Project Identification: HDG PRJ No. 201, 202, 203, 204

- B. The City School District of Peekskill

- |                                 |                           |
|---------------------------------|---------------------------|
| 1. PRJ 201 - Oakside Elementary | SED 66-15-00-01-0-005-020 |
| 2. PRJ 202 - Uriah Hill School  | SED 66-15-00-01-0-007-014 |
| 3. PRJ 203 – Woodside School    | SED 66-15-00-01-0-008-017 |

PRJ 201 Oakside Elementary  
PRJ 202 Uriah Hill School  
PRJ 203 Woodside School  
PRJ 204 Middle School

SED 66-15-00-01-0-005-020  
SED 66-15-00-01-0-007-014  
SED 66-15-00-01-0-008-017  
SED 66-15-00-01-0-014-005

4. PRJ 2014 – Middle School SED 66-15-00-01-0-014-005

C. Project Location:

1. Oakside Elementary School – 200 Decatur Ave., Peekskill, NY 10566
2. Uriah Hill School – 980 Pemart Ave. Peekskill, NY 10566.
3. Woodside Elementary School – 612 Depew Street, Peekskill, NY 10566
4. Middle School – 212 Ringgold Street, Peekskill, NY 10566.

D. Owner: City School District of Peekskill.

E. Architect: Hamlin Design Group. 915 Broadway Suite 101A, Albany, New York, 12207

F. Clerk of the Works – Carmine Crisci

1. The Owner will engage a clerk of the works for this project to serve as an advisor to Owner and to provide assistance in administering the Contract for Construction between Owner and each Contractor.

1.4 WORK COVERED BY CONTRACT DOCUMENTS

A. The Work of Project is defined by the Contract Documents and consists of the following:

1. Work to include new unit ventilators, back flow preventer, upgrade to pool chemical feed, associated , hazardous abatement, electrical and general construction work .

B. Type of Contract:

1. Project will be constructed under a single contract. Contractor is responsible for ALL work outlined in the drawings and specifications.

1.5 WORK UNDER SEPARATE CONTRACTS

A. General: Cooperate fully with Owner so work may be carried out smoothly, without interfering with or delaying work under this Contract or work by Owner. Coordinate the Work of this Contract with work performed by Owner.

B. Preceding Work: Owner will perform the following operations at Project site. Those operations are scheduled to be substantially complete before work under this Contract begins.

1. The moving in of private equipment and District property in spaces in preparation of the September of 2021-2022 school session.

1.6 ACCESS TO SITE

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

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- B. Use of Site: Limit use of Project site to work in areas indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated on the construction documents.
  - a. Limits: Confine construction operations to
    - 1) Specific areas on site outlined for work such as, rooms where replacement of mechanical unit ventilators is being completed..
    - 2) Reconstruction or alteration of electrical rooms and/or storage and utility spaces.
- C. Use and Condition of Existing Building: Maintain portions of existing building affected by construction operations in a weathertight condition throughout construction period. Repair damage caused by construction operations.

## 1.7 COORDINATION WITH OCCUPANTS

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

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## 1.8 WORK RESTRICTIONS

- A. Work Restrictions, General: Comply with restrictions on construction operations.
  - 1. Occupied Building (March 1, 2021 through June 22, 2021) – Work Not Permitted
  - 2. Unoccupied building: June 25<sup>th</sup> through August 31<sup>st</sup>:
    - a. 1<sup>st</sup> shift, daily hours: 7:00 a.m. to 3:30 p.m., Monday through Friday.
    - b. 2<sup>nd</sup> shift, evening hours: 3:30 pm to 11:00 pm, Monday through Friday.
  - 3. Weekend Hours: 7:00 a.m. to 10:00 p.m. (interior work to 11:00 p.m) with prior notice.
  - 4. Early Morning Hours: After 6:00 am.
  - 5. Hours for Utility Shutdowns: Coordination of any utility and/or power interruption must be done with the Owner 48 hrs. in advance. Shutdowns must occur during off hours and must be approved by the Owner. Coordination of any utility and/or power interruption must be done with the Owner 48 hours in advance and on non-occupied days only. Contractors are to submit a shutdown request form for shutdowns.
  - 6. Hours for Core Drilling and other noise producing activity: During off school hours
  - 7. Interior classroom or accessory area work to be performed during Off School hours.
    - a. For off hours work, notify Owner 48 hours prior to start of work.
    - b. Overtime work shall be coordinated with Owner 4 hours prior to quitting time.
- B. **Cost of shift work and /or overtime to meet the schedule shall be included in the base bid and shall not be subject to a change order”**
- C. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
  - 1. Notify Architect and Owner not less than two days in advance of proposed utility interruptions.
  - 2. Do not proceed with utility interruptions without Architect's or Owner's written permission.
- D. Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to Owner occupancy with Owner.
- E. Nonsmoking Building: Smoking is not permitted within the building or within 25 feet (8 m) of entrances, operable windows, or outdoor-air intakes.
- F. Controlled Substances: Use of tobacco products and other controlled substances within the existing building is not permitted.
- G. Employee Identification: Provide identification tags for Contractor personnel working on Project site. Require personnel to use identification tags at all times.
- H. Individual Contractor signs will not be permitted onsite.
- I. Lifts and/or rubber wheeled mobile cranes shall be provided by general contractor for this contract work.



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#### 1.9 TIME OF COMPLETION AND SEQUENCE OF OPERATIONS

- A. All work shall be completed as quickly as possible and installation shall be complete and operable not later than 08/13/21 (substantial completion), final completion 09/30/21.
- B. In the event that the work is delayed and not completed by the completion dates, the Owner shall have the option of selecting any one or a combination of the following procedures, in addition to other remedies:
  - 1. Permit the contractor to continue to work but only at times specified by the Owner who may include irregular days, hours, and weekends.
  - 2. Require that the contractor stop construction, remove materials not incorporated in the building, leave the building and equipment in a safe, workable condition and complete the work the following summer when directed.
  - 3. Take a credit for uncompleted work.
- C. Contractors are reminded that it is imperative that all work be scheduled, sequenced, tested, and operational and approved by the completion date.

#### 1.10 DELAYS AND EXTENSION OF TIME

- A. If the Contractor is delayed in the completion of his work by an act or neglect of the Owner or by changes ordered in the work or by any cause which the Architect shall deem to justify the delay as being beyond the Contractor's control, then the time of completion shall be extended for such reasonable time as the Architect may decide.
- B. No such extension shall be made for any delay occurring more than twenty (20) days before claim therefor is made in writing by the Contractor.
- C. No charges or claim for damages shall be made by the Contractor for any delays or hindrances, from any cause whatsoever, occurring during the progress of any portion of the work. Such delays or hindrances shall be compensated for by an extension of time as above provided.
- D. The permitting of the Contractor to proceed to complete any work or any part of it after the date of completion or after the date to which the time for completion may have been extended shall in no way operate as a waiver on the part of the Owner of any rights hereunder.

#### 1.11 PROTECTION OF THE WORK

- A. Work at the site shall proceed continuously. Shut down of job due to cold weather will not be permitted.
- B. Each contractor shall effectively protect, at his expense, all materials and equipment, including the employees, during the period of construction, and he shall be held

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responsible for all damage done to this work, until the same is fully and finally accepted by the Owner.

- C. Throughout this work, it shall be each contractor's responsibility to maintain water and weather protection for the areas of the building in which work is in progress.
- D. Ladders shall be removed from site or chained in place in storage areas so they are not accessible to unauthorized persons.
- E. Temporarily cap or plug existing storm leaders where storm leaders are designated for removal and/or extension to prohibit debris from accumulating into piping. Provide temporary piping to extend existing roof leader/drain piping to exterior of building until permanent piping is completed.
- F. Lifts and/or rubber wheeled mobile cranes shall be locked, and have keys removed and locked in contractors office trailer daily. Lifts and/or rubber wheeled mobile cranes shall be located to a designated area to prohibit access by unauthorized persons.

#### 1.12 SITE LOGISTICS

- A. Site Access.
  - 1. The Contractor shall provide, MAINTAIN and restore all site areas and construction access areas used.
  - 2. Only the Owners representative has the authority to alter these site logistics for the overall benefit of the project. All contractors are to be aware of ongoing activities surrounding the construction zone and in some cases, within the construction zone. Access roads, exits and means of egress in general must be kept open and free from materials, equipment, vehicles and debris at all times.
- B. Parking
  - 1. Due to the limited amount of space for staging of equipment and materials, there will be designated parking areas for construction employees. Parking in any other area of the Owner's property shall be strictly prohibited unless designated otherwise. No overnight parking shall be permitted.
- C. Deliveries
  - 1. All Deliveries must be scheduled and coordinated with Owner AT LEAST 48-HOURS IN ADVANCE. Contractor must have one or more employees present (and any necessary equipment) at the time of delivery arrival, to receive, unload and distribute all deliveries. Unscheduled or out-of-sequence deliveries may be turned away by Owner. Absolutely no deliveries are to be made in areas in or around bus arrival/departure times.
- D. Material And Equipment Storage/Staging
  - 1. Construction materials and equipment deliveries must be scheduled with Owner and are subject to coordination with other trades. Contractors are to bring only that material which will be used in a reasonable time frame. If stored material or equipment obstructs the progress of any portion of the work or interferes with the operations of the Owner,

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they shall be removed or relocated by the contractor as directed by the Owner without reimbursement of costs. All materials shall be stored in an orderly manner.

2. All equipment must be in compliance with all local, state, and federal regulations relating to its safety.
3. If in the opinion of the Owner, the jobsite cannot accommodate either early or bulk delivery of materials or equipment, the Contractor will make off-site arrangements for safe storage at no additional cost.
4. Storage of materials within the existing buildings is strictly prohibited.
5. Material and equipment scheduled to be “salvaged” and/or “return to Owner” shall be transported by contractor responsible for the given work, and unloaded at the direction of the Owner at Owners facilities within a 10 mile radius of the project site.

E. Equipment Locations

1. The locations of cranes, mixers, boom trucks, forklifts, welding machines, generators, field offices, workbenches, cutters, hose lines, etc., must be approved by Owner prior to utilization on this project. In addition, any contractor wishing to place a crane upon this project for the purpose of lifting materials or equipment must submit a lifting procedure safety plan and a current inspection certificate. This contractor will be responsible to erect, remove, maintain and replace any required safety barriers.

F. Security

1. Contractor shall remain solely responsible for any loss or damage to their property or operations or employee’s property. During all hours, the Contractor shall safeguard materials and equipment in storage on the project site, including work in place or in process of fabrication against theft, acts of malicious mischief, vandalism, and other losses or damages.
2. Existing building security systems shall remain operational at all times. Disruption of such systems is prohibited.

## 1.13 CONSTRUCTION SCHEDULE/PHASING

A. Schedule Responsibilities

1. Contractor shall develop their construction schedule based on the milestone dates and maintain milestone, substantial and final completion dates. It is the responsibility of the Contractor to indicate any scheduling problems before bids are due. Prior to the bid due date, it is imperative that each Contractor reviews this schedule and provides feedback with regard to activity duration and sequence of work. It is the responsibility of the Contractor to indicate any scheduling problems before bids are due. There will be no extensions of time to this schedule. ALL Contractors shall include in their bid proper allowances for winter construction methods and foul weather.
  - a. Letter of Intent (anticipated by) 03/19/2021.
  - b. Project (Physical) Start Date: 06/28/2021.
  - c. Project Substantial Completion Date: 08/13/2021
  - d. Project (Physical) Punch List Completion Date: 09/17/2021
  - e. Project final (Closeout) Completion Date: 09/30/2021

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2. If it becomes apparent that any single activity completion date may not be met, the responsible Contractor shall take some or all of the following actions at no cost to the Owner:
  - a. Increase construction manpower in such quantities as will eliminate the backlog of work and put the Project back on schedule.
  - b. Increase the number of working hours per shift, shifts per working day, working days per week, or the amount of construction equipment, or any combination of the foregoing as will substantially eliminate the backlog of work and put the Project back on schedule. Additional costs for supervision by the Architect or Owner for overtime or shiftwork is the Contractor's responsibility.
  - c. Reschedule activities to put the Project back on schedule. If a Contractor fails to take any of the above actions within twenty-four (24) hours after receiving written notice, the Architect will take appropriate action involving contractual commitments and performance bonds. Owner retains the right to back charge any contractor (as determined by the Architect) for any and all costs resulting from scheduling delays. This includes delays to the start or finish dates of other Contractors.
- B. Expediting
  1. Contractor shall be responsible for the cost of expediting all fabrication and delivery of his materials.
- C. Continuous Operations / Out of Sequence Work
  1. Work will be coordinated in an attempt to allow continuous installation by contractor. This will not always be possible and some comeback and/or out of sequence work will be necessary to complete the construction on the part of the contractors. Out of sequence work, ordered the Owner, which may be required to meet the job schedule or occupancy requirements or allow the Owner to use the facilities, shall be included in the base bid prices.
- D. Project Coordination
  1. Coordinate construction activities included under various Sections of the Specifications to assure efficient and orderly installation of each part of the Work.
  2. Coordinate construction operations included under different Sections of the specifications that are dependent upon each other for proper installation, connection, and operation. Where installation of one part of the Work is de-pendent on installation of other components, either before or after its own installation, schedule construction activities in the sequence required to obtain the best results. Where availability of space is limited, coordinate installation of different components to assure maximum accessibility for required maintenance, service and repair. Make adequate provisions to accommodate items scheduled for later installation. Verify that anchorage, blocking, joining and other detailing are provided as required.
- 3.
- E. Daily Construction Reports

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1. By the end of each workday, contractor will submit daily manpower counts (including subcontractors) and a brief description/location of the day's activities to the Owners Representative.

#### 1.14 JOB SITE RULES

##### A. Signage

1. Signs, logos, etc. will be permitted on the Contractor's own equipment but not on the site fence, shanties, or buildings.

##### B. Jobsite Conduct

1. The Project sites are situated on School property. Each Contractor's management should review with their employees that it is imperative that their conduct be socially acceptable at all times. Vulgar or abusive language, sexually suggestive comments or gestures are strictly prohibited and will result in removal from the jobsite and/or criminal prosecution.
2. Smoking is absolutely prohibited on all school property including areas within construction fencing and parking areas. If employees smoke on adjacent public property, it is expected any garbage will be properly disposed of.

##### C. Clothing

1. Proper attire is required on-site. Full-length pants, shirts with sleeves and hard sole work boots are required. No shorts, tank tops or sneakers are allowed.

##### D. Lunch Areas

1. Contractors and workers will contain their breaks and lunch periods to the areas designated by Owner or any public eating area outside the Project Site. The areas used for construction lunches are to be kept clean and orderly. Once flooring has been installed in a particular area, no food or beverages will be permitted in that area.

##### E. Disruptive Work

1. Due to construction adjacent to existing facilities and residential homes, noise and dust control is essential. All noisy or disruptive work that may affect the adjacent building rooms and homes must be scheduled two weeks in advance through the Owner. Work that interferes with the normal operations of school facilities must be performed off-hours at the Contractor's expense, or the Contractor must provide alternate means for the work to continue.
2. Noise levels will be monitored (measured and recorded) by any contractor if requested by Owner at no additional cost to the Owner. Noise in excess of 60 db must be coordinated with Owner for off-hour work regardless of work duration at no additional cost to the project.

##### F. Shutdowns/Notices/Permits

1. Plan the Work to minimize shutdown time of any service. Contractors are required to give all required notices to the proper authorities related to the work in their charge. To the maximum extent practicable, shutdowns shall be scheduled for periods when least need for that utility is anticipated. Provide within the Contract Sum an amount sufficient to cover all required overtime in connection with utility shutdown.

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2. For all shutdowns affecting construction operations, notification must be given to the Owner (2) weeks to prior desired shutdown.
    - a. If less notice is provided, the Owner may refuse interruption of utility service.
    - b. Resulting delay in performance of the Work will be a responsibility of the Contractor.
    - c. Do not proceed with the interruption of utility services without the approval of the Owner.
  3. The contractor is responsible to do due diligence to determine what systems are affected by the shutdown and identify these systems on the request form. Failure to receive proper approval will result in denial of the shutdown request.
  4. Contractors are required to strictly comply with all governing laws, rules, regulations, and inspection requirements, both as to labor and materials, and pay all fees in connection therewith, and shall bear all loss from neglect.
- G. Construction Vehicles
1. All construction vehicles must be cleaned prior to leaving the site. Any contractor failing to clean vehicles will be responsible for cleaning the street immediately at no cost to Owner.
- H. Damages
1. All contractors are cautioned that since the schools are occupied and adjacent to existing occupied homes, all precautions, protection and care must be exercised to protect existing structures in accordance with good safety practices. This is particularly applicable to protection for pedestrians.
  2. The contractor is responsible for any damage, which may occur to the property of the owner or adjacent private or public properties which in any way results from the acts or neglect of his employees.
  3. In Addition, repair and make good, at the expense of the Contractor, all damages thereto including damage to existing utilities and paving arising from operations under the Contract. Repair and protection is the Contractor's responsibility, regardless of the assignment of responsibility for inspection, testing, or similar services.

#### 1.15 TEMPORARY FACILITIES AND UTILITIES

- A. Jobsite Hoisting
1. There will be no exterior jobsite hoists. Use of crane or hoisting equipment over any building or area occupied by students, visitors, staff, or the general public is prohibited.
- B. Trash Removal:
1. Contractor shall provide and maintain dumpsters for their own use.
- C. Temporary Water
1. Contractor shall provide all drinking water for their work force. Non-drinking water is available thru the Owners domestic water system and will available for the contractors use at no charge.
  2. Any damages to finish work due to negligence or careless use of water by any Contractor will be repaired by the responsible Contractor.

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D. Temporary Offices

1. Each contractor will be allowed one 10'x 20' office trailer and one 10 x 40' storage trailer located where directed by Owner. All utilities if required will be the responsibility of the contractor.

## 1.16 GENERAL PROTECTION AND SAFETY

A. COVID-19 Construction Policy

1. Prime Contractors and their subcontractors shall monitor and adopt the following the COVID-19 directives:
  - a. For current New York State guidance, see the New York State Governor's Office website: <https://www.governor.ny.gov/>
  - b. For current State Education Department Guidance; see the New York State Education Department website at: <http://www.p12.nysed.gov/sss/schoolhealth/schoolhealthservices/coronavirus.html>
  - c. For current construction industry guidance, refer to the Associated General Contractors of New York State website at <https://www.agcnys.org/coronavirus/> and the Building Trades Employers Association website <https://www.bteany.com/covid19/>.
2. Prime Contractors and their subcontractors shall adopt best practices in conducting work on behalf of the District to mitigate the spread of COVID-19.
3. Contractors, subcontractors and employees are required to comply with current Executive Orders, which can be found at <https://coronavirus.health.ny.gov/new-york-state-pause>, current New York State Department of Health (DOH) guidance on limiting the spread of COVID-19, which can be found at <https://www.health.ny.gov/diseases/communicable/coronavirus/>, and to stay up to date on DOH requirements and directives.
4. In accordance with the executed AIA Contract, each Prime Contractor has the duty to provide a safe work environment for your own workforce. Contractors are hereby required to update their Project Specific Safety Plan with an amendment to address the spread of COVID-19 to incorporate current Occupational Safety and Health Administration (OSHA) requirements and recommendations posted to the OSHA website at <https://www.osha.gov/SLTC/covid-19/standards.html> and to incorporate DOH guidance and ensure that such procedures are enforced on project sites. The plan should include the following sections at a minimum;
  - a. Proactive prevention, such as;
    - 1) Educating all workers on COVID-19 and how it spreads
    - 2) As a best practice, all employees should encourage to take their own temperature at home before coming to work. Should they have a fever they should contact their doctor and self-quarantine for 14-days before returning to the site or follow whatever advice their physician or the DOH provides to them. Implementation of a temperature screening program at the project site for your employees before they enter occupied District facilities.
    - 3) Maintaining proper social distancing and coordination of your work with the other Prime Contractors



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- b. Maintenance and Cleaning of the site
  - 1) As recommended by DOH, provide extra cleaning on high touch areas such as tools, equipment, handles, doorknobs, elevator buttons, bathroom stall doors, faucets, handrails, swipe areas, keypads etc. consist with guidance issued by the NYS Department of Health
  - 2) Identify egress path for construction access to ensure appropriate cleaning mentioned above.
  - 3) Include training of employees on proper cleaning for COVID-19 OSHA standards.
- c. Notification
  - 1) Immediately notify the District of any work-related exposures and health risks presented by agents, workers and /or employees of the Prime Contractor and /or subcontractors.

If a Contractor has received notification that an employee at a worksite has tested positive for COVID-19. Contractor shall Immediately notify the District, Construction Manager, the NYS Department of Health(DOH) and the local health department with jurisdiction over the work location and comply with all DOH requirements and take all recommended, required and necessary steps requested by DOH

#### B. Safety Program

1. Contractors to be responsible for maintaining a safe job. This will be insured by the following means:
2. **All construction employees shall wear a hard hat and safety glasses at all times.** Other safety protection shall be as dictated by the work. Each contractor shall keep spares of each in their site trailer or gang box for new employees and replacement.
3. **All workers are required to wear green fluorescent safety vests** for increased awareness/visibility at all times while working on site. Each contractor shall keep spares in their site trailer or gang box for new employees and replacement.
4. In accordance with OSHA and CAP requests, each contractor will hold weekly "Tool Box" meetings with jobsite personnel to discuss safety. Aluminum or steel ladders are not allowed on this project (electrical conductors).
5. Contractors are required to utilize 100% positive fall protection at all times.
6. The contractor is expected to have a scheduled maintenance program for all tools and equipment.
7. Contractors are responsible to remove and replace in original positions barricades, railings, covers, etc., in accordance with OSHA 1926. Unguarded opening(s) shall be manned until the barricade is replaced. During discontinuous or intermittent work operation, safety protection is to be replaced immediately. If not promptly replaced, replacement will be by others at the removing contractor's expense.
8. All electrically operated tools and equipment must be properly grounded with the exception of approved insulated types.
9. Only low velocity powder actuated tools can be used. All personnel must be certified when using powder activated tools and laser devices.
10. All compressed gas cylinders must be properly handled. They must always be in the upright position and properly secured when stored. Cylinders are to be separated by a

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minimum of 15 feet. All oxygen and acetylene cylinders in use should be secured on a special carrier with a fire extinguisher.

11. All trailers must be supplied with a current 20# ABC fire extinguisher, an OSHA approved first aid kit and a copy of the OSHA Construction Standards. A prominent sign is required at the extinguishers location.
12. Take all necessary precautions to avoid fires. Provide fire watches when welding or burning operations are in progress.
13. Owner is to be notified immediately of any accident on site.
14. All project employees shall wear attire suitable for construction work. They shall wear shirts, long trousers and proper shoes at all times. No shorts, tank tops or tennis shoes shall be permitted.
15. Each Contractor is responsible for all his subcontractors and suppliers safety compliance, regardless of tier, with the contractor's project safety program, and all Federal, State and Local Codes and Regulations.
16. Each Contractor shall have at least one (1) qualified first aid person and competent person on the Project at all times. Alcoholic beverages or illegal drugs are not permitted on this Project.
17. Radios or personal communication devices with earphones are not permitted on this Project. Loud radio playing is not permitted.
18. No Contractor shall permit their employees to use another contractor's scaffold without written permission from the owner of the scaffold. All scaffolds shall be checked daily and before each use for safety compliance. No scaffold shall be left at any time in an unsafe condition and shall be removed immediately if not to be used again.
19. All extension cords, cables and hoses shall be maintained at least 6 feet 6 inches above the working floor. Where this is impossible, these items shall be inspected daily and repaired immediately or tagged and removed from use until repaired.
20. All temporary electrical installations and all extension cords shall conform to the latest OSHA Construction Standards.
21. No material shall be stored within 6 feet of a floor opening of the building. For assistance with storage locations, contact the Project Superintendent.
22. All equipment, materials and debris shall be secured at all times, or removed immediately to grade level until the building is enclosed, to prevent windblown objects.
23. Each Contractor shall be responsible for maintaining general housekeeping in their work area and all debris shall be placed in debris containers.
24. In accordance with the provisions of the HAZARD COMMUNICATION STANDARD 29 CFR-1926, Material and Safety Data Sheets for any chemical/substance alone with any additional information, safety data or supplemental material safety data sheets available now or in the future are required to be submitted to the Owner prior to material deliveries to the site.
25. The contractor shall be responsible for all costs for any citations issued in connection with the contractor's material.
26. The contractor shall be responsible for, but not limited to, the following conditions as it relates to the Hazards Communications Act:
  - a. Set up and conduct a program for its employees at each jobsite.
  - b. Maintain an updated chemical inventory sheet an MSDS's, which must be coordinated and shared with Owner and all other subcontractors at the jobsite. Contractors shall turn these in with copies of their Tool Box Talks.

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- c. Each contractor is responsible for maintaining an updated file for this jobsite for all hazards that may be encountered on the job.
  - d. Each contractor is responsible for labeling and identifying materials (per OSHA requirements) used by him and sharing this information with all other contractors and subcontractors at the jobsite.
  - e. Training and documentation of training in hazard communications is the responsibility of each contractor.
  - f. All documentation of respiratory "Fit Test", medical records, etc., shall be submitted prior to any work shall be performed requiring such protection.
- C. Protection of Utilities/Facilities
- 1. Prior to beginning any work, the Contractor shall carefully survey the existing work and examine the site for pre-existing damage. The Contractor shall document via photographs, videos, etc., any existing adjacent facilities that may be potentially affected by the work.
  - 2. During the progress of work, Contractors shall protect any newly installed or existing utilities and shall be responsible for the repair or replacement of same if damaged by work performed under his contract or incidental thereto. Contractor shall work expediently and continuously to repair damaged utilities at no additional cost to the Owner. If a shutdown is required, the Contractor must schedule same with Owner well in advance of the needed date, so as to minimize any disruption of normal operations.
  - 3. All contractors are cautioned that since the Project Site is located adjacent to existing occupied buildings, all precautions, protection, and care must be exercised to protect existing structures in accordance with good safety practices that are appropriate for work.
  - 4. Any shoring or bracing (including removal of same) required for the completion of Contract scope is the responsibility of the Contractor needing same.
  - 5. All Contractors are required to have a "competent" person on site during the performance of their work as defined by OSHA.
- D. Dust Protection
- 1. Each Contractor is responsible for their own dust control. **Each contractor is responsible for each worker's compliance with OSHA 29 CFR 1926.1153; OSHA PEL (permissible exposure limits) or NIOSH REL (recommended exposure limits) for materials being affected by or handled during construction activities.** When truck traffic conditions produce dust, the streets must be sprinkled with water and/or swept to minimize the generation of dust. All truck wheels must be inspected, and any loose materials must be removed prior to leaving the site.
  - 2. During interior demolition, all Contractors shall install, at a minimum, plastic sheeting for duct control to complete their work.
- E. Air pollution and Odor Control
- 1. Each Contractor shall employ measures to prevent creation of air pollution and odors. On interior work and work adjacent to occupied areas, all passageways and vent systems will be sealed to prevent dust, air pollution, and odors from traveling into occupied areas. Measures shall be taken by the each Contractor to ensure proper separation, by use of taped fire retardant visqueen tenting, or other separator. Each Contractor has responsibility to insure that the integrity of the separation is maintained throughout the

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- period of the work. In the event any Contractor must remove a barrier, it is their responsibility that the barrier is reconstructed at the end of each work period.
2. If the omission of construction related odors is found to be offensive by school facility or a student, work will stop and efforts to effectively exhaust the odors will begin immediately. Continuance of the odor causing work will be permitted during non-occupied times. Any additional cost associated shall be borne by the contractor producing the odor.
- F. Protection of the Public
1. In addition to the general requirements of the contract, it is the Contractor's responsibility to barricade or otherwise separate the work area from public access and/or exposure. Maintain barricades and signs in a clean and neat, graffiti free condition. Particular attention must be given to the isolation/protection of pedestrian and vehicular traffic at the perimeter of the Project Site. Any work that must be performed outside must be accompanied by the appropriate protection (by the Contractor).
- G. Protection of Finished Work
1. All Contractors are wholly responsible for the protection of finished work, both their own and that of others, as may be required to perform their work.
  2. All finished surfaces; including sills, jambs, and soffits of all openings used as passageways or through which materials are handled, shall be protected if any possible damage may result from the work by other trades.
  3. All finished surfaces, including factory-finished surfaces, shall be cleaned upon delivery of the building to the Owner. The Contractor shall, without extra compensation, refinish all damaged surfaces.
  4. Roof surfaces shall not be subjected to construction traffic nor shall they be used for the storage of materials.
  5. Each Contractor is responsible for any damage, which may occur to the property of any other Contractor connected with the work, or to adjacent private or public properties, or to any portion of the structure which in any way results from the acts of neglect of his/her employees.
  6. Prior to material being stored on finished floor surfaces, a protective paper is to be installed. All traffic over these areas should use rubber tires.
  7. Smoking, smokeless chews and eating in finished areas is prohibited.
- H. Cutting and Patching
1. All patching shall be done by tradesmen who are skilled in the required work. All patchwork will be done to the highest quality standards. The contractor shall include the cost of all cutting and patching required in connection with performance of his work. Include supports, protection from elements, protection of surroundings, and immediate clean up.
  2. If necessary for the contractor to remove a minimal amount of spray on fireproofing after initial installation it will be his responsibility to replace or pay for the necessary patching.
  3. Temporary utilities/openings shall include necessary comeback to infill, patch, fireproofing, etc.

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4. The Contractor shall not damage or endanger any portion of the work or property of the Owner. The Contractor shall not alter the Owner's work without written consent of the Owner.
  5. Do not cut and patch structural elements in a manner that would reduce their load carrying capacity or load-deflection ratio. Do not cut and patch operating elements or safety related components in a manner that would result in reducing their capacity to perform as intended, or result in increased maintenance, or decreased operational life or safety. If possible retain the original installer or fabricator to cut and patch exposed Work or, if it is not possible to engage the original installer or fabricator, engage another recognized experienced and specialized firm.
  6. If identical materials are not available or cannot be used where exposed surfaces are involved, use materials that match existing adjacent surfaces to the fullest extent possible with regard to visual effect, consult with the Architect prior to placement.
  7. If unsafe or unsatisfactory conditions are encountered, take corrective action before proceeding. Protect existing construction during cutting and patching to prevent damage. Until provisions have been made to bypass them, take all precautions necessary to avoid cutting existing pipe, conduit, or ductwork serving the building but scheduled to be removed or relocated.
  8. Where cutting is required use hand or small power tools designed for sawing or grinding, not hammering and chopping. Cut holes and slots neatly to size required to minimum disturbance of adjacent surface. Temporarily cover openings when not in use. To avoid marring existing finished surfaces, cut or drill from the exposed or finished side into concealed surfaces.
  9. Where removal of walls or partitions extends one finished area into another:
    - a. Patch and repair floor and wall surfaces in the new space to provide an even surface of uniform color and appearance; Remove existing floor and wall coverings and replace with new materials, if necessary to achieve uniform color and appearance;
    - b. Where patching occurs in a smooth painted surface, extend final paint coat over entire unbroken surface containing the patch, after the patched area has received primer and second coat; Patch, repair, or rehang existing ceilings as necessary to provide an even plane surface of uniform appearance.
  10. The Contractor will follow all applicable regulatory hot and safe work procedures when performing welding, cutting, torching, grinding, brazing, or tacking, including protecting personnel and the adjacent work area from fire hazards. Store paints, varnishes, volatile oils, and similar combustible materials in properly labeled storage containers and in storage area as required by law. Store gasoline and other volatile flammable liquids in properly labeled storage containers and in storage area as required by law.
- I. Perimeter Protection
1. The responsible contractor creating a hazard shall provide and MAINTAIN 2"x4" handrails and toe boards around any floor openings until such time that the walls, stairs etc. are installed, removing the safety fall hazard: stair openings, elevator openings, any pipe chases/mechanical openings and shaft openings. Meet all OSHA fall protection requirements.
- J. Traffic Control

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1. Provide traffic control barriers and flag persons throughout the construction period at any point in time that construction traffic obstructs normal traffic conditions. Provide flag persons at all times that construction equipment is operated near a pedestrian crossing. Provide and maintain adequate traffic control and flag persons at all points where transporting of equipment and materials engaged on the Work regularly enters and exits from the job site.

#### 1.17 CLEAN-UP

A. Cleaning, Trash Removal & Dumpsters

1. Contractor is responsible for CONTINUOUS CLEANUP! This includes mopping of floors, vacuuming of sills, and pickup of any loose debris/scraps inside and outside the building. If this is not performed to the Owner's satisfaction, the Owner may, without notice, self-perform or subcontract this work and back charge the responsible contractors accordingly. Cleanup within a classroom scheduled to be student occupied the following day shall have floors mopped and sills, desks, tables, etc. vacuumed and wiped free of dust.

#### 1.18 PROJECT SECURITY (Contractor)

- A. Contractor shall inspect all fencing, gates, building doors, windows and temporary enclosures, office & storage trailers shall confirm such items secured DAILY. Temporary security lighting shall be reviewed and confirmed operational daily. Contractor shall include a building walk through after each shift to ensure all construction areas are secured. An emergency call list will be submitted by each prime contractor with designate response team available on a 24/ 7 basis when notified.
- B. The existing building security system shall remain in operation at all times. The Contractor shall schedule meeting with Owner to review protocol for disabling and re-enabling existing security system for interconnection of any new security devices, hardware or appurtenances.

#### 1.19 CONSTRUCTION SEPARATION ENCLOSURES:

- A. Provide temporary weathertight, exterior enclosures (erected by Contractor) at areas of construction subject to air and water infiltration and to protect means of egress exits where affected by construction activities. Enclosures shall be 2"x6" wood framing with R-19 batt insulation and 5/8" CDX plywood sheathing. Roof enclosures shall be constructed with roof rafters of adequate size to allow for protection from snow loading. Provide self closing, thermal rated doors with all necessary door hardware and locksets to secure entry.
- A. Provide dust tight enclosures (erected by Contractor) to separate new work from existing. These shall be maintained during the course of construction and removed at completion of construction and wall, jambs and ceiling patched as required.



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- B. Provide doors in enclosures as required. Doors shall be self-closing with a secure latch and lock. When not in use, doors shall be locked. Doors shall have a warning sign to direct occupants to keep out.
- C. Enclosures shall be 5/8" gypsum wallboard on metal studs. Surfaces shall be free from hazardous projections, or other harmful conditions. Wallboard joints and nail heads shall be taped and sanded and exposed finished side painted 2 coats.
- D. Enclosure shall not be removed until new work has been cleaned. Contractor shall bear the cost of cleaning in existing building if due to removal of enclosures prior to proper cleaning of new areas.
- E. If necessary, enclosures shall be relocated during progress of work.
- F. No dead end corridors shall be formed by temporary enclosures. A dead end corridor shall be defined in accordance to the International Building Code Section 1024.4 Dead Ends.
- G. If not specifically depicted in construction documents, Site Contractor must provide temporary exits for occupants so that two means of egress are available, at all times, during construction, from all occupied spaces and corridors.
- H. All construction partitions at fire rated walls to be UL listed systems and constructed of Type X gypsum board, be continuous up to the underside of the structure above and meet the exiting rating of the existing wall. All doors and frames in these partitions to be rated openings, 45/60/90 minute, compliant with wall type.

#### 1.20 COORDINATION WITH LEAD COATINGS

- A. Lead coatings are present in the building. See hazardous materials survey, specification section 014990 Hazardous Materials and Division 1 specifications for guidelines

#### 1.21 COORDINATION WITH ASBESTOS EXPOSURE

- A. No contractor shall cut, drill, remove, abrade or otherwise disturb existing construction materials which may contain asbestos. This work will be strictly the work of an Asbestos Contractor, performed under a separate contract with the Owner.

#### 1.22 SPECIFICATION FORMATS AND CONVENTIONS

- A. Specification Format: The Specifications are organized into Divisions and Sections using the 32-division format and CSI/CSC's "MasterFormat" numbering system.
- B. Division 1: Sections in Division 1 govern the execution of the Work of all Sections in the Specifications.



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- C. 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:
- D. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be inferred as the sense requires. Singular words shall be interpreted as plural, and plural words shall be interpreted as singular where applicable as the context of the Contract Documents indicates.
- E. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by Contractor. Occasionally, the indicative or subjunctive mood may be used in the Section Text for clarity to describe responsibilities that must be fulfilled indirectly by Contractor or by others when so noted.
- F. 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.

#### 1.23 CONTRACT DOCUMENTS

- A. The Architect will provide specifications and drawings for contractor's use, each set shall contain all contract divisions of work. Contract documents shall be made available to contractor in accordance to applicable provisions and conditions of Specification 001116 – NOTICE TO BIDDERS.

#### 1.24 EXCAVATION AND BACKFILL

- A. Excavation is unclassified. Remove all materials encountered. No extras will be allowed for rock excavation.
- B. Unless indicated otherwise, Contractor shall perform his own excavation, filling and grading work. Where excavation is made into compacted materials the backfill shall be similar material compacted at least as well as the adjacent material.

#### 1.25 OSHA TEN HOUR BILL REQUIREMENTS:

- A. The advertised specifications for every contract for public work of \$250,000.00 or more must contain a provision requiring that every worker employed in the performance of a public work contract shall be certified as having completed an OSHA 10 safety training course. The clear intent of this provision is to require that all employees of public work contractors receive such training “prior to the performing any work on the project.”
- B. The Bureau will enforce the statute as follows:

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1. All contractors and sub contractors must attach a copy of proof of completion of the OSHA 10 course to the first certified payroll submitted to the contracting agency and on each succeeding payroll where any new or additional employee is first listed.
- C. Proof of completion may include but is not limited to:
  1. Copies of bona fide course completion card;
  2. Training roster, attendance record of other documentation from the certified trainer pending the issuance of the card.

**\*\*A certification by the employer attesting that all employees have completed such course is not sufficient proof that the course has been completed. Any questions regarding this statute may be directed to the New York State Department of Labor, Bureau of Public Work at 518-485-5696.**

#### 1.26 EXISTING CEILING REMOVALS

- A. Each Contractor shall be responsible for the removal and replacement of existing ceiling tiles and grid in areas of the existing building where their work is above existing ceilings and new ceilings are not scheduled to be provided. In event that the existing ceiling are damaged and cannot be replaced to the satisfaction of the Owner, the responsible contractor shall be liable for the cost of replacing in kind, the existing ceilings with new tile and grid.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 011000

## SECTION 012100 - ALLOWANCES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Section includes administrative and procedural requirements governing allowances.
  - 1. Certain items are specified in the Contract Documents by allowances. Allowances have been established in lieu of additional requirements and to defer selection of actual materials and equipment to a later date when direction will be provided to Contractor. If necessary, additional requirements will be issued by Change Order.
- B. Types of allowances include the following:
  - 1. Lump-sum allowances.

#### 1.3 ALLOWANCES

- A. Contractor shall include in his Base Bid an allowance of \$ (See Schedule for Dollar amounts). This Allowance shall be used only when authorized in writing by the Architect to cover the costs of additional work due to discovered unanticipated conditions, work that may be required for other contractor's installations, new requirements, or discovered omissions in the documents.
- B. Overhead and profit costs for all allowances must be included in the Base Bid and will not be permitted to be deducted from the allowance.
- C. All monies remaining shall be returned to the Owner at the completion of the project in the form of a Credit.

#### 1.4 ALLOWANCE SCHEDULE

- A. Construction Allowance
  - 1. Allowance - \$30,000

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## PART 2 - PRODUCTS (Not Used)

## PART 3 - EXECUTION

### 3.1 EXAMINATION

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

### 3.2 PREPARATION

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

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## 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 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes administrative and procedural requirements for alternates.
- B. 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. Alternates described in this Section are part of the Work only if enumerated in the Agreement.
  - 2. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

#### 1.4 PROCEDURES

- A. Coordination: Revise or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.
  - 1. The bid amount for each alternate includes cost of related coordination, modification or adjustment.
  - 2. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.
- B. Execute accepted alternates under the same conditions as other work of the Contract.

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- C. 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.

## PART 2 - PRODUCTS (Not Used)

## PART 3 - EXECUTION (Not Used)

### 3.1 SCHEDULE OF ALTERNATES

A.

1. Construction Alternate 1: This Alternate shall indicate the amount to be ADDED to Base Bid for all Construction work associated with work at Uriah Hill School. As indicated on Drawings U-A.100.00, U-H.100, U-E.001.00, and U-M.301.00 and related specifications.

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 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. This section applies to contractors.
- B. Section includes administrative and procedural requirements for handling and processing Contract modifications.
- C. Related Requirements:
  - 1. Section 012500 "Substitution Procedures" for administrative procedures for handling requests for substitutions made after the 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, on AIA Document G710, "Architect's Supplemental Instructions."

#### 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. Work Change Proposal Requests issued by Architect are not instructions either to stop work in progress or to execute the proposed change.
  - 2. Within 15 days, when not otherwise specified 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 changed conditions require modifications to the Contract, Contractor may initiate a claim 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 "Product Requirements" if the proposed change requires substitution of one product or system for product or system specified.
  - 7. Proposal Request Form: Use Use AIA Document G709 for Proposal Requests or forms approved by the Architect.

## 1.5 CHANGE ORDER PROCEDURES

- A. On Owner's approval of a Work Changes Proposal Request, Architect will issue a Change Order for signatures of Owner and Contractor on AIA Document G701.

## 1.6 CONSTRUCTION CHANGE DIRECTIVE

- A. Construction Change Directive: Architect may issue a Construction Change Directive on AIA Document G714 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.

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

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 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. This section applies to all contractors.
- B. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.
- C. Related Requirements:
  - 1. Section 012600 "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
  - 2. Section 013200 "Construction Progress Documentation" for administrative requirements governing the preparation and submittal of the Contractor's construction schedule.

#### 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. Coordinate 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. Submittal schedule.
    - c. Contractor's construction schedule.
  - 2. Submit the schedule of values to Architect at earliest possible date, but no later than 14 days before the date scheduled for submittal of initial Applications for Payment.

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B. Format and Content: Use 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. Submit schedule of values using AIA Document G703 Continuation Sheets.
3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with Project Manual table of contents. Provide several line items for principal subcontract amounts, where appropriate. Include separate line items under required principal subcontracts for operation and maintenance manuals, punch list activities, Project Record Documents, and demonstration and training in the amount of 5 percent of the Contract Sum.
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 required, include evidence of insurance or bonded warehousing.
6. Provide separate line items in the schedule of values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
7. Allowances: Provide a separate line item in the schedule of values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
8. Purchase Contracts: Provide a separate line item in the schedule of values for each purchase contract. Show line-item value of purchase contract. Indicate owner payments or deposits, if any, and balance to be paid by Contractor.
9. Each item in the schedule of values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
  - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the schedule of values or distributed as general overhead expense, at Contractor's option.
10. 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.
11. Provide a separate line item in the schedule of values for coordinating and scheduling.

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12. Provide a separate line item in the schedule of values for job meeting attendance.

## 1.5 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.
  1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.
- B. Payment Application Times: Submit Application for Payment Architect by the 1<sup>st</sup> of the month. The period covered by each Application for Payment is one month, ending on the last day of the month.
  1. Submit draft copy of Application for Payment by the 20<sup>th</sup> of the month for review by Architect.
- C. Application for Payment Forms: Use Document G732 and AIA Document G703 Continuation Sheets as form of Applications for Payment or a form approved by the Architect.
- D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect or Construction Manager 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 for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
  3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
- E. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.
  1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment, for stored materials.
  2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
  3. Provide summary documentation for stored materials indicating the following:
    - a. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.
- F. Transmittal: Submit 4 signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt within 24 hours. All four copies shall include waivers of lien, certified payrolls, allowance and change order backup and similar attachments if required.

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1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
- G. Partial Waiver of Lien: With each Application for Payment, submit signed Partial Waiver of Lien, Prime Contractor with each payment application.
- H. 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. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
  2. When an application shows completion of an item, submit conditional final or full waivers.
  3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
  4. Submit final Application for Payment with or preceded by conditional final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
  5. Waiver Forms: Submit executed waivers of lien on forms, acceptable to Owner.
- I. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
1. Schedule of values.
  2. Contractor's construction schedule (preliminary if not final).
  3. Products list (preliminary if not final).
  4. Schedule of unit prices.
  5. Submittal schedule (preliminary if not final).
  6. List of Contractor's staff assignments.
  7. List of Contractor's principal consultants.
  8. Copies of all required permits.
  9. Initial progress report.
  10. Certificates of insurance and insurance policies.
  11. Performance and payment bonds.
- J. Application for Payment at Substantial Completion: After Architect issues 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 Certificate(s) of Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
- K. Final Payment Application: After completing Project closeout requirements, 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.

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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. Asbestos Certification Form.
8. Evidence that claims have been settled.
9. Final liquidated damages settlement statement.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012900



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## 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 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. This section applies to all contractors.
- B. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
  - 1. Administrative and supervisory personnel
  - 2. Requests for Information (RFIs).
  - 3. Project meetings.
- C. Each Contractor shall participate in coordination requirements.
- D. Related Requirements:
  - 1. Section 013200 "Construction Progress Documentation" for preparing and submitting Contractor's construction schedule.
  - 2. Section 017700 "Closeout Procedures" for coordinating closeout of the Contract.

#### 1.3 DEFINITIONS

- A. RFI: Request from Contractor seeking information required by or clarifications of the Contract Documents.

#### 1.4 GENERAL COORDINATION PROCEDURES

- A. All documentation shall be submitted to Architects hosted website, Hamlin Design Group Project Forum.
  - 1. Contractor will be provided secure access to the website by Hamlin Design Group.
  - 2. Use of website shall limited to project management and coordination.
  - 3. Unauthorized use of site is prohibited.

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1.5 HDG PROJECT FORUM DESCRIPTION:

- A. The Contractor shall utilize Hamlin Design Group online project management system for electronic submittal of all data and documents (unless specified otherwise by the Architect or Contract Documents) throughout the duration of the Contract. The online project management system (hereinafter referred to as the Project Website) is a web-based electronic media site that is hosted by the Architect utilizing their collaboration software and will be made available to Contractor's designated personnel, as well as their subcontractors if so desired. The joint use of this system is to facilitate; electronic exchange of information, key processes, and overall management of the contract. The Project Website shall be the primary means of project information submission and management. When required by the Architect, paper documents will also be provided (i.e.; e.g. the signature of Contract Modifications and submission of Contract Claims). In the event of discrepancy between the electronic version and paper documents, the paper documents will govern.
- B. Coordination: Contractor shall coordinate its construction operations to ensure efficient and orderly installation of each part of the Work. Contractor shall coordinate its operations for proper installation, connection, and operation of the work.
  - 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 to ensure maximum performance and accessibility for required maintenance, service, and repair.
  - 3. Make adequate provisions to accommodate items scheduled for later installation.
- C. 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.
- D. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities 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.
- E. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.

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1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. See other Sections for disposition of salvaged materials that are designated as Owner's property.

## 1.6 COORDINATION DRAWINGS

- A. Coordination Drawings, General: Coordination drawings are not anticipated to be required for this contract work. In the event that coordination drawings are required due to unforeseen conditions, prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely shown on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed.
1. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:
    - a. Use applicable Drawings as a basis for preparation of coordination drawings. Prepare sections, elevations, and details as needed to describe relationship of various systems and components.
    - b. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
    - c. Indicate space requirements for routine maintenance and for anticipated replacement of components during the life of the installation.
    - d. Indicate required installation sequences.
    - e. Indicate dimensions shown on the Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Architect indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.
- B. Coordination Drawing Organization: Organize coordination drawings as follows:
1. Floor Plans and Reflected Ceiling Plans: Show architectural and structural elements, and mechanical, plumbing, fire-protection, fire-alarm, and electrical Work. Show locations of visible ceiling-mounted devices relative to acoustical ceiling grid. Supplement plan drawings with section drawings where required to adequately represent the Work.
  2. Plenum Space: Indicate subframing for support of ceiling and wall systems, mechanical and electrical equipment, and related Work. Locate components within ceiling plenum to accommodate layout of light fixtures indicated on Drawings. Indicate areas of conflict between light fixtures and other components.
  3. Mechanical Rooms: Provide coordination drawings for mechanical rooms showing plans and elevations of mechanical, plumbing, fire-protection, fire-alarm, and electrical equipment.
  4. Structural Penetrations: Indicate penetrations and openings required.
  5. Slab Edge and Embedded Items: Indicate slab edge locations and sizes and locations of embedded items for metal fabrications, sleeves, anchor bolts, bearing plates, angles, door floor closers, slab depressions for floor finishes, curbs and housekeeping pads, and similar items.

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6. Mechanical and Plumbing Work: Show the following:
    - a. Use applicable Drawings as a basis for preparation of coordination drawings. Prepare sections, elevations, and details as needed to describe relationship of various systems and components.
    - b. Sizes and bottom elevations of ductwork, piping, and conduit runs, including insulation, bracing, flanges, and support systems.
    - c. Dimensions of major components, such as dampers, valves, diffusers, access doors, cleanouts and electrical distribution equipment.
    - d. Fire-rated enclosures around ductwork.
  7. Electrical Work: Show the following:
    - a. Runs of vertical and horizontal conduit 1-1/4 inches (32 mm) in diameter and larger.
    - b. Light fixture, exit light, emergency battery pack, smoke detector, and other fire-alarm locations.
    - c. Panel board, switch board, switchgear, transformer, busway, generator, and motor control center locations.
    - d. Location of pull boxes and junction boxes, dimensioned from column center lines.
  8. Fire-Protection System: Show the following:
    - a. Locations of standpipes, mains piping, branch lines, pipe drops, and sprinkler heads.
  9. Review: Architect will review coordination drawings to confirm that the Work is being coordinated, but not for the details of the coordination, which are Contractor's responsibility. If Architect determines that coordination drawings are not being prepared in sufficient scope or detail, or are otherwise deficient, Architect will so inform Contractor, who shall make changes as directed and resubmit.
  10. Coordination Drawing Prints: Prepare coordination drawing prints according to requirements in Section 013300 "Submittal Procedures."
- C. Coordination Digital Data Files: Prepare coordination digital data files according to the following requirements:
1. File Preparation Format: Same digital data software program, version, and operating system as original Drawings.
  2. File Preparation Format: DWG, Version 2014, operating in Apple OS or Microsoft Windows operating system.
  3. File Submittal Format: Submit or post coordination drawing files Portable Data File (PDF) format.
  4. Architect will furnish Contractor one set of digital data files of Drawings for use in preparing coordination digital data files.
    - a. Architect makes no representations as to the accuracy or completeness of digital data files as they relate to Drawings.
    - b. Digital Data Software Program: Drawings are available in AutoCAD 2014(.dwg) operating in Apple OS or Microsoft Windows.
    - c. Contractor shall execute a data licensing agreement in the form of Agreement included in this Project Manual

1.7 REQUESTS FOR INFORMATION (RFIs)

- A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified by the Architect.
  - 1. RFI shall originate with Contractor. RFIs submitted by entities other than Contractor will be returned with no response.
  - 2. Contractor is responsible to coordinate and submit RFIs in a prompt manner so as to avoid delays in work of Prime Contracts or subcontractors.
  - 3. All RFI's are to be submitted through the Architects online project management system.
- B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
  - 1. Project name.
  - 2. Project number.
  - 3. Date.
  - 4. Name of Contractor.
  - 5. Name of Architect.
  - 6. RFI number, numbered sequentially.
  - 7. RFI subject.
  - 8. Specification Section number and title and related paragraphs, as appropriate.
  - 9. Drawing number and detail references, as appropriate.
  - 10. Field dimensions and conditions, as appropriate.
  - 11. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
  - 12. Contractor's signature.
  - 13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
    - a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.
- C. Software-Generated RFIs:
  - 1. Identify each page of attachments with the RFI number and sequential page number
  - 2. Attachments electronically shall be in Adobe Acrobat PDF format.
- D. Architect's Action: Architect will review each RFI, determine action required, and respond. Allow 7 working days for Architect's response for each RFI. RFIs received by Architect after 1:00 p.m. will be considered as received the following working day.
  - 1. The following Contractor-generated RFIs will be returned without action:
    - a. Requests for approval of submittals.
    - b. Requests for approval of substitutions.
    - c. Requests for approval of Contractor's means and methods.
    - d. Requests for coordination information already indicated in the Contract Documents.
    - e. Requests for adjustments in the Contract Time or the Contract Sum.
    - f. Requests for interpretation of Architect's actions on submittals.
    - g. Incomplete RFIs or inaccurately prepared RFIs.

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2. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt of additional information.
  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 Section 012600 "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.
- E. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log with not less than the following:
1. Project name.
  2. Name and address of Contractor.
  3. Name and address of Architect.
  4. RFI number including RFIs that were returned without action or withdrawn.
  5. RFI description.
  6. Date the RFI was submitted.
  7. Date Architect's response was received.
- 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 7 days if Contractor disagrees with response.
1. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.
  2. Identification of related Field Order, Work Change Directive, and Proposal Request, as appropriate.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013100

# Request for Information

**To:** HamlinDesignGroup  
915 Broadway Suite 101A  
Albany, NY 12207

**Phone:** 518-724-5159

**RFI #:**

**Date:**

**Project:** Peekskill City School District  
Renovations Project

**HDG Project #**

**Subject:**

**From Prime Contractor:**

**Reference Drawing Number:**

**Reference Specification Section:**

**Request:**

**Response:**

\_\_\_\_\_  
Response by

\_\_\_\_\_  
Company

\_\_\_\_\_  
Date





## 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 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
  - 1. Preliminary Construction schedule.
  - 2. Contractor's construction schedule.
  - 3. Submittal Schedule.
  - 4. Field conditions reports
  - 5. Special reports.
- B. Related Requirements:
  - 1. Section 013233 "Photographic Documentation.
  - 2. Section 013300 "Submittal Procedures" for submitting schedules and reports.
  - 3. Section 014000 "Quality Requirements" for submitting a schedule of tests and inspections.

#### 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 Activity: An activity on the critical path that 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. 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 and Owner's Representative final release or approval.
- B. Preliminary Construction Schedule: Submit two opaque copies.
  - 1. Approval of cost-loaded preliminary construction schedule will not constitute approval of Schedule of Values for cost-loaded activities.
- C. Contractor's Construction Schedule: Submit two opaque copies of initial schedule, large enough to show entire schedule for entire construction period.
- D. Field Condition Reports: Submit two copies at time of discovery of differing conditions.
- E. 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 Section 013100 "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, including phasing work stages area separations interim milestones and partial Owner occupancy.
  4. Review delivery dates for Owner-furnished products.
  5. Review submittal requirements and procedures.
  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 Project closeout and Owner startup procedures
  9. Review and finalize list of construction activities to be included in schedule.
  10. 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.
- B. Coordinate Contractor's construction schedule with the schedule of values, list of subcontractors, submittal schedule, progress reports, payment requests, and other required schedules and reports
1. Secure time commitments for performing critical elements of the Work from entities involved.
  2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

## 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. Initial Submittal: Submit concurrently with preliminary bar-chart schedule or network diagram. Include submittals required during the first 60 days of construction. List those required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.

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3. 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 the Notice of Award (letter of Intent) 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 story or separate area as a separate numbered activity for each main 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 the following 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 Section 013300 "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's construction schedule with submittal 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.
  5. Punch List and Final Completion: Include not more than 30 days for completion of punch list items and final 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. Phasing: Arrange list of activities on schedule by phase.
  2. Work under More Than One Contract: Include a separate activity for each contract.
  3. Work Restrictions: Show the effect of the following items on the schedule:
    - a. Coordination with existing construction.
    - b. Limitations of continued occupancies.
    - c. Uninterruptible services.
    - d. Partial occupancy before Substantial Completion.
    - e. Use of premises restrictions.
    - f. Provisions for future construction.
    - g. Seasonal variations.
    - h. Environmental control.

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4. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:
  - a. Subcontract awards.
  - b. Submittals.
  - c. Purchases.
  - d. Mockups.
  - e. Fabrication.
  - f. Sample testing.
  - g. Deliveries.
  - h. Installation.
  - i. Tests and inspections.
  - j. Adjusting.
  - k. Curing.
  - l. Building flush-out.
  - m. Startup and placement into final use and operation.
5. Area Separations: Identify each major area of construction for each major portion of the Work. Indicate where each construction activity within a major area must be sequenced or integrated with other construction activities to provide for the following:
  - a. Structural completion.
  - b. Temporary enclosure and space conditioning.
  - c. Permanent space enclosure.
  - d. Completion of mechanical installation.
  - e. Completion of electrical installation.
  - f. Substantial Completion.

- 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. Computer Scheduling Software: Prepare schedules using current version of a program that has been developed specifically to manage construction schedules.

## 2.3 PRELIMINARY SCHEDULE

- A. Bar-Chart Schedule: Submit startup, horizontal, bar-chart-type construction schedule within 7 days of date established for the Notice to Proceed (Letter of Intent)
- B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line. Outline significant construction activities for first 60 days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.

## 2.4 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 Notice to Proceed

(Letter of Intent) Base schedule on the startup construction schedule and additional information 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.
  - 1. For construction activities that require three months or longer to complete, indicate an estimated completion percentage 10 percent increments within time bar.

## 2.5 CONTRACTOR'S CONSTRUCTION SCHEDULE (CPM SCHEDULE)

- A. General: Prepare network diagrams using AON (activity-on-node) format.
- B. Startup Network Diagram: Submit diagram within 14 days of date established for the Notice of Award. Outline significant construction activities for the first 60 days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.
- C. CPM Schedule: Prepare Contractor's construction schedule using a cost- and resource-loaded time-scaled CPM network analysis diagram for the Work.
  - 1. Develop network diagram in sufficient time to submit CPM schedule so it can be accepted for use no later than 60 days after date established for the Notice of Award.
    - a. Failure to include any work item required for performance of this Contract shall not excuse Contractor from completing all work within applicable completion dates, regardless of Architect's approval of the schedule.
  - 2. Conduct educational workshops to train and inform key Project personnel, including subcontractors' personnel, in proper methods of providing data and using CPM schedule information.
  - 3. Establish procedures for monitoring and updating CPM schedule and for reporting progress. Coordinate procedures with progress meeting and payment request dates.
  - 4. Use "one workday" as the unit of time for individual activities. Indicate nonworking days and holidays incorporated into the schedule in order to coordinate with the Contract Time.
- D. CPM Schedule Preparation: Prepare a list of all activities required to complete the Work. Using the startup network diagram, prepare a skeleton network to identify probable critical paths.
  - 1. Activities: Indicate the estimated time duration, sequence requirements, and relationship of each activity in relation to other activities. Include estimated time frames for the following activities:
    - a. Preparation and processing of submittals.
    - b. Mobilization and demobilization.
    - c. Purchase of materials.
    - d. Delivery.
    - e. Fabrication.



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- f. Utility interruptions.
  - g. Installation.
  - h. Work by Owner that may affect or be affected by Contractor's activities.
  - i. Testing
  - j. Punch list and final completion.
  - k. Activities occurring following final completion.
2. Critical Path Activities: Identify critical path activities, including those for interim completion dates. Scheduled start and completion dates shall be consistent with Contract milestone dates.
3. Processing: Process data to produce output data on a computer-drawn, time-scaled network. Revise data, reorganize activity sequences, and reproduce as often as necessary to produce the CPM schedule within the limitations of the Contract Time.
4. Format: Mark the critical path. Locate the critical path near center of network; locate paths with most float near the edges.
  - a. Subnetworks on separate sheets are permissible for activities clearly off the critical path.
5. Cost- and Resource-Loading of CPM Schedule: Assign cost to construction activities on the CPM schedule. Do not assign costs to submittal activities. Obtain Architect's approval prior to assigning costs to fabrication and delivery activities. Assign costs under main subcontracts for testing and commissioning activities, operation and maintenance manuals, punch list activities, Project record documents, and demonstration and training (if applicable), in the amount of 5 percent of the Contract Sum.
  - a. Each activity cost shall reflect an appropriate value subject to approval by Architect.
  - b. Total cost assigned to activities shall equal the total Contract Sum.
- E. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using a network fragment to demonstrate the effect of the proposed change on the overall project schedule.
- F. Initial Issue of Schedule: Prepare initial network diagram from a sorted activity list indicating straight "early start-total float." Identify critical activities. Prepare tabulated reports showing the following:
  1. Contractor or subcontractor and the Work or activity.
  2. Description of activity.
  3. Main events of activity.
  4. Immediate preceding and succeeding activities.
  5. Early and late start dates.
  6. Early and late finish dates.
  7. Activity duration in workdays.
  8. Total float or slack time.
  9. Average size of workforce.
  10. Dollar value of activity (coordinated with the schedule of values).

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G. Schedule Updating: Concurrent with making revisions to schedule, prepare tabulated reports showing the following:

1. Identification of activities that have changed.
2. Changes in early and late start dates.
3. Changes in early and late finish dates.
4. Changes in activity durations in workdays.
5. Changes in the critical path.
6. Changes in total float or slack time.
7. Changes in the Contract Time.

H. Value Summaries: Prepare two cumulative value lists, sorted by finish dates.

1. In first list, tabulate activity number, early finish date, dollar value, and cumulative dollar value.
2. In second list, tabulate activity number, late finish date, dollar value, and cumulative dollar value.
3. In subsequent issues of both lists, substitute actual finish dates for activities completed as of list date.
4. Prepare list for ease of comparison with payment requests; coordinate timing with progress meetings.
  - a. In both value summary lists, tabulate "actual percent complete" and "cumulative value completed" with total at bottom.
  - b. Submit value summary printouts one before each regularly scheduled progress meeting.

## 2.6 REPORTS

- A. Field Condition Reports: Immediately on discovery of a difference between field conditions and the Contract Documents, prepare and submit a detailed report. Submit with a request for interpretation. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

## 2.7 SPECIAL REPORTS

- A. General: Submit special reports directly to Owner within one day(s) 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.

### 3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before 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 final 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. Post copies in Project meeting rooms and temporary field offices.
  - 2. 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 013233 - PHOTOGRAPHIC DOCUMENTATION

### PART 1 - GENERAL

1.1 All work in this section shall be performed by the contractor.

#### 1.2 RELATED DOCUMENTS

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

#### 1.3 SUMMARY

- A. Section includes administrative and procedural requirements for the following:
1. Preconstruction photographs.
  2. Periodic construction photographs.
  3. Final completion construction photographs.
- B. Related Requirements:
1. Section 013300 "Submittal Procedures" for submitting photographic documentation.
  2. Section 024119 "Selective Structure Demolition" for photographic documentation before selective demolition operations commence.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For photographer.
- B. Key Plan: Submit key plan of Project site and building with notation of vantage points marked for location and direction of each photograph. Indicate elevation or story of construction. Include same information as corresponding photographic documentation.
- C. Digital Photographs: Submit image files within three days of taking photographs.
1. Digital Camera: Minimum sensor resolution of 8 megapixels.
  2. Format: Minimum 3200 by 2400 pixels, uncompressed JPG. format in unaltered original files, with same aspect ratio as the sensor, uncropped, date and time stamped, in folder named by date of photograph, accompanied by key plan file.
  3. Identification: Provide the following information with each image description in file metadata tag:
    - a. Name of Project.
    - b. Name and contact information for photographer.
    - c. Name of Architect.

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- d. Name of Contractor.
- e. Date photograph was taken.
- f. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.
- g. Unique sequential identifier keyed to accompanying key plan.
- h. Photographs shall be accessible via CD or Web-based format allowing access and downloading of pictures by Owner and Architect.

## 1.5 USAGE RIGHTS

- A. Obtain and transfer copyright usage rights from photographer to Owner for unlimited reproduction of photographic documentation.

## PART 2 - PRODUCTS

### 2.1 PHOTOGRAPHIC MEDIA

- A. Digital Images: Provide images in JPG format, produced by a digital camera with minimum sensor size of **8** megapixels, and at an image resolution of not less than **3200 by 2400** pixels.

## PART 3 - EXECUTION

### 3.1 CONSTRUCTION PHOTOGRAPHS

- A. General: Take photographs using the maximum range of depth of field, and that are in focus, to clearly show the Work. Photographs with blurry or out-of-focus areas will not be accepted.
  - 1. Maintain key plan with each set of construction photographs that identifies each photographic location.
- B. Digital Images: Submit digital images exactly as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.
  - 1. Date and Time: Include date and time in file name for each image.
  - 2. Field Office Images: Maintain one set of images accessible in the field office at Project site, available at all times for reference. Identify images in the same manner as those submitted to Architect.
- C. Preconstruction Photographs: Before starting construction, take photographs of Project site and surrounding properties, including existing items to remain during construction, from different vantage points, as directed by Architect.
  - 1. Flag construction limits before taking construction photographs.
  - 2. Take photographs to show existing conditions adjacent to property before starting the Work.

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3. Take photographs of existing buildings either on or adjoining property to accurately record physical conditions at start of construction.
  4. Take additional photographs as required to record settlement or cracking of adjacent structures, pavements, and improvements.
- D. Periodic Construction Photographs: Take 20 photographs weekly, with timing each month adjusted to coincide with the cutoff date associated with each Application for Payment. Select vantage points to show status of construction and progress since last photographs were taken.
- E. Final Completion Construction Photographs: Take 20 color photographs after date of Substantial Completion for submission as project record documents. Architect will inform photographer of desired vantage points.
- F. Additional Photographs: Architect may request photographs in addition to periodic photographs specified. Additional photographs will be paid for by Change Order and are not included in the Contract Sum or in the allowance for construction photographs.
1. Three days' notice will be given, where feasible.
  2. In emergency situations, take additional photographs within 24 hours of request.
  3. Circumstances that could require additional photographs include, but are not limited to, the following:
    - a. Special events planned at Project site.
    - b. Immediate follow-up when on-site events result in construction damage or losses.
    - c. Photographs to be taken at fabrication locations away from Project site. These photographs are not subject to unit prices or unit-cost allowances.
    - d. Substantial Completion of a major phase or component of the Work.
    - e. Extra record photographs at time of final acceptance.
    - f. Owner's request for special publicity photographs.

END OF SECTION 013233

## SECTION 013300 – SUBMITTAL PROCEDURES

### PART 1 - GENERAL

#### 1.1 EQUIVALENCY CLAUSE OR EQUAL

- A. In the specifications, two or more kinds, types, brands, or manufacturers or materials are regarded as the required standard of quality and are presumed to be equal. The contractor may select one of these items or, if the contractor desires to use any kind, type, brand, or manufacturer or material other than those named in the specifications, they shall indicate in writing, when requested, and prior to award of contract, what kind, type, brand, or manufacturer is included in the base bid for the specified item.

#### 1.2 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.

#### 1.3 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 "Project Management and Coordination".
  - 3. Division 1 Section "Construction Progress Documentation" for submitting schedules and reports, including Contractor's Construction Schedule and the Submittals Schedule.
  - 4. Division 1 Section "Quality Requirements" for submitting test and inspection reports.
  - 5. Division 1 Section "Closeout Procedures" for submitting warranties.
  - 6. Division 1 Section "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
  - 7. Division 1 Section "Operation and Maintenance Data" for submitting operation and maintenance manuals.
  - 8. Divisions 2 through 34 Sections for specific requirements for submittals in those Sections.



#### 1.4 DEFINITIONS

- A. Action Submittals: Written and graphic information that requires Architect's and Owner's Representative responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals".
- B. Informational Submittals: Written information that does not require Architect's and Owner's Representative responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals".
- C. File Transfer Protocol (FTP): Communications protocol that enables transfer of files to and from another computer over a network and that serves as the basis for standard Internet protocols. An FTP site is a portion of a network located outside of network firewalls within which internal and external users are able to access files.
- D. Portable Document Format (PDF): An open standard file format licensed by Adobe Systems used for representing documents in a device-independent and display resolution-independent fixed-layout document format.

#### 1.5 SUBMITTAL PROCEDURES

- A. General: Electronic copies of CAD Drawings of the Contract Drawings can be provided by Architect or their consultants for Contractor's use in preparing submittals (See spec 013300F2 for conditions and fees).
- B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
  - 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
  - 2. 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 and Owner's Representative reserve the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- C. Submittals Schedule: Comply with requirements in Division 1 Section "Construction Progress Documentation" for list of submittals and time requirements for scheduled performance of related construction activities.
- D. Processing Time: Allow enough time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's or Owner's Representative 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 5 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect or Owner's Representative 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 5 days for review of each resubmittal.
  4. Sequential Review: Where sequential review of submittals by Architect's consultants, Owner, or other parties is indicated, allow 21 days for initial review of each submittal.
- E. 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 on label or beside title block to record Contractor's review and approval markings and action taken by Architect and Owner's Representative.
  3. Include the following information on label for processing and recording action taken:
    - a. Project name.
    - b. Date.
    - c. Name and address of Architect and Owner's Representative.
    - 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 number shall use Specification Section number followed by a decimal point and then a sequential number (e.g., 06100.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., 06100.01.A).
        - a) Number and title of appropriate Specification Section.
        - b) Drawing number and detail references, as appropriate.
        - c) Location(s) where product is to be installed, as appropriate.
        - d) Other necessary identification.
- F. Deviations: Highlight, encircle, or otherwise specifically identify deviations from the Contract Documents on submittals.
- G. Additional Copies: Unless additional copies are required for final submittal, and unless Architect or Owner's Representative observes noncompliance with provisions in the Contract Documents, initial submittal may serve as final submittal.
- H. Transmittal: Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Architect and Owner's Representative will return submittals, without review, received from sources other than Contractor.
1. Transmittal Form: Use Architects approved form.
  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

Owner's Representative on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same label information as related submittal.

- I. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
  - 1. Note date and content of previous submittal.
  - 2. Note date and content of revision in label or title block and clearly indicate extent of revision.
  - 3. Resubmit submittals until they are marked "Approved, Approved as Corrected or Approved as Noted from Architect's action stamp."
- J. Distribution:
  - 1. Furnish color copies of final submittals with mark indicating "Approved, Approved as Corrected or Approved as Noted from Architect's action stamp" to manufacturers, subcontractors, suppliers, fabricators, installers and authorities having jurisdiction and others as necessary for performance of construction activities. Show distribution on transmittal forms.
  - 2. Furnish four color copies of final submittals with mark indicating "Approved, Approved as Corrected or Approved as Noted from Architect's action stamp" to the Architect for distribution to the Owner, Clerk-of-the-Works, and the Architect and others as necessary for performance of construction activities. Show distribution on transmittal forms.
- K. Use for Construction: Use only final submittals with mark indicating "Approved, Approved as Corrected or Approved as Noted from Architect's action stamp".

#### 1.6 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

- A. All submittals to be uploaded to Architects hosted website, Hamlin Design Group Project Forum.
  - 1. Contractor will be provided secure access to the website by Hamlin Design Group.
  - 2. Use of website shall limited to project management and coordination.
  - 3. Unauthorized use of site is prohibited.
- B. Architect's Digital Data Files: Electronic digital data files of the Contract Drawings will be provided by Architect for Contractor's use in preparing submittals.
  - 1. Architect will furnish Contractor one set of digital data drawing files of the Contract Drawings for use in preparing Shop Drawings and Project record drawings.
    - a. Architect makes no representations as to the accuracy or completeness of digital data drawing files as they relate to the Contract Drawings.
    - b. Digital Drawing Software Program: The Contract Drawings are available in AutoCAD.
    - c. Contractor shall execute a data licensing agreement in the form of AIA Document C106.
    - d. The following digital data files will by furnished for each appropriate discipline:
      - 1) Floor plans.

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## PART 2 - PRODUCTS

### 2.1 HDG PROJECT FORUM DESCRIPTION:

- A. The Contractor shall utilize Hamlin Design Group online project management system for electronic submittal of all data and documents (unless specified otherwise by the Architect or Contract Documents) throughout the duration of the Contract. The online project management system (hereinafter referred to as the Project Website) is a web-based electronic media site that is hosted by the Architect utilizing their collaboration software and will be made available to Contractor's designated personnel, as well as their subcontractors if so desired. The joint use of this system is to facilitate; electronic exchange of information, key processes, and overall management of the contract. The Project Website shall be the primary means of project information submission and management. When required by the Architect, paper documents will also be provided (i.e.; e.g. the signature of Contract Modifications and submission of Contract Claims). In the event of discrepancy between the electronic version and paper documents, the paper documents will govern.

### 2.2 PROJECT WEBSITE UTILIZATION:

- A. Hamlin Design Group Project Forum (Project Website) shall be utilized in connection with submittal preparation and information management required by Section 010270 APPLICATIONS FOR PAYMENT, 013100 – PROJECT MANAGEMENT AND COORDINATION, 013200 – CONSTRUCTION PROGRESS DOCUMENTATION, 013300 – SUBMITTAL PROCEDURES and other Division One sections where indicated. Requirements of this section are in addition to requirements of all other sections of the specifications.

### 2.3 USER ACCESS LIMITATIONS:

- A. The Architect will control the Contractor's access to the Project Website by allowing access and assigning user profiles to accepted Contractor personnel. User profiles will define levels of access into the system; determine assigned function-based authorizations (determines what can be seen) and user privileges (determines what they can do). Sub-contractors and suppliers can have direct access to the Project Website at the Contractor's discretion. Entry of information exchanged and transferred between the Contractor and its sub-contractors and suppliers on the Project Website shall be the responsibility of the Contractor.
  - 1. Joint Ownership of Data
    - a. Data entered in a collaborative mode (entered with the intent to share as determined by permissions and workflows within the Project Website) by the Owner, Architect, and the Contractor will be jointly owned.

## 2.4 AUTOMATED SYSTEM NOTIFICATION AND AUDIT LOG TRACKING:

- A. Review comments made (or lack thereof) by the Architect on Contractor submitted documentation shall not relieve the Contractor from compliance with requirements of the Contract Documents. The Contractor is responsible for managing, tracking, and documenting the Work to comply with the requirements of the Contract Documents. Architect acceptance via automated system notifications or audit logs extends only to the face value of the submitted documentation and does not constitute validation of the Contractor's submitted information.

## 2.5 SUBMITTAL PROCEDURES

- A. General Submittal Procedure Requirements: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.
  - 1. Post electronic submittals as PDF electronic files directly to Hamlin Design Group Project Forum specifically established for Project.
    - a. Architect will return annotated file. Annotate and retain one copy of file as an electronic Project record document file.
  - 2. Action Submittals: Submit PDF electronic files directly to Hamlin Design Group Project Forum.
  - 3. Informational Submittals: Submit PDF electronic files directly to Hamlin Design Group Project Forum.
  - 4. Certificates and Certifications Submittals: Provide a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
    - a. Provide a digital signature with digital certificate on electronically submitted certificates and certifications where indicated.
    - b. Provide a notarized statement on original paper copy certificates and certifications where indicated.
- B. Shop Drawings
  - 1. Shop drawing and design data documents shall be submitted as PDF attachments to the Project Website's submittal workflow process and form. All PDF shop drawing submittal documents shall have the Contractor's review and submittal stamp (including signatures) as specified in this spec section the same as if submitted as hard copy. Examples of shop drawings include, but are not limited to:
  - 2. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
    - a. Identification of products.
    - b. Schedules.
    - c. Compliance with specified standards.
    - d. Notation of coordination requirements.
    - e. Notation of dimensions established by field measurement.
    - f. Relationship and attachment to adjoining construction clearly indicated.

- g. Seal and signature of professional engineer if specified.
  - 1) Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches, but no larger than 30 by 42 inches.
  - 2) Submit Shop Drawings in the following format:
    - a) PDF electronic file.

#### C. Product Data

- 1. Product catalog data and manufacturer's instructions shall be submitted as PDF attachments to the Project Website's submittal workflow process and form, except that color charts and similar color oriented pages shall be submitted as hard copy separate from and in addition to the PDF copy. Submittal forms shall indicate when hard copy color documents are submitted. All PDF product data submittal documents shall have the Contractors review and submittal stamp (including signatures) as specified in this spec section the same as if submitted as hard copy. Examples of product data include, but are not limited to:
  - a. Manufacturer's printed literature.
  - b. Preprinted product specification data and installation instructions.
  - c. If information must be specially prepared for submittal because standard published data are not suitable for use, submit as Shop Drawings, not as Product Data.
  - d. Mark each copy of each submittal to show which products and options are applicable.
- 2. Include the following information, as applicable:
  - a. Manufacturer's catalog cuts.
  - b. Manufacturer's product specifications.
  - c. Standard color charts.
  - d. Statement of compliance with specified referenced standards.
  - e. Testing by recognized testing agency.
  - f. Application of testing agency labels and seals.
  - g. Notation of coordination requirements.
  - h. Availability and delivery time information.
- 3. Submit Product Data before or concurrent with Samples.
  - a. PDF electronic file.

#### D. Samples

- 1. Sample submittals shall be physically submitted as specified in Section in this spec section. Contractor shall enter submittal data information into the Project Website with a copy of the transmittal form(s) generated by the Project Website attached to the submittal. Examples of samples include, but are not limited to:
- 2. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
- 3. 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 applicable Specification Section.
- e. Specification paragraph number and generic name of each item.
- 4. For projects where electronic submittals are required, provide corresponding electronic submittal of Sample transmittal, digital image file illustrating Sample characteristics, and identification information for record.
- 5. 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.
- 6. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
  - a. Number of Samples: Submit one full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect, through Owner's Representative will return submittal with options selected.
- 7. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
  - a. Number of Samples: Submit three sets of Samples. Architect and Owner's Representative will retain two Sample sets; remainder will be returned. Mark up and retain one returned Sample set as a project record sample.
    - 1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
    - 2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least Three sets of paired units that show approximate limits of variations.
      - a) Product finishes and color selection samples.
      - b) Product finishes and color verification samples.
      - c) Finish/color boards.
      - d) Physical samples of materials.

E. Administrative Submittals

- 1. All correspondence and Preconstruction submittals shall be submitted to the Project Website. Examples of administrative submittals include, but are not limited to:
  - a. Digging permits and notices for excavation.
  - b. List of Contractor personnel accessing the Project Website.



- c. List of contact personnel.
- d. Notices for roadway interruption, work outside regular hours, and utility cutovers.
- e. Requests for Information (RFI).
- f. Construction Schedules, Project Schedules and associated reports and updates.
- g. Each schedule submittal specified in Specification Section 01320 – CONSTRUCTION PROGRESS DOCUMENTATION shall be submitted as a native backed-up file [.mpp or .mpx (Microsoft Project) or .xls (Microsoft Excel)] of the scheduling program being used. The schedule will also be posted as a PDF file in the format specified in Specification Section 01320, Paragraph 1.4.
- h. Submittal Register: Use the submittal register data provided by the Architect. Contractor shall input data for dates as specified and upon acceptance of the register, load the register up to the Project Website and update as required by the Contract documents.
- i. Plans for safety, demolition, environmental protection, and similar activities.
- j. Quality Control Plan(s), Testing Plan and Log, Quality Control Reports, Production Reports, Quality Control Specialist Reports, Preparatory Phase Checklist, Initial Phase Checklist, Field Test reports, Summary reports, Rework Items List, etc.
- k. Meeting minutes for quality control meetings, progress meetings, pre-installation meetings, etc.
- l. Any general correspondence submitted.

F. Compliance Submittals

- 1. Test report, certificate, and manufacture field report submittals shall be submitted to the Project Website as PDF attachments. Examples of compliance submittals include, but are not limited to:
  - a. Field test reports.
  - b. Quality Control certifications.
  - c. Manufacturers documentation and certifications for quality of products and materials provided.

G. Record and Closeout Submittals

- 1. Operation and maintenance data and closeout submittals shall be submitted to the Project Website as PDF documents during the approval and review stage as specified, with actual set of documents submitted for final. Examples of record submittals include, but are not limited to:
  - a. Operation and Maintenance Manuals: Final documents shall be submitted as specified.
  - b. As-built Drawings: Final documents shall be submitted as specified.
  - c. Extra Materials, Spare Stock, etc.: Submittal forms shall indicate when actual materials are submitted.

H. Exceptions

1. Documents with legal consequences, contract modifications, contract claims, security implications, and those required by other agencies may require an additional submittal as original hard copy with original signatures and seals. Hard copies of these documents shall be submitted as specified or as directed by the Architect.
- I. Application for Payment and Schedule of Values: Comply with requirements specified in Division 01 Section "Applications for Payment."
- J. Test and Inspection Reports and Schedule of Tests and Inspections Submittals: Comply with requirements specified in Division 01 Section "Quality Requirements."
- K. Maintenance Data: Comply with requirements specified in Division 01 Section "Operation and Maintenance Data."
- L. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.
- M. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on AWS forms. Include names of firms and personnel certified.
- N. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
- O. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
- P. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
- Q. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
- R. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
- S. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.

- T. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
  - 1. Name of evaluation organization.
  - 2. Date of evaluation.
  - 3. Time period when report is in effect.
  - 4. Product and manufacturers' names.
  - 5. Description of product.
  - 6. Test procedures and results.
  - 7. Limitations of use.
- U. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
- V. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
- W. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
- X. Design Data: Prepare and submit 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.

## 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 and Owner's Representative.
- 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.

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PRJ 203 Woodside School  
PRJ 204 Middle School

The City School District of Peekskill  
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SED 66-15-00-01-0-007-014  
SED 66-15-00-01-0-008-017  
SED 66-15-00-01-0-014-005

### 3.2 ARCHITECT'S AND OWNER'S REPRESENTATIVE / ACTION

- A. General: Architect and Owner's Representative will not review submittals that do not bear Contractor's approval stamp and will return them without action.
- B. Action Submittals: Architect and Owner's Representative will review each submittal, make marks to indicate corrections or modifications required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken, as follows:
  - 1. Approved: Fabrication/installation may be undertaken. Approval does not authorized changes to the Contract Sum or Contract Time.
  - 2. Approved as Corrected: Fabrication/installation may be undertaken. Approval does not authorized changes to the Contract Sum or Contract Time.
  - 3. Revise and Resubmit: Fabrication and/or installation MAY NOT be undertaken. In resubmitting, limit corrections to items marked.
  - 4. Rejected: Fabrication and/or installation MAY NOT be undertaken. In resubmitting, limit corrections to items marked.
- C. Informational Submittals: Architect and Owner's Representative will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect and Owner's Representative will forward each submittal to appropriate party.
- D. Partial submittals are not acceptable, will be considered nonresponsive, 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

# Submittal Cover Sheet



Project:

APN:

Contractor:

Street Address:

City/State:

Contractor Phone:

Contractor Fax:

Contractor Project No:

Date Of Submittal:

Subcontractor:

Submittal Description:

Substitution: **YES / NO**

## REFERENCE

Resubmittal: **YES / NO**

Specification Section:

Contract Drawing(s)

Sheet No.

Revision No.:

Date

Samples:

Manufacturer:

Address:

## CONTRACTORS STAMP:

## ARCHITECT'S USE ONLY

☐ **Approved**

Fabrication/ installation may be undertaken. Approval does not authorize changes to the Contract Sum or Contract time

☐ **Approved as Corrected**

☐ **Revise and Resubmit**

Fabrication and/or installations MAY NOT be undertaken. In resubmitting limit corrections to items marked.

☐ **Reject / Resubmit as Specified**

☐ **No Action Required**

☐ **Submittal Not Requested / Returned Without Review**

Approval is only for general conformance with the design concept of the Project and the information given in the Contract Documents. Contractor is responsible for dimensions to be confirmed and correlated at the job site; information that pertains solely to the fabrication process or to the means and methods of construction; coordination of the work of all trades; coordination of the work in a safe manner. This approval does not modify Contractor's duty to comply with the Contract Documents.

**HAMLIN DESIGN GROUP**

**BY:**

**DATE:**

Comments:

# Transfer Documents

Date:

To:

From:

Project:

---

Hamlin Design Group Architects (HDG) grants permission to use these files contingent upon compliance with the following provisions:

1. As author of the drawings, we retain all common law, statutory law, and other rights, including copyrights.
2. No other design professional or entity may be allowed use of these files.
3. We make no warranties, either expressed or implied, as to the fitness or applicability of these files for any particular purpose. We will not be held responsible for the accuracy or correctness of any documents produced using the information contained in these files.
4. Transfer of these files does not constitute their sale.
5. If these terms are acceptable, please sign and fax a return copy to Hamlin Design Group Architects.
6. HDG will furnish the following electronic files under this agreement:

In consideration of the above agreement, a service fee of \$100.00 per file / drawing shall be remitted to HDG.

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Printed Name & Title: \_\_\_\_\_

\_\_\_\_\_

Contractor Name: \_\_\_\_\_

Hamlin Design Group Representative: \_\_\_\_\_

## SECTION 014000 - QUALITY REQUIREMENTS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
  - 1. Specific quality-assurance and -control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
  - 2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
  - 3. Requirements for Contractor to provide quality-assurance and -control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.
  - 4. Specific test and inspection requirements are not specified in this Section.

#### 1.3 DEFINITIONS

- A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
- B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Architect.
- C. Mockups: Full-size physical assemblies that are constructed on-site. Mockups are constructed to verify selections made under Sample submittals; to demonstrate aesthetic effects and, where indicated, qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified



installation tolerances. Mockups are not Samples. Unless otherwise indicated, approved mockups establish the standard by which the Work will be judged.

1. Laboratory Mockups: Full-size physical assemblies constructed at testing facility to verify performance characteristics.
  2. Integrated Exterior Mockups: Mockups of the exterior envelope erected separately from the building but on Project site, consisting of multiple products, assemblies, and subassemblies.
- D. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria.
- E. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.
- F. Source Quality-Control Testing: Tests and inspections that are performed at the source, e.g., plant, mill, factory, or shop.
- G. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- H. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.
- I. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).
- J. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

#### 1.4 CONFLICTING REQUIREMENTS

- A. Referenced Standards: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Architect for a decision before proceeding.
- B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as

appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

## 1.5 SUBMITTALS

- A. Qualification Data: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.
- B. Schedule of Tests and Inspections: Prepare in tabular form and include the following:
  - 1. Specification Section number and title.
  - 2. Entity responsible for performing tests and inspections.
  - 3. Description of test and inspection.
  - 4. Identification of applicable standards.
  - 5. Identification of test and inspection methods.
  - 6. Number of tests and inspections required.
  - 7. Time schedule or time span for tests and inspections.
  - 8. Requirements for obtaining samples.
  - 9. Unique characteristics of each quality-control service.

## 1.6 REPORTS AND DOCUMENTS

- A. Tests and Inspection Reports: Prepare and submit certified written reports that include the following:
  - 1. Date of issue.
  - 2. Project title and number.
  - 3. Name, address, and telephone number of testing agency.
  - 4. Dates and locations of samples and tests or inspections.
  - 5. Names of individuals making tests and inspections.
  - 6. Description of the Work and test and inspection method.
  - 7. Identification of product and Specification Section.
  - 8. Complete test or inspection data.
  - 9. Test and inspection results and an interpretation of test results.
  - 10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
  - 11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
  - 12. Name and signature of laboratory inspector.
  - 13. Recommendations on retesting and reinspecting.
- B. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

## 1.7 QUALITY ASSURANCE

- A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
- B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- D. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar in material, design, and extent to those indicated for this Project.
- F. Specialists: Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
  - 1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.
- G. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 329 and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.
  - 1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
  - 2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.
- H. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- I. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

- J. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:
1. Contractor responsibilities include the following:
    - a. Provide test specimens representative of proposed products and construction.
    - b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
    - c. Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.
    - d. Build site-assembled test assemblies and mockups using installers who will perform same tasks for Project.
    - e. Build laboratory mockups at testing facility using personnel, products, and methods of construction indicated for the completed Work.
    - f. When testing is complete, remove test specimens, assemblies, and mockups do not reuse products on Project.
  2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.
- K. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
1. Build mockups in location and of size indicated or, if not indicated, as directed by Architect.
  2. Notify Architect 7 days in advance of dates and times when mockups will be constructed.
  3. Employ supervisory personnel who will oversee mockup construction. Employ workers that will be employed during the construction at Project.
  4. Demonstrate the proposed range of aesthetic effects and workmanship.
  5. Obtain Architect's approval of mockups before starting work, fabrication, or construction.
    - a. Allow seven days for initial review and each re-review of each mockup.
  6. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
  7. Demolish and remove mockups when directed unless otherwise indicated.
- L. Integrated Exterior Mockups: Construct integrated exterior mockup according to approved Shop Drawings. Coordinate installation of exterior envelope materials and products for which mockups are required in individual Specification Sections, along with supporting materials.

## 1.8 QUALITY CONTROL

- A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.
1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.

2. Payment for these services will be made from testing and inspecting allowances, as authorized by Change Orders.
  3. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor and the Contract Sum will be adjusted by Change Order.
- B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities required to verify that the Work complies with requirements, whether specified or not.
1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
  2. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
    - a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.
  3. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
  4. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
  5. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
  6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- C. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Section 013300 "Submittal Procedures."
- D. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.
- E. Testing Agency Responsibilities: Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
1. Notify Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
  2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
  3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
  4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
  5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
  6. Do not perform any duties of Contractor.

- F. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
1. Access to the Work.
  2. Incidental labor and facilities necessary to facilitate tests and inspections.
  3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
  4. Facilities for storage and field curing of test samples.
  5. Delivery of samples to testing agencies.
  6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
  7. Security and protection for samples and for testing and inspecting equipment at Project site.
- G. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
1. Schedule times for tests, inspections, obtaining samples, and similar activities.
- H. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents. Coordinate and submit concurrently with Contractor's construction schedule. Update as the Work progresses.
1. Distribution: Distribute schedule to Owner and Architect testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

## 1.9 SPECIAL TESTS AND INSPECTIONS

- A. Special Tests and Inspections: Owner will engage a qualified testing agency and special inspector to conduct special tests and inspections as required by authorities having jurisdiction, as indicated in individual Specification Sections and as follows:
1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviews the completeness and adequacy of those procedures to perform the Work.
  2. Notifying Architect and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
  3. Submitting a certified written report of each test, inspection, and similar quality-control service to Architect, with copy to Contractor and to authorities having jurisdiction.
  4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
  5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
  6. Retesting and reinspecting corrected work.

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SED 66-15-00-01-0-007-014  
SED 66-15-00-01-0-008-017  
SED 66-15-00-01-0-014-005

## PART 2 - PRODUCTS (Not Used)

## PART 3 - EXECUTION

### 3.1 TEST AND INSPECTION LOG

- A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:
  - 1. Date test or inspection was conducted.
  - 2. Description of the Work tested or inspected.
  - 3. Date test or inspection results were transmitted to Architect.
  - 4. Identification of testing agency or special inspector conducting test or inspection.
- B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Architect's reference during normal working hours.

### 3.2 REPAIR AND PROTECTION

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
  - 1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Section 017300 "Execution."
- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 014000



## SECTION 014200 - REFERENCES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 DEFINITIONS

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

#### 1.3 INDUSTRY STANDARDS

- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if

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bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

- B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.
- C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
  - 1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

#### 1.4 ABBREVIATIONS AND ACRONYMS

- A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Gale's "Encyclopedia of Associations: National Organizations of the U.S." or in Columbia Books' "National Trade & Professional Associations of the United States."
- B. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.
  - 1. AABC - Associated Air Balance Council; [www.aabc.com](http://www.aabc.com).
  - 2. AAMA - American Architectural Manufacturers Association; [www.aamanet.org](http://www.aamanet.org).
  - 3. AAPFCO - Association of American Plant Food Control Officials; [www.aapfco.org](http://www.aapfco.org).
  - 4. AASHTO - American Association of State Highway and Transportation Officials; [www.transportation.org](http://www.transportation.org).
  - 5. AATCC - American Association of Textile Chemists and Colorists; [www.aatcc.org](http://www.aatcc.org).
  - 6. ABMA - American Bearing Manufacturers Association; [www.americanbearings.org](http://www.americanbearings.org).
  - 7. ACI - American Concrete Institute; (Formerly: ACI International); [www.concrete.org](http://www.concrete.org).
  - 8. ACPA - American Concrete Pipe Association; [www.concrete-pipe.org](http://www.concrete-pipe.org).
  - 9. AEIC - Association of Edison Illuminating Companies, Inc. (The); [www.aeic.org](http://www.aeic.org).
  - 10. AF&PA - American Forest & Paper Association; [www.afandpa.org](http://www.afandpa.org).
  - 11. AGA - American Gas Association; [www.aga.org](http://www.aga.org).
  - 12. AHAM - Association of Home Appliance Manufacturers; [www.aham.org](http://www.aham.org).
  - 13. AHRI - Air-Conditioning, Heating, and Refrigeration Institute (The); [www.ahrinet.org](http://www.ahrinet.org).
  - 14. AI - Asphalt Institute; [www.asphaltinstitute.org](http://www.asphaltinstitute.org).
  - 15. AIA - American Institute of Architects (The); [www.aia.org](http://www.aia.org).
  - 16. AISC - American Institute of Steel Construction; [www.aisc.org](http://www.aisc.org).
  - 17. AISI - American Iron and Steel Institute; [www.steel.org](http://www.steel.org).
  - 18. AITC - American Institute of Timber Construction; [www.aitc-glulam.org](http://www.aitc-glulam.org).
  - 19. AMCA - Air Movement and Control Association International, Inc.; [www.amca.org](http://www.amca.org).
  - 20. ANSI - American National Standards Institute; [www.ansi.org](http://www.ansi.org).
  - 21. AOSA - Association of Official Seed Analysts, Inc.; [www.aosaseed.com](http://www.aosaseed.com).
  - 22. APA - APA - The Engineered Wood Association; [www.apawood.org](http://www.apawood.org).
  - 23. APA - Architectural Precast Association; [www.archprecast.org](http://www.archprecast.org).

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24. API - American Petroleum Institute; [www.api.org](http://www.api.org).
25. ARI - Air-Conditioning & Refrigeration Institute; (See AHRI).
26. ARI - American Refrigeration Institute; (See AHRI).
27. ARMA - Asphalt Roofing Manufacturers Association; [www.asphaltroofing.org](http://www.asphaltroofing.org).
28. ASCE - American Society of Civil Engineers; [www.asce.org](http://www.asce.org).
29. ASCE/SEI - American Society of Civil Engineers/Structural Engineering Institute; (See ASCE).
30. ASHRAE - American Society of Heating, Refrigerating and Air-Conditioning Engineers; [www.ashrae.org](http://www.ashrae.org).
31. ASME - ASME International; (American Society of Mechanical Engineers); [www.asme.org](http://www.asme.org).
32. ASSE - American Society of Safety Engineers (The); [www.asse.org](http://www.asse.org).
33. ASSE - American Society of Sanitary Engineering; [www.asse-plumbing.org](http://www.asse-plumbing.org).
34. ASTM - ASTM International; (American Society for Testing and Materials International); [www.astm.org](http://www.astm.org).
35. ATIS - Alliance for Telecommunications Industry Solutions; [www.atis.org](http://www.atis.org).
36. AWEA - American Wind Energy Association; [www.awea.org](http://www.awea.org).
37. AWI - Architectural Woodwork Institute; [www.awinet.org](http://www.awinet.org).
38. AWMAC - Architectural Woodwork Manufacturers Association of Canada; [www.awmac.com](http://www.awmac.com).
39. AWPA - American Wood Protection Association; (Formerly: American Wood-Preservers' Association); [www.awpa.com](http://www.awpa.com).
40. AWS - American Welding Society; [www.aws.org](http://www.aws.org).
41. AWWA - American Water Works Association; [www.awwa.org](http://www.awwa.org).
42. BHMA - Builders Hardware Manufacturers Association; [www.buildershardware.com](http://www.buildershardware.com).
43. BIA - Brick Industry Association (The); [www.gobrick.com](http://www.gobrick.com).
44. BICSI - BICSI, Inc.; [www.bicsi.org](http://www.bicsi.org).
45. BIFMA - BIFMA International; (Business and Institutional Furniture Manufacturer's Association); [www.bifma.com](http://www.bifma.com).
46. BISSC - Baking Industry Sanitation Standards Committee; [www.bissc.org](http://www.bissc.org).
47. BWF - Badminton World Federation; (Formerly: International Badminton Federation); [www.bwfbadminton.org](http://www.bwfbadminton.org).
48. CDA - Copper Development Association; [www.copper.org](http://www.copper.org).
49. CEA - Canadian Electricity Association; [www.electricity.ca](http://www.electricity.ca).
50. CEA - Consumer Electronics Association; [www.ce.org](http://www.ce.org).
51. CFFA - Chemical Fabrics & Film Association, Inc.; [www.chemicalfabricsandfilm.com](http://www.chemicalfabricsandfilm.com).
52. CFSEI - Cold-Formed Steel Engineers Institute; [www.cfsei.org](http://www.cfsei.org).
53. CGA - Compressed Gas Association; [www.cganet.com](http://www.cganet.com).
54. CIMA - Cellulose Insulation Manufacturers Association; [www.cellulose.org](http://www.cellulose.org).
55. CISCA - Ceilings & Interior Systems Construction Association; [www.cisca.org](http://www.cisca.org).
56. CISPI - Cast Iron Soil Pipe Institute; [www.cispi.org](http://www.cispi.org).
57. CLFMI - Chain Link Fence Manufacturers Institute; [www.chainlinkinfo.org](http://www.chainlinkinfo.org).
58. CPA - Composite Panel Association; [www.pbmdf.com](http://www.pbmdf.com).
59. CRI - Carpet and Rug Institute (The); [www.carpet-rug.org](http://www.carpet-rug.org).
60. CRRC - Cool Roof Rating Council; [www.coolroofs.org](http://www.coolroofs.org).
61. CRSI - Concrete Reinforcing Steel Institute; [www.crsi.org](http://www.crsi.org).
62. CSA - Canadian Standards Association; [www.csa.ca](http://www.csa.ca).

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63. CSA - CSA International; (Formerly: IAS - International Approval Services); [www.csa-international.org](http://www.csa-international.org).
64. CSI - Construction Specifications Institute (The); [www.csinet.org](http://www.csinet.org).
65. CSSB - Cedar Shake & Shingle Bureau; [www.cedarbureau.org](http://www.cedarbureau.org).
66. CTI - Cooling Technology Institute; (Formerly: Cooling Tower Institute); [www.cti.org](http://www.cti.org).
67. CWC - Composite Wood Council; (See CPA).
68. DASMA - Door and Access Systems Manufacturers Association; [www.dasma.com](http://www.dasma.com).
69. DHI - Door and Hardware Institute; [www.dhi.org](http://www.dhi.org).
70. ECA - Electronic Components Association; (See ECIA).
71. ECAMA - Electronic Components Assemblies & Materials Association; (See ECIA).
72. ECIA ? Electronic Components Industry Association; [www.eciaonline.org](http://www.eciaonline.org)
73. EIA - Electronic Industries Alliance; (See TIA).
74. EIMA - EIFS Industry Members Association; [www.eima.com](http://www.eima.com).
75. EJMA - Expansion Joint Manufacturers Association, Inc.; [www.ejma.org](http://www.ejma.org).
76. ESD - ESD Association; (Electrostatic Discharge Association); [www.esda.org](http://www.esda.org).
77. ESTA - Entertainment Services and Technology Association; (See PLASA).
78. EVO - Efficiency Valuation Organization; [www.evo-world.org](http://www.evo-world.org).
79. FIBA - F?d?ration Internationale de Basketball; (The International Basketball Federation); [www.fiba.com](http://www.fiba.com).
80. FIVB - F?d?ration Internationale de Volleyball; (The International Volleyball Federation); [www.fivb.org](http://www.fivb.org).
81. FM Approvals - FM Approvals LLC; [www.fmglobal.com](http://www.fmglobal.com).
82. FM Global - FM Global; (Formerly: FMG - FM Global); [www.fmglobal.com](http://www.fmglobal.com).
83. FRSA - Florida Roofing, Sheet Metal & Air Conditioning Contractors Association, Inc.; [www.floridarooft.com](http://www.floridarooft.com).
84. FSA - Fluid Sealing Association; [www.fluidsealing.com](http://www.fluidsealing.com).
85. FSC - Forest Stewardship Council U.S.; [www.fscus.org](http://www.fscus.org).
86. GA - Gypsum Association; [www.gypsum.org](http://www.gypsum.org).
87. GANA - Glass Association of North America; [www.glasswebsite.com](http://www.glasswebsite.com).
88. GS - Green Seal; [www.greenseal.org](http://www.greenseal.org).
89. HI - Hydraulic Institute; [www.pumps.org](http://www.pumps.org).
90. HI/GAMA - Hydronics Institute/Gas Appliance Manufacturers Association; (See AHRI).
91. HMMA - Hollow Metal Manufacturers Association; (See NAAMM).
92. HPVA - Hardwood Plywood & Veneer Association; [www.hpva.org](http://www.hpva.org).
93. HPW - H. P. White Laboratory, Inc.; [www.hpwhite.com](http://www.hpwhite.com).
94. IAPSC - International Association of Professional Security Consultants; [www.iapsc.org](http://www.iapsc.org).
95. IAS - International Accreditation Service; [www.iasonline.org](http://www.iasonline.org).
96. IAS - International Approval Services; (See CSA).
97. ICBO - International Conference of Building Officials; (See ICC).
98. ICC - International Code Council; [www.iccsafe.org](http://www.iccsafe.org).
99. ICEA - Insulated Cable Engineers Association, Inc.; [www.icea.net](http://www.icea.net).
100. ICPA - International Cast Polymer Alliance; [www.icpa-hq.org](http://www.icpa-hq.org).
101. ICRI - International Concrete Repair Institute, Inc.; [www.icri.org](http://www.icri.org).
102. IEC - International Electrotechnical Commission; [www.iec.ch](http://www.iec.ch).
103. IEEE - Institute of Electrical and Electronics Engineers, Inc. (The); [www.ieee.org](http://www.ieee.org).
104. IES - Illuminating Engineering Society; (Formerly: Illuminating Engineering Society of North America); [www.ies.org](http://www.ies.org).
105. IESNA - Illuminating Engineering Society of North America; (See IES).

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106. IEST - Institute of Environmental Sciences and Technology; [www.iest.org](http://www.iest.org).
107. IGMA - Insulating Glass Manufacturers Alliance; [www.igmaonline.org](http://www.igmaonline.org).
108. IGSHPA - International Ground Source Heat Pump Association; [www.igshpa.okstate.edu](http://www.igshpa.okstate.edu).
109. ILI - Indiana Limestone Institute of America, Inc.; [www.iliai.com](http://www.iliai.com).
110. Intertek - Intertek Group; (Formerly: ETL SEMCO; Intertek Testing Service NA); [www.intertek.com](http://www.intertek.com).
111. ISA - International Society of Automation (The); (Formerly: Instrumentation, Systems, and Automation Society); [www.isa.org](http://www.isa.org).
112. ISAS - Instrumentation, Systems, and Automation Society (The); (See ISA).
113. ISFA - International Surface Fabricators Association; (Formerly: International Solid Surface Fabricators Association); [www.isfanow.org](http://www.isfanow.org).
114. ISO - International Organization for Standardization; [www.iso.org](http://www.iso.org).
115. ISSFA - International Solid Surface Fabricators Association; (See ISFA).
116. ITU - International Telecommunication Union; [www.itu.int/home](http://www.itu.int/home).
117. KCMA - Kitchen Cabinet Manufacturers Association; [www.kcma.org](http://www.kcma.org).
118. LMA - Laminating Materials Association; (See CPA).
119. LPI - Lightning Protection Institute; [www.lightning.org](http://www.lightning.org).
120. MBMA - Metal Building Manufacturers Association; [www.mbma.com](http://www.mbma.com).
121. MCA - Metal Construction Association; [www.metalconstruction.org](http://www.metalconstruction.org).
122. MFMA - Maple Flooring Manufacturers Association, Inc.; [www.maplefloor.org](http://www.maplefloor.org).
123. MFMA - Metal Framing Manufacturers Association, Inc.; [www.metalframingmfg.org](http://www.metalframingmfg.org).
124. MHIA - Material Handling Industry of America; [www.mhia.org](http://www.mhia.org).
125. MIA - Marble Institute of America; [www.marble-institute.com](http://www.marble-institute.com).
126. MMPA - Moulding & Millwork Producers Association; (Formerly: Wood Moulding & Millwork Producers Association); [www.wmmpa.com](http://www.wmmpa.com).
127. MPI - Master Painters Institute; [www.paintinfo.com](http://www.paintinfo.com).
128. MSS - Manufacturers Standardization Society of The Valve and Fittings Industry Inc.; [www.mss-hq.org](http://www.mss-hq.org).
129. NAAMM - National Association of Architectural Metal Manufacturers; [www.naamm.org](http://www.naamm.org).
130. NACE - NACE International; (National Association of Corrosion Engineers International); [www.nace.org](http://www.nace.org).
131. NADCA - National Air Duct Cleaners Association; [www.nadca.com](http://www.nadca.com).
132. NAIMA - North American Insulation Manufacturers Association; [www.naima.org](http://www.naima.org).
133. NBGQA - National Building Granite Quarries Association, Inc.; [www.nbgqa.com](http://www.nbgqa.com).
134. NCAA - National Collegiate Athletic Association (The); [www.ncaa.org](http://www.ncaa.org).
135. NCMA - National Concrete Masonry Association; [www.ncma.org](http://www.ncma.org).
136. NEBB - National Environmental Balancing Bureau; [www.nebb.org](http://www.nebb.org).
137. NECA - National Electrical Contractors Association; [www.necanet.org](http://www.necanet.org).
138. NeLMA - Northeastern Lumber Manufacturers Association; [www.nelma.org](http://www.nelma.org).
139. NEMA - National Electrical Manufacturers Association; [www.nema.org](http://www.nema.org).
140. NETA - InterNational Electrical Testing Association; [www.netaworld.org](http://www.netaworld.org).
141. NFHS - National Federation of State High School Associations; [www.nfhs.org](http://www.nfhs.org).
142. NFPA - NFPA; (National Fire Protection Association); [www.nfpa.org](http://www.nfpa.org).
143. NFPA - NFPA International; (See NFPA).
144. NFRC - National Fenestration Rating Council; [www.nfrc.org](http://www.nfrc.org).
145. NHLA - National Hardwood Lumber Association; [www.nhla.com](http://www.nhla.com).

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146. NLGA - National Lumber Grades Authority; [www.nlga.org](http://www.nlga.org).
147. NOFMA - National Oak Flooring Manufacturers Association; (See NWFA).
148. NOMMA - National Ornamental & Miscellaneous Metals Association; [www.nomma.org](http://www.nomma.org).
149. NRCA - National Roofing Contractors Association; [www.nrca.net](http://www.nrca.net).
150. NRMCA - National Ready Mixed Concrete Association; [www.nrmca.org](http://www.nrmca.org).
151. NSF - NSF International; (National Sanitation Foundation International); [www.nsf.org](http://www.nsf.org).
152. NSPE - National Society of Professional Engineers; [www.nspe.org](http://www.nspe.org).
153. NSSGA - National Stone, Sand & Gravel Association; [www.nssga.org](http://www.nssga.org).
154. NTMA - National Terrazzo & Mosaic Association, Inc. (The); [www.ntma.com](http://www.ntma.com).
155. NWFA - National Wood Flooring Association; [www.nwfa.org](http://www.nwfa.org).
156. PCI - Precast/Prestressed Concrete Institute; [www.pci.org](http://www.pci.org).
157. PDI - Plumbing & Drainage Institute; [www.pdionline.org](http://www.pdionline.org).
158. PLASA - PLASA; (Formerly: ESTA - Entertainment Services and Technology Association); [www.plasa.org](http://www.plasa.org).
159. RCSC - Research Council on Structural Connections; [www.boltcouncil.org](http://www.boltcouncil.org).
160. RFCI - Resilient Floor Covering Institute; [www.rfci.com](http://www.rfci.com).
161. RIS - Redwood Inspection Service; [www.redwoodinspection.com](http://www.redwoodinspection.com).
162. SAE - SAE International; (Society of Automotive Engineers); [www.sae.org](http://www.sae.org).
163. SCTE - Society of Cable Telecommunications Engineers; [www.scte.org](http://www.scte.org).
164. SDI - Steel Deck Institute; [www.sdi.org](http://www.sdi.org).
165. SDI - Steel Door Institute; [www.steeldoor.org](http://www.steeldoor.org).
166. SEFA - Scientific Equipment and Furniture Association; [www.sefalabs.com](http://www.sefalabs.com).
167. SEI/ASCE - Structural Engineering Institute/American Society of Civil Engineers; (See ASCE).
168. SIA - Security Industry Association; [www.siaonline.org](http://www.siaonline.org).
169. SJI - Steel Joist Institute; [www.steeljoist.org](http://www.steeljoist.org).
170. SMA - Screen Manufacturers Association; [www.smainfo.org](http://www.smainfo.org).
171. SMACNA - Sheet Metal and Air Conditioning Contractors' National Association; [www.smacna.org](http://www.smacna.org).
172. SMPTE - Society of Motion Picture and Television Engineers; [www.smpte.org](http://www.smpte.org).
173. SPFA - Spray Polyurethane Foam Alliance; [www.sprayfoam.org](http://www.sprayfoam.org).
174. SPIB - Southern Pine Inspection Bureau; [www.spib.org](http://www.spib.org).
175. SPRI - Single Ply Roofing Industry; [www.spri.org](http://www.spri.org).
176. SRCC - Solar Rating and Certification Corporation; [www.solar-rating.org](http://www.solar-rating.org).
177. SSINA - Specialty Steel Industry of North America; [www.ssina.com](http://www.ssina.com).
178. SSPC - SSPC: The Society for Protective Coatings; [www.sspc.org](http://www.sspc.org).
179. STI - Steel Tank Institute; [www.steeltank.com](http://www.steeltank.com).
180. SWI - Steel Window Institute; [www.steelwindows.com](http://www.steelwindows.com).
181. SWPA - Submersible Wastewater Pump Association; [www.swpa.org](http://www.swpa.org).
182. TCA - Tilt-Up Concrete Association; [www.tilt-up.org](http://www.tilt-up.org).
183. TCNA - Tile Council of North America, Inc.; (Formerly: Tile Council of America); [www.tileusa.com](http://www.tileusa.com).
184. TEMA - Tubular Exchanger Manufacturers Association, Inc.; [www.tema.org](http://www.tema.org).
185. TIA - Telecommunications Industry Association; (Formerly: TIA/EIA - Telecommunications Industry Association/Electronic Industries Alliance); [www.tiaonline.org](http://www.tiaonline.org).
186. TIA/EIA - Telecommunications Industry Association/Electronic Industries Alliance; (See TIA).



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187. TMS - The Masonry Society; [www.masonrysociety.org](http://www.masonrysociety.org).
188. TPI - Truss Plate Institute; [www.tpinst.org](http://www.tpinst.org).
189. TPI - Turfgrass Producers International; [www.turfgrasssod.org](http://www.turfgrasssod.org).
190. TRI - Tile Roofing Institute; (Formerly: National Tile Roofing Manufacturing Association); [www.tilerroofing.org](http://www.tilerroofing.org).
191. UBC - Uniform Building Code; (See ICC).
192. UL - Underwriters Laboratories Inc.; [www.ul.com](http://www.ul.com).
193. UNI - Uni-Bell PVC Pipe Association; [www.uni-bell.org](http://www.uni-bell.org).
194. USAV - USA Volleyball; [www.usavolleyball.org](http://www.usavolleyball.org).
195. USGBC - U.S. Green Building Council; [www.usgbc.org](http://www.usgbc.org).
196. USITT - United States Institute for Theatre Technology, Inc.; [www.usitt.org](http://www.usitt.org).
197. WASTEC - Waste Equipment Technology Association; [www.wastec.org](http://www.wastec.org).
198. WCLIB - West Coast Lumber Inspection Bureau; [www.wclib.org](http://www.wclib.org).
199. WCMA - Window Covering Manufacturers Association; [www.wcmanet.org](http://www.wcmanet.org).
200. WDMA - Window & Door Manufacturers Association; [www.wdma.com](http://www.wdma.com).
201. WI - Woodwork Institute; (Formerly: WIC - Woodwork Institute of California); [www.wicnet.org](http://www.wicnet.org).
202. WMMPA - Wood Moulding & Millwork Producers Association; (See MMPA).
203. WSRCA - Western States Roofing Contractors Association; [www.wsrca.com](http://www.wsrca.com).
204. WPA - Western Wood Products Association; [www.wwpa.org](http://www.wwpa.org).

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

1. DIN - Deutsches Institut f?r Normung e.V.; [www.din.de](http://www.din.de).
2. IAPMO - International Association of Plumbing and Mechanical Officials; [www.iapmo.org](http://www.iapmo.org).
3. ICC - International Code Council; [www.iccsafe.org](http://www.iccsafe.org).
4. ICC-ES - ICC Evaluation Service, LLC; [www.icc-es.org](http://www.icc-es.org).

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

1. COE - Army Corps of Engineers; [www.usace.army.mil](http://www.usace.army.mil).
2. CPSC - Consumer Product Safety Commission; [www.cpsc.gov](http://www.cpsc.gov).
3. DOC - Department of Commerce; National Institute of Standards and Technology; [www.nist.gov](http://www.nist.gov).
4. DOD - Department of Defense; <http://dodssp.daps.dla.mil>.
5. DOE - Department of Energy; [www.energy.gov](http://www.energy.gov).
6. EPA - Environmental Protection Agency; [www.epa.gov](http://www.epa.gov).
7. FAA - Federal Aviation Administration; [www.faa.gov](http://www.faa.gov).
8. FG - Federal Government Publications; [www.gpo.gov](http://www.gpo.gov).
9. GSA - General Services Administration; [www.gsa.gov](http://www.gsa.gov).
10. HUD - Department of Housing and Urban Development; [www.hud.gov](http://www.hud.gov).
11. LBL - Lawrence Berkeley National Laboratory; Environmental Energy Technologies Division; <http://eetd.lbl.gov>.
12. OSHA - Occupational Safety & Health Administration; [www.osha.gov](http://www.osha.gov).
13. SD - Department of State; [www.state.gov](http://www.state.gov).



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14. TRB - Transportation Research Board; National Cooperative Highway Research Program; [www.trb.org](http://www.trb.org).
  15. USDA - Department of Agriculture; Agriculture Research Service; U.S. Salinity Laboratory; [www.ars.usda.gov](http://www.ars.usda.gov).
  16. USDA - Department of Agriculture; Rural Utilities Service; [www.usda.gov](http://www.usda.gov).
  17. USDJ - Department of Justice; Office of Justice Programs; National Institute of Justice; [www.ojp.usdoj.gov](http://www.ojp.usdoj.gov).
  18. USP - U.S. Pharmacopeia; [www.usp.org](http://www.usp.org).
  19. USPS - United States Postal Service; [www.usps.com](http://www.usps.com).
- E. Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.
1. CFR - Code of Federal Regulations; Available from Government Printing Office; [www.gpo.gov/fdsys](http://www.gpo.gov/fdsys).
  2. DOD - Department of Defense; Military Specifications and Standards; Available from Department of Defense Single Stock Point; <http://dodssp.daps.dla.mil>.
  3. DSCC - Defense Supply Center Columbus; (See FS).
  4. FED-STD - Federal Standard; (See FS).
  5. FS - Federal Specification; Available from Department of Defense Single Stock Point; <http://dodssp.daps.dla.mil>.
    - a. Available from Defense Standardization Program; [www.dsp.dla.mil](http://www.dsp.dla.mil).
    - b. Available from General Services Administration; [www.gsa.gov](http://www.gsa.gov).
    - c. Available from National Institute of Building Sciences/Whole Building Design Guide; [www.wbdg.org/ccb](http://www.wbdg.org/ccb).
  6. MILSPEC - Military Specification and Standards; (See DOD).
  7. USAB - United States Access Board; [www.access-board.gov](http://www.access-board.gov).
  8. USATBCB - U.S. Architectural & Transportation Barriers Compliance Board; (See USAB).
- F. State Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.
1. CBHF; State of California; Department of Consumer Affairs; Bureau of Electronic Appliance and Repair, Home Furnishings and Thermal Insulation; [www.bearhfti.ca.gov](http://www.bearhfti.ca.gov).
  2. CCR; California Code of Regulations; Office of Administrative Law; California Title 24 Energy Code; [www.calregs.com](http://www.calregs.com).
  3. CDHS; California Department of Health Services; (See CDPH).
  4. CDPH; California Department of Public Health; Indoor Air Quality Program; [www.cal-iaq.org](http://www.cal-iaq.org).
  5. CPUC; California Public Utilities Commission; [www.cpuc.ca.gov](http://www.cpuc.ca.gov).
  6. SCAQMD; South Coast Air Quality Management District; [www.aqmd.gov](http://www.aqmd.gov).
  7. TFS; Texas Forest Service; Forest Resource Development and Sustainable Forestry; <http://txforests.service.tamu.edu>.

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PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 014200

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## SECTION 014533 - SPECIAL INSPECTIONS AND STRUCTURAL TESTING

### PART 1 - GENERAL

#### 1.1 GENERAL REQUIREMENTS

- A. Special Inspections and Structural Testing shall be in accordance with Chapter 17 of the New York State Uniform Code (NYSUC).

#### 1.2 DEFINITIONS

- A. Registered Design Professional: Licensed Professional Engineer or Registered Architect whose seal appears in the Construction Drawings. Unless noted otherwise, references to the Registered Design Professional in this section refer to the Structural Engineer for building design.
- B. Code Enforcement Official: Officer or other designated authority charged with administration and enforcement of the NYSUC. For projects under jurisdiction of New York State agencies such as the Department of Education (SED), State University Construction Fund (SUCF), Office of General Services (OGS), and Dormitory Authority (DASNY), the Code Enforcement Official is an official from agency having jurisdiction.
- C. Special Inspector (SI): Professional Engineer licensed in the State of New York [or other state], acting on behalf of the Owner, that implements the Special Inspection Program for the project.
- D. Testing/Inspecting Agency: Agent retained by Special Inspector or Owner and coordinated by Special Inspector to perform some inspection services on behalf of Special Inspector.
- E. Testing/Inspecting Agency (Agent 1): Professional Engineer licensed in the State of New York [or other state] that is qualified to perform structural inspections. The Special Inspector shall have a minimum of three years of experience performing inspections for similar projects.
- F. Testing/Inspecting Agency (Agents 3 or 4): Agency or firm qualified to inspect certain structural elements and perform field and laboratory tests to determine the characteristics and quality of building materials and workmanship.
- G. Statement of Special Inspections: Documents prepared by the Registered Design Professional and filed with and approved by the Code Enforcement Official as a condition of obtaining a building permit. These documents include this specification and the Schedule of Special Inspections.
- H. Schedule of Special Inspections: An itemized list of inspections, verifications, and tests (including frequency) required for the project and individuals, agencies, or firms who will be retained to perform these services. The Schedule of Special Inspections is located in Drawing S.001.
- I. Inspect and Inspection: Visual observation of materials, equipment, or construction work as defined in the Statement of Special Inspections, to determine that the work is in substantial conformance with the requirements of the Contract Documents.
- J. Continuous Special Inspection: Full-time observation of work by the Special Inspector or Testing Agency while the work is being performed.

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- K. Periodic Special Inspections: Part-time or intermittent observation of work by the Special Inspector or Testing Agency for work that has been or is being performed and at completion of work.

### 1.3 QUALIFICATIONS

- A. Special Inspector and Testing/Inspecting Agency shall be accepted by the Registered Design Professional (RDP) and the Code Enforcement Official.
- B. Special Inspections shall be performed by agents who have relevant experience for each category of inspections indicated in the drawings.
- C. Minimum qualifications of inspection agents are indicated in the drawings.

### 1.4 SUBMITTALS

- A. Special Inspector and Testing/Inspecting Agency shall submit to the Registered Design Professional and Code Enforcement Official for review, a copy of their qualifications including names and qualifications of each inspector and technician who will be performing inspections or tests.
- B. Special Inspector and Testing/Inspecting Agency shall disclose past or current business relationship or potential conflict of interest with Contractor or Subcontractors whose work will be inspected or tested.

### 1.5 PAYMENT

- A. Owner will engage and pay for services of Special Inspector and Testing/Inspecting Agency.
- B. If materials requiring Special Inspections are fabricated in a plant not within 200 miles of project site, Contractor shall be responsible for travel expenses of Special Inspector or Testing/Inspecting Agency.
- C. Contractor shall be responsible for cost of retesting or reinspection of work failing to comply with requirements of Contract Documents.

### 1.6 OWNER RESPONSIBILITIES

- A. Owner will provide Special Inspector with complete set of Contract Documents sealed by the Registered Design Professional and approved by the Code Enforcement Official.

### 1.7 CONTRACTOR RESPONSIBILITIES

- A. Contractor shall cooperate with Special Inspector and his agents so Special Inspections and testing may be performed without hindrance.
- B. As indicated in the Schedule of Special Inspections, Contractor shall notify Special Inspector or Testing/Inspecting Agency at least 48 hours in advance of a required inspection or test.
- C. Contractor shall provide incidental labor and facilities to provide access to work to be inspected or tested, to obtain and handle samples at site or at source of products to be tested, to facilitate tests and inspections, and for storing and curing of test samples.
- D. If Special Inspections or testing require the use of Contractor's scaffolding to access work areas, Contractor shall provide competent person to perform daily evaluation of scaffolding to verify it is safe to use. Contractor shall notify Special Inspector and Testing Agent of this

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review before each use. Contractor is responsible for safe assembly and stability of scaffolding.

- E. Contractor shall keep latest set of Construction Drawings, field sketches, accepted shop drawings, and specifications at project site for field use by Inspectors and Testing Technicians.
- F. Contractor shall perform remedial work if required and sign nonconformance reports stating remedial work has been completed. Contractor shall submit signed reports to Special Inspector as work proceeds.
- G. The Special Inspection program shall not relieve Contractor of obligation to perform work in accordance with requirements of Contract Documents or from implementing an effective Quality Control program.
- H. Contractor shall be solely responsible for construction site safety.

#### 1.8 SPECIAL INSPECTOR RESPONSIBILITIES

- A. Special Inspector shall hold a Special Inspections preconstruction meeting at least 7 days prior to initial planned date for start of construction. Attendees shall include Contractors, Owner's Representative, Testing Agency, Special Inspector, and Registered Design Professionals for Structural Engineering and for Architecture. Discussions shall include the following:
  - 1. Review of specifications and Schedule of Special Inspections for work requiring Special Inspections.
  - 2. Responsibilities of Contractors, Owner, Testing Agency, Special Inspector, and Registered Design Professional.
  - 3. Notification and reporting procedures.
- B. Special Inspector shall record and distribute minutes from the Special Inspection Preconstruction meeting.
- C. Special Inspector shall review inspection and material testing reports and coordinate the services of the Testing/Inspecting Agencies as follows:
  - 1. Verify inspections have been performed in accordance with the Schedule of Special Inspections.
  - 2. Verify reports are being distributed to the Contractor, Owner, Architect, Code Enforcement Official, and Registered Design Professional (RDP) for Structural Engineering.
  - 3. Verify discrepancies have been recorded and are being tracked.
- D. Special Inspector shall make site visits to inspect work as designated in the Statement of Special Inspections. Discrepancies will be brought to the attention of the Contractor and RDP.
- E. Special Inspector shall keep records of inspections and tests.
- F. Special Inspector shall review Certificates of Compliance for conformance with the standards specified in the Contract Documents. Discrepancies will be brought to the attention of the Contractor and RDP.
- G. Special Inspector shall submit a final report of Special Inspections in accordance with Section 1.3 of this specification.

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## 1.9 LIMITS ON AUTHORITY

- A. Special Inspector or Testing/Inspecting Agency shall not release, revoke, alter, or enlarge on requirements of Contract Documents.
- B. Special Inspector or Testing/Inspecting Agency shall not have control over Contractor's means and methods of construction.
- C. Special Inspector or Testing/Inspecting Agency shall not be responsible for construction site safety.
- D. Special Inspector or Testing/Inspecting Agency shall not have authority to stop work.

## PART 2 - INSPECTIONS AND TESTING

- 2.1 Perform inspections in accordance with the schedule on the Drawings.

## PART 3 - DOCUMENTATION

### 3.1 RECORDS AND REPORTS

- A. Prepare detailed reports of each test or inspection. Include the following general information:
  - 1. Project name and number.
  - 2. Date of test or inspection.
  - 3. Name of Testing Agency or Inspecting Agency.
  - 4. Name of technician or inspector.
  - 5. Weather conditions.
  - 6. Locations and elevations of specific areas tested or inspected referenced to grid lines.
  - 7. Description of test or inspection.
  - 8. Reference to applicable ASTM standard.
  - 9. Summary of observations, results, and recommendations.
  - 10. Description of areas or materials requiring retesting or reinspection.

### 3.2 COMMUNICATION

- A. Testing/Inspecting Agency shall immediately notify Contractor, Special Inspector, and Registered Design Professional by telephone, fax, or e-mail of test results failing to comply with requirements of Contract Documents.
- B. Special Inspector shall immediately notify Contractor of work found to be in nonconformance with Contract Documents during inspections. If nonconforming work is not corrected while Special Inspector is on-site, Special Inspector shall notify Registered Design Professional within 24 hours (one business day) and issue an inspection report noting the nonconformance.
- C. Special Inspector and each Testing/Inspecting Agent shall use a log to record and track nonconforming work during construction. Non-Conformance log shall include the following information:

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1. Description of non-conformance.
  2. Date of non-conformance.
  3. Description of RDP response if received.
  4. Status of nonconformance: 'Open' or 'Closed.'
- D. Updated log shall be attached to each inspection report. Special Inspector or Testing/Inspecting Agent may use Non-Conformance Log form provided at end of this section or other similar form.
- E. If non-conforming work is not corrected at time of substantial completion of structure or other appropriate time, Special Inspector shall notify Code Enforcement Official.

### 3.3 DISTRIBUTION OF REPORTS

- A. Testing/Inspecting Agency shall submit reports to Special Inspector and Registered Design Professional within 7 days of inspection or test. Legible handwritten reports may be submitted if final typed copies are not available.
- B. Special Inspector shall distribute reports to the Contractor, Owner, Architect, Code Enforcement Official, and RDP for Structural Engineering within 7 days of inspections. Legible handwritten reports may be submitted if final typed copies are not available.
- C. If requested by the Code Enforcement Official, Special Inspector shall submit interim reports that include inspections and tests performed since beginning of construction or since previous interim report. Interim reports shall be addressed to the Code Enforcement Official with copies sent to the Registered Design Professionals (Structural Engineer and Architect) and Contractor. Interim reports shall be signed by Agent performing inspections.

### 3.4 FINAL REPORT OF SPECIAL INSPECTIONS

- A. At completion of work, each Testing/Inspecting Agency shall submit Agent's Final Report of Special Inspections to Special Inspector stating work was completed in substantial conformance with Contract Documents and appropriate inspections and tests were performed. Testing/Inspecting Agency may use Agent's Final Report of Special Inspections form provided at end of this section or other similar form.
- B. At completion of work, Special Inspector shall compile a Final Report of Special Inspections including each Agent's Final Report of Special Inspections. The Final Report of Special Inspections shall state required inspections have been performed and itemize nonconforming work not corrected or resolved as required by the NYSUC. Interim reports from all Agents will not be included unless specifically requested by the Owner or Code Enforcement Official. The Final Report shall be stamped by a New York State Professional Engineer.
- C. Special Inspector may use Final Report of Special Inspections form provided at end of this section or other similar form based on CASE Form 102-2001.
- D. Special Inspector shall submit Final Report of Special Inspections to Registered Design Professional and Code Enforcement Official prior to issuance of a Certificate of Use and Occupancy.



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PROJECT:

PROJECT NUMBER:

## AGENT X NON-CONFORMANCE LOG

Non-Conformance Item No. (See Note 1)	Special Inspection Report No. Reference/Date	Summary of Non-Conformance	Date of RDP Response Received	SI Reinspection Required	Date Contractor Verification Received (See Note 1)	Status (See Note 2)
NC 1						
NC 2						
NC 3						
NC 4						
NC 5						
NC 6						

1. New items are in **bold**. For each non-conformance item above, the General Contractor or Subcontractor must sign and submit the Contractor Verification statement located in the RDP Response Report.

2. Non-conformance items remain "OPEN" until the Contractor Verification have been received. When the signed verifications have been received by the RDP, the item will be "CLOSED".

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## Testing/Inspection Agent's Final Report of Special Inspections

	Design Professional Seal or Certification
Project Name: _____	Inspection Agent: _____
Location: _____	Inspection Agent Project No.: _____
Owner: _____	Special Inspector: _____
Owner Address: _____	Structural RDP: _____
Hamlin Design Group Project No: 201, 202, 203, 204	

To the best of my information, knowledge, and belief, the Special Inspections and testing required for this project and designated for this Agent in the **Statement of Special Inspections** (which includes Specification Section **014533** and the Schedule of Special Inspections) have been performed and discovered discrepancies have been reported and resolved except for the following:

Comments:

**[Attach continuation sheets if required to complete description of uncorrected discrepancies.]**

Respectfully submitted,  
Agent of the Special Inspector  
**[TITLE]**

\_\_\_\_\_  
(Type or print name)

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

\_\_\_\_\_  
Address

\_\_\_\_\_  
City, State, Zip



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## Final Report of Special Inspections

Project Name: \_\_\_\_\_ Professional Seal  
Special Inspector: \_\_\_\_\_  
Location: \_\_\_\_\_ Special Inspector Project No.: \_\_\_\_\_  
Owner: \_\_\_\_\_ Architect of Record: \_\_\_\_\_  
Owner Address: \_\_\_\_\_ Structural RDP: \_\_\_\_\_  
Hamlin Design Group Project No: 201, 202, 203, 204

To the best of my information, knowledge, and belief, Special Inspections required for this project, as indicated in the **Statement of Special Inspections**, (which includes Specification Section **014533** and the Schedule of Special Inspections) have been performed and discovered discrepancies have been reported and resolved except for the following:

Comments:

**[Attach continuation sheets if required to complete description of uncorrected discrepancies.]**

Interim reports submitted prior to this Final Report form a basis for and are to be considered an integral part of this Final Report. Upon request, the interim Testing and Special Inspection reports can be provided. Agent's Final Reports of Special Inspections are attached and are also a part of this Final Report.

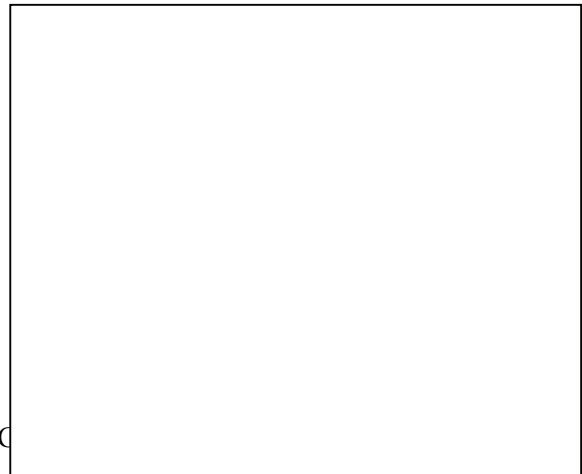
Respectfully submitted,  
Special Inspector  
[TITLE]

\_\_\_\_\_  
(Type or print name)

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

SPECIAL INSPECTIONS AND STRUCTURAL TESTING



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## Contractor's Statement of Responsibility

Project Name: \_\_\_\_\_ Contractor: \_\_\_\_\_  
Location: \_\_\_\_\_ Contractor Project No.: \_\_\_\_\_  
Owner: \_\_\_\_\_ Architect of Record: \_\_\_\_\_  
Owner Address: \_\_\_\_\_ Structural RDP: \_\_\_\_\_  
Hamlin Design Group Project No: 201, 202, 203, 204

As the Contractor responsible for the construction of \_\_\_\_\_, I reviewed and understand the special requirements for the seismic/wind-force-resisting systems listed in the **Statement of Special Inspections** (which includes Specification Section **014533** and the Schedule of Special Inspections). I verify the following:

1. Procedures for exercising control within my organization, the method and frequency of reporting, and the distribution of reports have been reviewed and are understood.
2. Control will be exercised to obtain conformance with the Construction Documents approved by the Code Enforcement Official.
3. Each person exercising such control and his position in the organization have been identified. Their qualifications have been reviewed and accepted by the RDP.

Comments [**Attach continuation sheets if required**]:

Respectfully submitted,

\_\_\_\_\_  
(Type or print name)

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

\_\_\_\_\_  
Address

\_\_\_\_\_  
City, State, Zip

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END OF SECTION

014990 - HAZARDOUS MATERIALS

A. ASBESTOS

1. If potential asbestos-containing building materials (ACBM) are encountered in this project, the work in the area in question shall immediately be stopped and the Architect notified.
2. The Owner will arrange for a certified asbestos inspector to inspect the area. If ACBM is present, a certified management planner will identify the appropriate response to be performed by the contractor and/or a qualified Abatement Contractor.
3. All work shall be performed in accordance with the current applicable Federal, State and Local regulations including but not limited to EPA, OSHA, SED, Industrial Code Rule 56, and as specified.
4. A qualified Abatement Contractor is required to perform asbestos related work. If work is specified for any contractor, a licensed and qualified Asbestos Abatement subcontractor shall be employed.
5. The provisions of spec section 011000, paragraph 1.10, Delays and Extension of Time, shall be applicable to delays with respect to NEW abatement work.

B. LEAD

1. All painted surfaces, including but not limited to, walls, ceilings, floors and structure, both interior and exterior surfaces, shall be considered to have the presence of lead in the highest levels as indicated on the report contained herein. Contractor's plan and site assessment shall be submitted within 30 days from notice to proceed so not to delay construction start date. Testing, if required, shall be completed off hours when school is in session, coordinate with CM.
2. Renovation and reconstruction work that will disturb lead containing building materials must comply with applicable regulations/guidelines below and in section 028313.
3. Each contractor and all workers under his jurisdiction (including subcontractors) shall comply with OSHA Regulations 29 CFR 1926.62 "Lead in Construction Standard" which includes safety training and education. This regulation applies to any construction work where an employee may be occupationally exposed to lead. Compliance with OSHA includes written programs, medical monitoring, exposure assessment, and work practices that, at a minimum, require the use of plastic drop cloth, wet methods for disturbance and clean up and the use of HEPA filtered vacuum cleaner.
4. Workers performing reconstruction work that may disturb surfaces containing lead are not required to be EPA trained and certified except as required in item 5. It is the responsibility of each contractor to keep apprised of EPA requirements for worker certification if and when they change.
5. All contractors performing work that disturbs lead-based paint in target housing and child-occupied facilities (built before 1978) must be EPA certified. A child-occupied facility is a building that regularly houses children under the age of 6 years.
  - a. Submit certification of all workers prior to performing any work that disturbs any lead containing materials.
6. The applicable regulations/guidelines for handling and management of lead-based paint include but are not limited to the following:
  - a. "Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing", Department of Housing and Urban Development (HUD). These HUD guidelines are designed for residences and childcare facilities, where children under the age of six are likely to reside or be placed. These work practice requirements apply to school construction projects.

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- b. Occupational Safety and Health (OSHA) Standards and Regulations contained in 29CFR 1926.62, Lead-in-Construction Standard. These standards apply to all construction work where a contractor's employee may be occupationally exposed to lead.
  - c. U.S. Environmental Protection Agency's (USEPA) Resource Conservation and Recovery Act (RCRA), 40 CFR Part 260. These standards shall apply to the disposal of demolition debris waste generated during the course of construction/renovation.
- 7. Although the Owner may elect to undertake clearance testing prior to re-occupancy by the school, contractors disturbing lead containing building materials must provide Cleaning and Clearance in accordance with HUD "Guidelines" criteria (Chapters 14 & 15) prior to occupancy of any renovated space by the Owner.
  - a. HUD "Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing", may be obtained electronically at the following:
  - b. <http://portal.hud.gov/hudportal/HUD?src=/programoffices/healthyhomes/lbp/hudguidelines>
  - c. Or 1-800-245-2691.

END OF SECTION 014990



## 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 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.
- B. Related Requirements:
  - 1. Section 011000 "Summary" for work restrictions and limitations on utility interruptions.
  - 2. Division 1 Section "Submittal Procedures" for procedures for submitting copies of implementation and termination schedule and utility reports.
  - 3. Division 1 Section "Execution" for progress cleaning requirements.

#### 1.3 DEFINITIONS

- A. Permanent Enclosure: As determined by Architect, permanent or temporary roofing or wall is complete, insulated, and weathertight; and all openings are closed with permanent construction or substantial temporary closures.

#### 1.4 USE CHARGES

- A. General: Installation and removal of and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities to use temporary services and facilities without cost, including, but not limited to, Owner's construction forces, Architect, occupants of Project, testing agencies, and authorities having jurisdiction.
- B. Sewer Service: Owner will pay sewer-service use charges for sewer usage by all entities for construction operations.
- C. Water Service: Owner will pay water-service use charges for water used by all entities for construction operations.
- D. Electric Power Service: Owner will play electric-power-service use charges for electricity used by all entities for construction operations.

- E. Water and Sewer Service from Existing System: Water from Owner's existing water system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.
- F. Electric Power Service from Existing System: Electric power from Owner's existing system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

## 1.5 INFORMATIONAL SUBMITTALS

- A. Site Plan: Show temporary facilities, utility hookups, staging areas, and parking areas for construction personnel.
- B. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.
- C. Moisture-Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage.
  - 1. Describe delivery, handling, and storage provisions for materials subject to water absorption or water damage.
  - 2. Indicate procedures for discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and replacing water-damaged Work.
- D. Dust- and HVAC-Control Plan: Submit coordination drawing and narrative that indicates the dust- and HVAC-control measures proposed for use, proposed locations, and proposed time frame for their operation. Identify further options if proposed measures are later determined to be inadequate. Include the following:
  - 1. Locations of dust-control partitions at each phase of work.
  - 2. HVAC system isolation schematic drawing.
  - 3. Location of proposed air-filtration system discharge.
  - 4. Waste handling procedures.
  - 5. Other dust-control measures.

## 1.6 QUALITY ASSURANCE

- A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
- B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.
- C. Accessible Temporary Egress: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1.

## 1.7 PROJECT CONDITIONS

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

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. Chain-Link Fencing: Minimum 2-inch (50-mm), 0.148-inch- (3.8-mm-) thick, galvanized-steel, chain-link fabric fencing; minimum 6 feet (1.8 m) high with galvanized-steel pipe posts; minimum 2-3/8-inch- (60-mm-) OD line posts and 2-7/8-inch- (73-mm-) OD corner and pull posts with 1-5/8-inch- (42-mm-) OD top rails
- B. Portable Chain-Link Fencing: Minimum 2-inch (50-mm), 0.148-inch- (3.8-mm-) thick, galvanized-steel, chain-link fabric fencing; minimum 6 feet (1.8 m) high with galvanized-steel pipe posts; minimum 2-3/8-inch- (60-mm-) OD line posts and 2-7/8-inch- (73-mm-) OD corner and pull posts, with 1-5/8-inch- (42-mm-) OD top and bottom rails. Provide concrete or galvanized-steel bases for supporting posts.
- C. Lumber and Plywood: Comply with requirements in Division 6 Section "Rough Carpentry."
- D. Insulation: Unfaced mineral-fiber blanket, manufactured from glass, slag wool, or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively.
- E. Paint: Comply with requirements in Division 9 painting Sections

### 2.2 NEW YORK STATE EDUCATION DEPARTMENT 155.5 REGULATIONS:

- A. General Safety and Security Standards for Construction Projects:
  - 1. ALL construction materials shall be stored in a safe and secure manner.
  - 2. Fences around construction supplies or debris shall be maintained.
  - 3. Gates shall always be locked unless a worker is in attendance to prevent unauthorized entry.
  - 4. During exterior renovation work, overhead protection shall be provided for any sidewalks or areas immediately beneath the work site or such areas shall be fenced off and provided with warning signs to prevent entry.
  - 5. Workers shall be required to wear photo-identification badges at all times for identification and security purposes while working at occupied sites. Contractor MUST provide them for all workers under his direction and control, including sub-contractors.
- B. Separation of Construction Areas from Occupied Spaces:
  - 1. Construction areas, which are under the control of a Contractor and therefore not occupied by the District staff or students, shall be separated from occupied areas.

Provisions shall be made to prevent the passage of dust and contaminants into occupied parts of the building. Periodic inspection and repairs of the containment barriers must be made to prevent exposure to dust or contaminants. Gypsum board must be used in exit ways or other areas that require fire rated separation. Heavy-duty plastic sheeting may be used only for a vapor, fine dust or air infiltration barrier, and shall not be used to separate occupied spaces from construction areas.

2. A specific stairwell and/or elevator should be assigned for construction worker use during work hours. In general, workers may not use corridors, stairs, or elevators designated for students or school staff.
3. All occupied parts of the building affected by renovation activity shall be cleaned at the close of each workday. School buildings occupied during a construction project shall maintain required health, safety and educational capabilities at all times that classes are in session.
4. Large amounts of debris must be removed by using enclosed chutes or a similar sealed system. There shall be no movement of debris through hall of occupied spaces of the building. No material shall be dropped or thrown outside the walls of the building.
5. Exterior work such as roofing, flashing, siding, or soffit work may be performed on occupied buildings provided proper variances are in place as required, and complete isolation of ventilation systems and at windows is provided. Care must be taken to schedule work so that classes are not disrupted by noise or visual distraction.
6. Occupied CLASSROOM spaces shall be protected against visual distraction due to construction activities.
7. All Contractors shall maintain proper operation of fire extinguishers, fire alarm, and smoke/fire detection systems and all items shall be maintained throughout the project.

C. Fire and Hazard Prevention:

1. All holes in floors and walls shall be sealed with a fire-resistant material.
2. Proper operation of fire extinguishers, fire alarm, and smoke/fire detection systems shall be maintained throughout the project.
3. During construction daily inspections of district occupied areas shall be conducted by school district personnel to assure that construction materials, equipment or debris does not block fire exits or emergency egress windows.
4. Areas of buildings under construction that are to remain occupied shall maintain a certificate of occupancy.

D. Construction Noise: Construction and maintenance operation shall not produce noise in excess of 60 dba in occupied spaces or shall be scheduled for times when the building or affected spaces are not occupied or acoustical abatement measures shall be taken.

E. Construction Ventilation of All Occupied Spaces:

1. See drawing for a plan detailing how adequate ventilation shall be maintained during construction. The plan shall indicate ductwork which must be rerouted, disconnected, or capped in order to prevent contaminants from the construction area from entering the occupied areas of the building. The plan shall also indicate how required ventilation to occupied spaces affected by construction will be maintained during the project. In the absence of any drawing, General Contractor shall provide temporary ventilation equivalent to 15 CFM per occupant and sufficient outdoor air to comply with applicable codes.

2. The Contractor shall be responsible for the control of chemical fumes, gases, and other contaminants produced by welding, gasoline or diesel engines, roofing, paving, painting, etc. to ensure they do not enter occupied portions of the building or air intakes.
3. The Contractor shall be responsible to ensure that activities and materials “which result in off-gassing” of volatile organic compounds such as glues, paints, furniture, carpeting, wall covering, drapery, etc. are scheduled, cured or ventilated in accordance with manufacturers recommendations before a space can be occupied.

F. Hazardous Materials:

1. Asbestos:
  - a. Asbestos Industrial Code Rule 56: large and small asbestos abatement projects as defined by 12NYCRR56 shall not be performed while the building is occupied except as determined by AICR56 with proper isolation.
  - b. Labor Rule 56 and AHERA both must be followed for asbestos projects in schools. Whenever air clearance is required by Labor Rule 56 or AHERA, TEM must be used for the final air clearance test.
  - c. Labor Rule 56 addresses final air clearance for all asbestos work including minor glove bag projects when there is a breach in containment. AHERA requires that TEM be used for final air clearance for work in schools, but does not speak to minor project air clearance.
  - d. NOTE: It is NYS State Education Department’s interpretation that the term “building” as referenced in this section, means a wing or major section of a building that can be completely isolated from the rest of the building with a sealed non-combustible construction. The isolated portion of the building must contain exits, which do not pass through the occupied portion, and ventilation systems must be physically separated and sealed at the isolation barrier.
2. Exterior Work:
  - a. Exterior work such as roofing, flashing, siding, or soffit work may be performed on occupied buildings provided proper variances are in place as required and complete isolation of ventilation systems and at windows is provided. Care must be taken to schedule work so that classes are not disrupted by noise or visual distraction.
3. Lead:
  - a. Surfaces that will be disturbed by reconstruction must have a determination made as to the presence of lead. Projects which disturb surfaces that contain lead shall have in the specifications a plan prepared by a certified Lead Risk Assessor or Supervisor which details provisions for occupant protection, worksite preparation, work methods, cleaning and clearance testing which are in general accordance with the HUD Guidelines.

G. SCHOOL DISTRICT REGULATIONS:

1. Control Of Persons, Traffic On Site:
  - a. It shall be noted and stressed that the contractor's installations may be made during a period when school is in session. Schedule and conduct operations so as to cause the least amount of inconvenience to normal school operations. Provide the necessary safeguards to protect those children and others at the site.

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- b. Contractor shall control action of all persons on the site working on this project and shall enforce all regulations. Do not interfere with operations and traffic pattern of school buses and other normal traffic on site.
  - c. Workers will use only designated parking areas and work and staging areas.
  - d. Workers will not enter building except to perform work in the building.
  - e. All personnel on the site are subject to the same general regulations as school staff and the contractor shall enforce such regulations.
  - f. Contractor's personnel shall limit their access to the building to areas in which work is being done.
  - g. Contractors SHALL NOT use tools, or other equipment, ladders, or appliances, etc., owned by the School District or occupants.
  - h. No smoking and/or drinking alcoholic beverages is allowed on public school property, including construction areas.
2. Field Test Procedures:
- a. Contractors, their agents, sub-contractors etc. shall do no "testing" of any equipment or systems while school is in session.
  - b. Contractor shall notify Owner and Architect prior to any test.

## 2.3 EQUIPMENT

- A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

## PART 3 - EXECUTION

### 3.1 INSTALLATION, GENERAL

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

### 3.2 TEMPORARY UTILITY INSTALLATION

- A. General: Install temporary service or connect to existing service.
  - 1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
- B. Sanitary Facilities: The Contractor shall provide for the workmen a suitable toilet and wash facilities in a proper location, until the building is completed, when it will be removed and the site cleaned, graded and restored. Comply with authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.

- C. Ventilation and Humidity Control: Provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.
- D. 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.

### 3.3 SUPPORT FACILITIES INSTALLATION

- A. General: Comply with the following:
  - 1. Maintain support facilities until Substantial Completion. Remove support facilities after Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.
- B. Traffic Controls: Comply with requirements of authorities having jurisdiction.
  - 1. Protect existing site improvements to remain including curbs, pavement, and utilities.
  - 2. Maintain access for fire-fighting equipment and access to fire hydrants.
- C. Prime Contractor shall provide "site signage" as required. Signage shall be installed at driveway intersections, etc., where shown on the drawings and shall be maintained during the life of the project
- D. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with Division 1 Section "Execution Requirements" for progress cleaning requirements.
- E. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.
  - 1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.
- F. Existing Stair Usage: Use of Owner's existing stairs will be permitted, as long as stairs are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore stairs to condition existing before initial use.
  - 1. Provide protective coverings, barriers, devices, signs, or other procedures to protect stairs and to maintain means of egress. If, despite such protection, stairs become damaged, restore damaged areas so no evidence remains of correction work.

### 3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.



- B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
  - 1. Comply with work restrictions specified in Division 01 Section "Summary."
- C. Tree and Plant Protection: Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.
- D. Security Enclosure and Lockup: Install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each work day.
- E. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
- F. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.
- G. Temporary Partitions: Provide floor-to-ceiling dustproof partitions to limit dust and dirt migration and to separate areas occupied by Owner from fumes and noise.
  - 1. Construct dustproof partitions with gypsum wallboard with joints taped on occupied side, and fire-retardant-treated plywood on construction operations side.
  - 2. Where fire-resistance-rated temporary partitions are indicated or are required by authorities having jurisdiction, construct partitions according to the rated assemblies.
  - 3. Insulate partitions to control noise transmission to occupied areas.
  - 4. Seal joints and perimeter. Equip partitions with gasketed dustproof doors and security locks where openings are required.
  - 5. Protect air-handling equipment.
  - 6. Provide walk-off mats at each entrance through temporary partition.
- H. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire-prevention program.
  - 1. Prohibit smoking in construction areas.
  - 2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
  - 3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
  - 4. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.

### 3.5 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B. Maintenance: Maintain facilities in good operating condition until removal.
  - 1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
- C. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
  - 1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
  - 2. Remove temporary paving not intended for or acceptable for integration into permanent paving. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.
  - 3. At Substantial Completion, clean and renovate permanent facilities used during construction period. Comply with final cleaning requirements specified in Division 1 Section "Closeout Procedures."

END OF SECTION

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## SECTION 015010 – PROJECT IDENTIFICATION SIGN

### 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. Project Sign: The contractor shall furnish, install, maintain, and remove at the end of construction one project sign, constructed near the designated access road to the site.

#### 1.3 REFERENCES:

- A. Lumber Standard: American Softwood Lumber Standard; U.S. Department of Commerce Product Standards PS 20.
- B. Softwood Plywood Standard: Construction and Industrial; U.S. Department of Commerce Standard PS 1.

#### 1.4 SUBMITTALS:

- A. Product Data: Submit manufacturer's color data, and technical information including paint label analysis and application instructions for each material proposed for use.
  - 1. Manufacturer's complete range of available colors for each finish paint product to be applied.
- B. Provide layout drawing for approval for a 6'-3"x 3'-2" sign.

#### 1.5 QUALITY ASSURANCE:

- A. Painter Qualifications: Lettering and striping shall be applied by a professional sign painter.

## PART 2 - PRODUCTS

### 2.1 MATERIALS:

- A. Framing and Posts: Standard grade Douglas Fir, Hem-Fir, White Pine or Southern Yellow Pine, S4S, Preservative Treated.
- B. Plywood: Overlaid Plywood, MDO B-B EXT-APA
- C. Alkyd Painting System:
  - 1. Primer:
    - a. (S-W) A-100 Alkyd Primer (Y24)
    - b. (B-M) Moorcraft Super Spec Alkyd Exterior Primer (176)
  - 2. Finish / Background:
    - a. (S-W) SuperPaint High Gloss (A85)
    - b. (B-M) D.T.M. Acrylic Gloss Enamel (M28)

### 2.2 FABRICATION AND PAINTING:

- A. Fasten framing members together with 16D common nails.
- B. Fasten plywood to framing members with 8D finishing nails spaced 12 inches on center. Set nail heads and fill holes flush with plywood face with wood filler.
- C. Painting:
  - 1. Paint both sides and all edges of sign with 2 coats of primer and coat of background enamel.
  - 2. Paint lettering and striping with 2 coats of lettering enamel.
  - 3. Apply paint at manufacturer's recommended spreading rate in even coats of uniform thickness without brush marks, runs, or lap marks. Do not apply succeeding coat until previous coat has completely dried.
  - 4. Lettering and striping shall be uniform with sharp, neat profiles.

## PART 3 - EXECUTION.

### 3.1 INSTALLATION:

- A. Install sign within one week after work begins at the site. Set posts plumb, 4 feet into the ground. Compact backfill around posts.
- B. Fasten sign framing, in a level position, securely to posts with 16D common nails (minimum 3 per post).

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3.2 MAINTENANCE AND REMOVAL:

- A. Maintain the sign plumb and level for duration of the work.
- B. When directed, at completion of project, remove sign from property.

END OF SECTION

## 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 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. This section applies to all contractors.
- B. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.
- C. Related Requirements:
  - 1. Section 012500 "Substitution Procedures" for requests for substitutions.
  - 2. Section 014200 "References" for applicable industry standards for products specified.
  - 3. Division 1 Section "Closeout Procedures" for submitting warranties for Contract closeout.
  - 4. Division 2 through 34 Sections for specific requirements for warranties on products and installations specified to be warranted.

#### 1.3 DEFINITIONS

- A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
  - 1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature, that is current as of date of the Contract Documents.
  - 2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
  - 3. Comparable Product: Product that is demonstrated and approved through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.

- B. Basis-of-Design Product Specification: A specification in which a specific manufacturer's product is named and accompanied by the words "basis-of-design product," 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 / equal products of additional manufacturers named in the specification.

#### 1.4 VARIATIONS FROM SPECIFIED STANDARDS: (or EQUAL)

- A. Where some particular product or device is specified by brand name or manufacturer, it is to be considered standard and that if approved equal, items of other manufacturer than those mentioned may be used upon written approval of the Architect. In the specifications, many items are preceded or followed by the phrase "or approved equal" and many others are not. The absence of that phrase is not to be interpreted as in derogation of the provisions of this paragraph. See "Information for Bidders, EQUIVALENTS" for additional requirements prior to award of contracts.

#### 1.5 PRODUCT REQUIREMENTS

- A. At the end of the project all contractors must certify that all work of this contract has been fully completed in accordance with the plans and specifications for this contract and that all materials installed contain "NO" asbestos or lead. See form 017700F2 Asbestos Certification Form that is required to be signed and submitted with all other closeout documents.

#### 1.6 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. Form: Tabulate information for each product under the following column headings:
    - a. Specification Section number and title.
    - b. Generic name used in the Contract Documents.
    - c. Proprietary name, model number, and similar designations.
    - d. Manufacturer's name and address.
    - e. Supplier's name and address.
    - f. Installer's name and address.
    - g. Projected delivery date or time span of delivery period.
    - h. Identification of items that require early submittal approval for scheduled delivery date.
  - 3. Completed List: Within 45 days after date of commencement of the Work, submit 4 copies of completed product list. Include a written explanation for omissions of data and for variations from Contract requirements.



4. 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 attached form or form approved by Architect
  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.

4. If the approved product (substitution) results in additional cost to other contractors, a deduct change order will be issued to cover the cost of the work of the other contractors.
- C. Comparable Product / Equal 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 title
1. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within one week of receipt of a comparable / equal product request. Architect will notify Contractor of approval or rejection of proposed comparable / equal product request within 15 days of receipt of request, or 7 days of receipt of additional information or documentation, whichever is later.
- D. Basis-of-Design Product Specification Submittal: Comply with requirements in Division 1 Section "Submittal Procedures." Show compliance with requirements.

#### 1.7 QUALITY ASSURANCE

- A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.
1. Each Contractor is responsible for providing products and construction methods compatible with products and construction methods of other contractors.
  2. If a dispute arises over concurrently selectable but incompatible products, Architect will determine which products shall be used.

#### 1.8 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.
- B. Delivery and Handling:
1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
  2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
  3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
  4. Inspect products on delivery to determine compliance with the Contract Documents and to determine 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. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
6. Protect stored products from damage and liquids from freezing.
7. Delete subparagraph below if Owner provides own storage facilities.
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.

## 1.9 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: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
  2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.
- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.
  1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
  2. Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
  3. See other Sections for specific content requirements and particular requirements for submitting special warranties.
- C. Submittal Time: Comply with requirements in Section 017700 "Closeout Procedures."

## PART 2 - PRODUCTS

### 2.1 PRODUCT SELECTION PROCEDURES

- A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.
  1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.

2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
  3. Owner reserves the right to limit selection to products with warranties 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: For products specified by name and accompanied by the term "or equal," or "or approved equal," or "or approved," comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product.
- B. Product Selection Procedures:
1. Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
  2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
  3. Products:
    - a. Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements.
  4. Manufacturers:
    - a. Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements.
    - b. 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
  5. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.
- C. Visual Matching Specification: Where Specifications require "match Architect's sample", and/or drawing indicate "match to existing", provide a product that complies with requirements and matches Architect's sample or the existing product. Architect's decision will be final on whether a proposed product matches.

1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Section 012500 "Substitution Procedures" for proposal of product.

- D. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

## 2.2 PRODUCT SUBSTITUTIONS

- A. Timing: Architect will consider requests for substitution if received within 45 days after the Notice to Proceed (Letter of Intent). 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. Where some particular product or device is specified by brand name or manufacturer, it is to be considered standard and that if approved equal, items of other manufacturer than those mentioned may be used upon written approval of the Architect. In the specifications, many items are preceded or followed by the phrase "or approved equal" and many others are not. The absence of that phrase is not to be interpreted as in derogation of the provisions of this

Hamlin Design Group  
PRJ 201 Oakside Elementary  
PRJ 202 Uriah Hill School  
PRJ 203 Woodside School  
PRJ 204 Middle School

The City School District of Peekskill  
SED 66-15-00-01-0-005-020  
SED 66-15-00-01-0-007-014  
SED 66-15-00-01-0-008-017  
SED 66-15-00-01-0-014-005

paragraph. See “Information for Bidders, EQUIVALENTS” for additional requirements prior to award of contracts

- B. Conditions for Consideration: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with these requirements:
1. Evidence that the proposed product does not require 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

Project:	_____	Substitution Request Number:	_____
To:	_____	From:	_____
Re:	_____	Date:	_____
		A/E Project Number:	_____
		Contract For:	_____

Specification Title:	_____			Description:	_____
Section:	_____	Page:	_____	Article/Paragraph:	_____

Proposed Substitution: \_\_\_\_\_

Manufacturer:	_____	Address:	_____	Phone:	_____
Trade Name:	_____			Model No.	_____
Installer:	_____	Address:	_____	Phone:	_____
History:	_____				

Differences between proposed substitution and specified product: \_\_\_\_\_

☐ Point-by-point comparative data attached - REQUIRED BY A/E

Reason for not providing specified item: \_\_\_\_\_

Similar Installation:	_____	Architect:	_____
Project:	_____	Owner:	_____
Address:	_____	Date Installed:	_____

Proposed substitution affects other parts of Work: ☐ No ☐ Yes; explain \_\_\_\_\_

Savings to Owner for accepting substitution: \_\_\_\_\_ (\$ \_\_\_\_\_ )

Proposed substitution changes Contract Time: ☐ No ☐ Yes [Add] [Deduct] \_\_\_\_\_ days.

Supporting Data Attached: ☐ Drawings ☐ Product Data ☐ Sample ☐ Tests ☐ Reports ☐ \_\_\_\_\_



**SUBSTITUTION  
REQUEST  
(Continued)**

The Undersigned certifies:

- ☐ Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- ☐ Same warranty will be furnished for proposed substitution as for specified product.
- ☐ Same maintenance service and source of replacement parts, as applicable, is available.
- ☐ Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- ☐ Cost data as stated above is complete. Claims for additional costs related to accepted substitution which may subsequently become apparent are to be waived.
- ☐ Proposed substitution does not affect dimensions and functional clearances.
- ☐ Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.
- ☐ Coordination, installation, and changes in the Work as necessary for accepted substitution will be complete in all respects.

Submitted by:

Signed by:

Firm:

Address:

Telephone:

Attachments:

**A/E's REVIEW AND ACTION**

- ☐ Substitution approved - Make submittals in accordance with Specification Section 01330.
- ☐ Substitution approved as noted - Make submittals in accordance with Specification Section 01330.
- ☐ Substitution rejected - Use specified materials.
- ☐ Substitution Request received too late - Use specified materials.

Signed by:

Date:

Additional Comments: ☐ Contractor ☐ Subcontractor ☐ Supplier ☐ Manufacturer ☐ A/E ☐

## SECTION 017300 - EXECUTION

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:
  - 1. Construction layout.
  - 2. Field engineering and surveying.
  - 3. Installation of the Work.
  - 4. Cutting and patching.
  - 5. Coordination of Owner-installed products.
  - 6. Progress cleaning.
  - 7. Starting and adjusting.
  - 8. Protection of installed construction.
- B. Related Requirements:
  - 1. Section 011000 "Summary" for limits on use of Project site.
  - 2. Section 013300 "Submittal Procedures" for submitting surveys.
  - 3. Section 017700 "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.
  - 4. Section 024119 "Selective Demolition" for demolition and removal of selected portions of the building.

#### 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 construction to original conditions after installation of other work.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For land surveyor and professional engineer.
- B. Certificates: Submit certificate signed by land surveyor and professional engineer certifying that location and elevation of improvements comply with requirements.
- C. Cutting and Patching Plan: Submit plan describing procedures at least 10 days prior to the time cutting and patching will be performed. Include the following information:
  - 1. Extent: Describe reason for and extent of each occurrence of cutting and patching.
  - 2. Changes to In-Place Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building appearance and other significant visual elements.
  - 3. Products: List products to be used for patching and firms or entities that will perform patching work.
  - 4. Dates: Indicate when cutting and patching will be performed.
  - 5. Utilities and Mechanical and Electrical Systems: List services and systems that cutting and patching procedures will disturb or affect. List services and systems that will be relocated and those that will be temporarily out of service. Indicate length of time permanent services and systems will be disrupted.
    - a. Include description of provisions for temporary services and systems during interruption of permanent services and systems.
- D. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.
- E. Certified Surveys: Submit two copies signed by land surveyor and professional engineer.
- F. Final Property Survey: Submit 10 copies showing the Work performed and record survey data.

#### 1.5 QUALITY ASSURANCE

- A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.
- B. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.
  - 1. Structural Elements: When cutting and patching structural elements, notify Architect of locations and details of cutting and await directions from Architect before proceeding. Shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection

2. 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.
    - a. Primary operational systems and equipment.
    - b. Fire separation assemblies.
    - c. Air or smoke barriers.
    - d. Fire-suppression systems.
    - e. Mechanical systems piping and ducts.
    - f. Control systems.
    - g. Communication systems.
    - h. Fire-detection and -alarm systems.
    - i. Conveying systems.
    - j. Electrical wiring systems.
    - k. Operating systems of special construction.
  3. Other Construction Elements: Do not cut and patch other construction elements or 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. Other construction elements include but are not limited to the following:
    - a. Water, moisture, or vapor barriers.
    - b. Membranes and flashings.
    - c. Exterior wall construction.
    - d. Sprayed fire-resistive material.
    - e. Equipment supports.
    - f. Piping, ductwork, vessels, and equipment.
    - g. Noise- and vibration-control elements and systems.
  4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction 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.
- C. Cutting and Patching Conference: Before proceeding, meet at Project site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.
- D. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. General: Comply with requirements specified in other Sections.
  - 1. For projects requiring compliance with sustainable design and construction practices and procedures, use products for patching that comply with requirements Division 01
- B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
  - 1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Architect for the visual and functional performance of in-place materials.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities, mechanical and electrical systems, and other construction affecting the Work.
  - 1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; underground electrical services, and other utilities.
  - 2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.
- B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, 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. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
  - 2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
  - 3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
- C. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:

1. Description of the Work.
2. List of detrimental conditions, including substrates.
3. List of unacceptable installation tolerances.
4. Recommended corrections.

- D. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

### 3.2 PREPARATION

- A. Existing Utility Information: Furnish information to local utility and Owner that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.
- B. 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.
- C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Architect according to requirements in Section 013100 "Project Management and Coordination."

### 3.3 CONSTRUCTION LAYOUT

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect and Construction Manager promptly.
- B. General: Engage a land surveyor and professional engineer to lay out the Work using accepted surveying practices.
1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
  2. Establish limits on use of Project site.
  3. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
  4. Inform installers of lines and levels to which they must comply.
  5. Check the location, level and plumb, of every major element as the Work progresses.
  6. Notify Architect and Construction Manager when deviations from required lines and levels exceed allowable tolerances.

7. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.

- C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.
- D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.
- E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect and Construction Manager.

### 3.4 FIELD ENGINEERING

- A. Identification: Owner will identify existing benchmarks, control points, and property corners.
- B. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.
  - 1. Do not change or relocate existing benchmarks or control points without prior written approval of Architect or Construction Manager. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Architect and Construction Manager before proceeding.
  - 2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.
- C. Benchmarks: Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.
  - 1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
  - 2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
  - 3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.
- D. Certified Survey: On completion of foundation walls, major site improvements, and other work requiring field-engineering services, prepare a certified survey showing dimensions, locations, angles, and elevations of construction and sitework.
- E. Final Property Survey: Engage a land surveyor and professional engineer to prepare a final property survey showing significant features (real property) for Project. Include on the survey a



certification, signed by land surveyor and professional engineer, that principal metes, bounds, lines, and levels of Project are accurately positioned as shown on the survey.

1. Show boundary lines, monuments, streets, site improvements and utilities, existing improvements and significant vegetation, adjoining properties, acreage, grade contours, and the distance and bearing from a site corner to a legal point.
2. Recording: At Substantial Completion, have the final property survey recorded by or with authorities having jurisdiction as the official "property survey."

### 3.5 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.
  3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.
  4. Maintain minimum headroom clearance of 96 inches.
- 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. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.
- F. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.
- G. 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.
- H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.
  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.

- I. 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.
- J. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

### 3.6 CUTTING AND PATCHING

- A. Cutting and Patching, 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. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.
- C. Temporary Support: Provide temporary support of work to be cut.
- D. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- E. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching according to requirements in Section 011000 "Summary."
- F. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to minimize interruption to occupied areas.
- G. 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 neatly to minimum 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 and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
4. Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.
5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
6. Proceed with patching after construction operations requiring cutting are complete.

H. 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 practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.

1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical 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 minimize 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.
3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
  - a. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.

I. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

### 3.7 OWNER COORDINATION

- A. Site Access: Provide access to Project site for Owner's construction personnel.
- B. Coordination: Coordinate construction and operations of the Work with Owner's personnel.

1. Construction Schedule: Inform Owner of Contractor's preferred construction schedule. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.
2. Preinstallation Conferences: Include Owner's personnel at preinstallation conferences covering portions of the Work that require Owner's coordination. Attend preinstallation conferences conducted by Owner's construction personnel if portions of the Work depend on Owner's coordination.

### 3.8 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. 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 waste materials more than seven days during normal weather or three 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.
    - a. Use containers intended for holding waste materials of type to be stored.
  4. Coordinate progress cleaning for joint-use areas where Contractor and other contractors are working concurrently.
- B. Site: Maintain Project site free of waste materials and debris.
- C. 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.
- D. 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.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Section 015000 "Temporary Facilities and Controls".

- H. 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.
- I. 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.
- J. 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.

### 3.9 STARTING AND ADJUSTING

- A. Coordinate startup and adjusting of equipment and operating components with requirements in Section 019113 "General Commissioning Requirements."
- B. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- C. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.
- D. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- E. Manufacturer's Field Service: Comply with qualification requirements in Section 014000 "Quality Requirements."

### 3.10 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.

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 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. This section applies to prime contractor.
- B. Contractor shall bear the cost of cutting and patching required by and for his work, unless noted otherwise on their drawings.
- C. This Section includes procedural requirements for cutting and patching.
- D. It is the intent of the specifications that at the completion of the work, all indications of cutting and patching shall be as inconspicuous as the materials involved will permit and that the spaces in which the work is done will have a finished appearance.
- E. The drawings and/or specifications indicate the general extent of the work to be done; however, the notations on the drawings and specifications shall not be taken as a complete description of the work. Additional work may be required.
- F. Finishes shown on the drawings are finishes that shall exist after completion of construction.
- G. Where existing and new work join, finishes shall be brought together in proper alignment. Remove existing materials or provide new materials as required.
- H. All construction work including, but not limited to new work, patch work, and existing work shall be finished as specified for new work. Patch work shall match adjacent finishes, and all existing surfaces to receive new finishes shall have all loose material removed and surfaces thoroughly cleaned prior to application of new materials.
- I. Where existing equipment is removed patch to match adjacent construction.
- J. Divisions 2 through 34 Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work.
- K. Division 7 Section "Through-Penetration Firestop Systems" for patching fire-rated construction.

### 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 or removal of existing 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.
- 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.
- 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.
- E. Existing Roof Work: Cutting and patching of existing roof surfaces and structures shall only be Performed by a qualified (warranted) roofing contractor, as approved by the roofing system manufacturer. The contractor shall insure that the existing roof warranties remain in force. (Note: Roofing Contractor shall hold a current and valid installers license by manufacturer of primary roofing materials)

### 1.5 WARRANTY

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



## PART 2 - PRODUCTS

### 2.1 MATERIALS

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

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.
  - 1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with in-place finishes or primers.
  - 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.
- B. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- C. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.
- D. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to prevent interruption to occupied 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 and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
  4. Excavating and Backfilling: Comply with requirements in applicable Division 2 Sections where required by cutting and patching operations.
  5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
  6. Proceed with patching after construction operations requiring cutting are complete.
- C. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections.
1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.
  2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
  3. Clean piping, conduit, and similar features before applying paint or other finishing materials.
  4. Restore damaged pipe covering to its original condition.
  5. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
  6. a. Where patching occurs in a painted surface, apply primer and intermediate paint coats over the patch and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
  7. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
  8. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition.

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

END OF SECTION

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## SECTION 017400 - BUILDING, EXTERIOR AND SITE CLEANING

### PART 1 - GENERAL

1.1 All work in this section shall be provided by the prime contractor.

#### 1.2 RELATED DOCUMENTS

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

### PART 2 - PRODUCTS

#### 2.1 Cleaning Agents

- A. 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.
- B. Use cleaning products that comply with Green Seal's GS-37, or if GS-37 is not applicable, use products that comply with the California Code of Regulations maximum allowable VOC levels.

### PART 3 - EXECUTION

#### 3.1 Cleaning Operations

- A. All cleaning shall be performed according to manufacturer's instructions for the item being cleaned -no chemicals or solutions shall be brought onto Owner property without the contractor first supplying an MSDS sheet for Owner review -items damaged, stained, or marred as a result of the cleaning process or cleaning agents used shall be repaired or replaced at no cost to the Owner -use of cleaning agents with highly aromatic or pungent odors shall be scheduled for second or third shift and coordinated with the Owner.
  - a. Perform additional cleaning when directed by the Architect or Owner's Representative.
  - b. Perform the pre-occupancy cleaning when directed by the Architect or Owner's Representative.

### 3.2 Cleaning Sequence:

- A. Begin pre-occupancy cleaning operations at the top floor and proceed down to the lowest floor. Complete the cleaning required on each floor before proceeding to the next floor.
- B. Perform cleaning within the minimum standards specified, including but not limited to the following requirements.
  - 1. Floor Maintenance:
    - a. Do not splash, disfigure, or damage baseboards, walls, stair risers, furniture or equipment during these operations. Take proper precautions to advise building occupants of wet / slippery floor conditions during the cleaning operations. Be responsible for the security of equipment, materials, tools, etc. The Owner's Representative (if space is available) will assign storage area(s) for the neat storage of tools and equipment.
  - 2. Sweeping and Damp Mopping:
    - a. Thoroughly sweep the floors to remove visible dirt and debris. After sweeping and damp mopping operations, floors shall be clean and free of dirt streaks; no dirt shall be left in corners, behind radiators, under furniture, behind doors, on stair landings and treads. Entrances and all similar areas shall be swept clean of all dirt and trash. No dirt shall be left where sweepings have been picked up. There shall be no dirt, trash or foreign matter remaining.
  - 3. Wet Mopping and Scrubbing:
    - a. Properly prepare the floors; thoroughly sweep to remove all visible dirt and debris. Remove all paint spots, wads of gum, tar and similar substances from the floor surface. On completion of the mopping and scrubbing, the floors shall be clean and free of dirt, water streaks, mop marks, string, etc., properly rinsed, and dry mopped to present an overall appearance of cleanliness. All surfaces shall be dry and corners and cracks clean after the wet mopping or scrubbing. Scrubbing shall be accomplished by machine or by hand with a brush.
  - 4. Floor Finishing:
    - a. All sealers and wax finishes shall be compatible with owners current materials.
    - b. Proper preparation of a floor, prior to refinishing, is considered the most important procedure in floor maintenance. Therefore, special attention must be given to the following requirements: Sweep entire floor area with treated dust cloth to control airborne dust and apply the proper stripping solution or synthetic disinfectant detergents to the floor; scrub with a floor scrubbing machine or agitate with a mop to remove old finish and/or old wax, soap film, dirt and stains; pick up dirty solution with a mop, squeegee or wet vacuum and thoroughly rinse with clean water and dry.
    - c. Apply floor finish in even coats. The number of coats applied will depend on the type and condition of the floor, but shall not be less than two coats.
    - d. Take special care when applying the floor finish, do not splash or coat the baseboard, walls, furniture or equipment.
    - e. Machine scrub concrete floors and wash with a germicidal cleaner, finish with two coats of sealer.
    - f. Machine scrub vinyl floor tile, wash and strip and refinish.

- g. Machine scrub ceramic and quarry tile flooring and wash with a germicidal type cleaner, rinse with clean water and wipe with a well wrung mop.
  - h. Vacuum carpeting thoroughly.
- 5. Dusting:
  - a. Do not move dust from spot to spot, but remove directly from the areas in which it lies by the most effective means such as appropriately treated dusting cloths, vacuum tools, etc. When doing high cleaning, dust shall not be allowed to fall from high areas onto furniture and equipment below. The following conditions shall exist after the completion of each dusting task:
    - 1) There shall be no dust streaks.
    - 2) Corners, crevices, moldings, and ledges shall be free of all dust.
    - 3) There shall be no oils, spots or smudges on dusted surfaces caused by dusting tools.
    - 4) When inspected by a flashlight, there shall be few traces of dust.
- 6. Damp Wiping:
  - a. Use a clean damp cloth or sponge to remove all dirt, spots, streaks and smudges from walls, doors (both wood and metal), glass and other specified surfaces. When dry, the surfaces shall have a polished appearance. The wetting solution shall contain an appropriate cleaning agent. When damp wiping in toilet areas, a multi-purpose (disinfectant-deodorizer) cleaner shall be used.
- 7. Bright Metal Polishing:
  - a. Polish bright metal by damp wiping and drying with a suitable cloth. If a polished appearance is not thereby produced, apply the appropriate metal polish.
- 8. Windows and Glass:
  - a. Wash and clean all interior and exterior glass, with the inside and outside cleaning of windows to be performed on the same day.
  - b. After each washing operation, all glass shall be clean and free of dirt, grime, streaks, excessive moisture and shall not be cloudy.
  - c. Window sills, sash and woodwork about interior glass and other such surroundings shall be thoroughly wiped free of drippings and other watermarks.
  - d. Cleaners shall use pads to protect window sills when placing cleaning materials on them and all such pads and/or cloths necessary to protect the property shall be furnished by the Contractor. Window sills are not to be utilized in lieu of ladders and/or stepladders.
  - e. Extreme care shall be taken in opening any and all windows, when opening them for cleaning, assume full responsibility for damage to glass and painted surfaces.
- 9. Spot Cleaning:
  - a. Following this operation, smudges, marks or spots shall have been removed from the designated areas without causing unsightly discoloration.
- 10. Trash Removal:
  - a. Collect and remove all refuse, debris, rubbish and trash within contract work area. Unless otherwise directed by the Owner's Representative all collected matter shall be deposited in dumpsters of sanitation trucks provided by the Contractor, and removed from the site.
- 11. Supply vents, exhaust grilles and room fan coil units shall be thoroughly vacuumed and cleaned.

12. Walls:
  - a. Vacuum brick and concrete interior walls and all adhered debris shall be removed in accordance with guidelines established by the National Concrete Institute and the National Concrete Masonry Association.
13. Ceilings:
  - a. Vacuum acoustic ceilings, taking care not to damage them. Vacuum painted gypsum board / plaster ceilings and spot clean where required. Wash entire ceiling if stain results.
14. Other:
  - a. Overhead items, such as louvers, grilles, pipes, molding, etc., shall be dusted, vacuumed and spot cleaned.
  - b. Under no circumstances shall any product or procedure be used that may leave a non-conductive film.
15. Fixtures and Equipment:
  - a. Thoroughly scour, wash and disinfect all equipment and fixtures, including, but not limited to toilet bowls, seats, urinals, wash basins, mirrors, shelving, dispensers, receptors, slop sinks, water fountains, kitchen equipment, refrigerators and booth partitions, various dispensers, walk-in refrigerators, and lockers.
16. Plumbing fixtures (drinking fountains, wash basins, urinals, toilets, etc.) shall be thoroughly washed, using a germicidal solution, and dried, leaving no dust, spots, streaks or stains, rust, mold, encrustation or excess moisture. The walls and floor adjacent to fixtures shall be free of spots, drippings and water marks. Drinking fountains shall be kept free of trash, ink, coffee grounds, etc., and nozzles free from encrustation.
17. Light fixtures, including glass and plastic lenses, ceiling and wall mounted lights, cover panels, side panels, louvers, fixture frames and lamps, shall be vacuumed and cleaned with a damp cloth.
18. Supply vents, exhaust grilles and room fan coil units shall be thoroughly vacuumed and cleaned.
19. Wood and Metal Doors:
  - a. Remove protective tape from doors, frames and signage and kickplates. Remove all tape and adhesive residues. Clean and polish all unpainted metal on doors, including, but not limited to, trim, hardware, kickplates, handplates and door knobs. Wood doors shall be thoroughly cleaned and oiled and wiped dry.
20. Elevators:
  - a. Clean all surfaces in the interior of the car including hoistway doors and services of the corridors on the side of the elevator and all bright metal surfaces polished. All resilient tiles shall be cleaned and spray buffed. Dust and damp wipe elevator cab doors, wall and bright work. Scrub and wash elevator cab floors using germicidal detergent.
21. Stairwells:
  - a. Sweep all stairs clean. Remove all paint spots, wads of gum, tar and similar substances and wash with a germicidal cleaner. Vacuum brick / concrete block walls, remove spots, stains, etc. and wash and dry (wipe or blow dry).
22. Entrances:
  - a. Thoroughly sweep, vacuum and wash entrances with a germicidal cleaner.
23. Safety Standards:



- a. Conform to all Federal, State and Local Codes and Safety Standards and to the best practices of the trade. 017400 - 4 1414.1
- 24. Building Exterior and Site Cleaning Sequence:
  - a. General: Provide building exterior and site cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- 25. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:
  - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
  - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
  - c. Rake grounds that are neither planted nor paved to a smooth, even- textured surface.
  - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
  - e. Remove snow and ice to provide safe access to building.
  - f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
  - g. Remove debris and surface dust from limited access spaces, including roofs, manholes, and similar spaces.
  - h. Clean transparent materials, including glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials.
  - i. Remove labels that are not permanent.
  - j. 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.
  - k. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency.
- C. Pest Control: Engage an experienced, licensed exterminator to make a final inspection and rid Project of rodents, insects, and other pests. Prepare a report.
- D. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury 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

## SECTION 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Section includes administrative and procedural requirements for the following:
  - 1. Salvaging nonhazardous demolition and construction waste.
  - 2. Disposing of nonhazardous demolition and construction waste.
- B. Related Requirements:
  - 1. Section 011200 "Contract Summary" for coordination of responsibilities for waste management.
  - 2. Section 024119 "Selective Demolition" for disposition of waste resulting from partial demolition of buildings, structures, and site improvements. Section 042000 "Unit Masonry" for disposal requirements for masonry waste.
  - 3. Section 311000 "Site Clearing" for disposition of waste resulting from site clearing and removal of above- and below-grade improvements.

#### 1.3 DEFINITIONS

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

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

#### 1.4 ACTION SUBMITTALS

- A. Waste Management Plan: Submit plan within 30 days of date established for the Notice to Proceed.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

#### 1.6 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Waste Management Conference: Conduct conference at Project site to comply with requirements in Section 013100 "Project Management and Coordination." Review methods and procedures related to waste management including, but not limited to, the following:
  - 1. Review and discuss waste management plan.
  - 2. Review requirements for documenting quantities of each type of waste and its disposition.
  - 3. Review and finalize procedures for materials separation and verify availability of containers and bins needed to avoid delays.
  - 4. Review procedures for periodic waste collection and transportation to recycling and disposal facilities.
  - 5. Review waste management requirements for each trade.

#### 1.7 WASTE MANAGEMENT PLAN

- A. General: Develop a waste management plan according to ASTM E 1609 and requirements in this Section. Plan shall consist of waste identification, and shall distinguish between demolition and construction waste. Indicate quantities by weight or volume, but use same units of measure throughout waste management plan.
- B. Waste Identification: Indicate anticipated types and quantities of demolition, site-clearing and construction waste generated by the Work.
  - 1. Salvaged Materials for Reuse: For materials that will be salvaged and reused in this Project, describe methods for preparing salvaged materials before incorporation into the Work.

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2. Disposed Materials: Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incinerator facility.
3. Handling and Transportation Procedures: Include method that will be used for separating recyclable waste including sizes of containers, container labeling, and designated location where materials separation will be performed.

## PART 2 - PRODUCTS (Not Used)

## PART 3 - EXECUTION

### 3.1 PLAN IMPLEMENTATION

- A. General: Implement approved waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.
  1. Comply with operation, termination, and removal requirements in Section 015000 "Temporary Facilities and Controls."
- B. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
  1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.
  2. Comply with Section 015000 "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.

### 3.2 SALVAGING DEMOLITION WASTE

- A. Salvaged Items for Reuse in the Work: Salvage items for reuse and handle as follows:
  1. Clean salvaged items.
  2. Pack or crate items after cleaning. Identify contents of containers with label indicating elements, date of removal, quantity, and location where removed.
  3. Store items in a secure area until installation.
  4. Protect items from damage during transport and storage.
  5. Install salvaged items to comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make items functional for use indicated.
- B. Salvaged Items for sale and donation is prohibited.
- C. Salvaged Items for Owner's Use: Salvage items for Owner's use and handle as follows:

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1. Clean salvaged items.
  2. Pack or crate items after cleaning. Identify contents of containers with label indicating elements, date of removal, quantity, and location where removed.
  3. Store items in a secure area until delivery to Owner.
  4. Transport items to Owner's storage area on-site or as designated by Construction Manager.
  5. Protect items from damage during transport and storage.
- D. Doors and Hardware: Brace open end of door frames. Except for removing door closers, leave door hardware attached to doors.
- E. Equipment: Drain tanks, piping, and fixtures. Seal openings with caps or plugs. Protect equipment from exposure to weather.
- F. Plumbing Fixtures: Separate by type and size.
- G. Lighting Fixtures: Separate lamps by type and protect from breakage.
- H. Electrical Devices: Separate switches, receptacles, switchgear, transformers, meters, panelboards, circuit breakers, and other devices by type.

### 3.3 DISPOSAL OF WASTE

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

END OF SECTION 017419

## 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 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
  - 1. Substantial Completion procedures.
  - 2. Final completion procedures.
  - 3. Warranties.
  - 4. Final cleaning.
  - 5. Repair of the Work.
- B. Related Requirements:
  - 1. Section 013233 "Photographic Documentation" for submitting final completion construction photographic documentation.
  - 2. Section 017300 "Execution" for progress cleaning of Project site.
  - 3. Section 017823 "Operation and Maintenance Data" for operation and maintenance manual requirements.
  - 4. Section 017839 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.
  - 5. Section 017900 "Demonstration and Training" for requirements for instructing Owner's personnel.
  - 6. Divisions 02 through 33 Sections for specific closeout and special cleaning requirements for the Work in those Sections.

#### 1.3 ACTION SUBMITTALS

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

#### 1.4 CLOSEOUT SUBMITTALS

- A. Certificates of Release: From authorities having jurisdiction.
- B. Certificate of Insurance: For continuing coverage.

#### 1.5 MAINTENANCE MATERIAL SUBMITTALS

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

#### 1.6 SUBSTANTIAL COMPLETION PROCEDURES

- A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's punch list), indicating the value of each item on the list and reasons why the Work is incomplete.
- B. Submittals Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
  - 1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
  - 2. Submit closeout submittals specified in other Division 01 Sections, including project record documents, operation and maintenance manuals, final completion construction photographic documentation, damage or settlement surveys, property surveys, and similar final record information.
  - 3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
- C. Procedures Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
  - 1. Advise Owner of pending insurance changeover requirements.
  - 2. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
  - 3. Complete final cleaning requirements, including touchup painting.
  - 4. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. 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. General contractor shall provide a wheeled aerial lift (with a trained operator) and OSHA required safety equipment for the Architect to inspect the work.
2. Re-inspection: Request re-inspection when the Work identified in previous inspections as incomplete is completed or corrected.
3. Results of completed inspection will form the basis of requirements for final completion.

#### 1.7 FINAL COMPLETION PROCEDURES

A. Submittals Prior to Final Completion: Before requesting final inspection for determining final completion, complete the following:

1. Submit a final Application for Payment according to Section 012900 "Payment Procedures."
2. Certified List of Incomplete Items: Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.

B. Inspection: Submit a written request for final inspection to determine acceptance a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Architect 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. General contractor shall provide a wheeled aerial lift (with a trained operator) and OSHA required safety equipment for the Architect to inspect the work.
2. Re-inspection: Request re-inspection when the Work identified in previous inspections as incomplete is completed or corrected.

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

A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction. Use CSI Form 14.1A.

1. Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor.
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:

Hamlin Design Group  
PRJ 201 Oakside Elementary  
PRJ 202 Uriah Hill School  
PRJ 203 Woodside School  
PRJ 204 Middle School

The City School District of Peekskill  
SED 66-15-00-01-0-005-020  
SED 66-15-00-01-0-007-014  
SED 66-15-00-01-0-008-017  
SED 66-15-00-01-0-014-005

- a. Project name.
  - b. Date.
  - c. Name of Architect.
  - d. Name of Contractor.
  - e. Page number.
4. Submit list of incomplete items in the following format:
- a. MS Excel electronic file. Architect will return annotated file.
  - b. PDF electronic file. Architect will return annotated file.

#### 1.9 SUBMITTAL OF PROJECT WARRANTIES

- A. Time of Submittal: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated, or when delay in submittal of warranties might limit Owner's rights under warranty.
- B. Submit properly executed warranties within 15 days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.
- C. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.
  1. Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive **8-1/2-by-11-inch (215-by-280-mm)** paper.
  2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
  3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
  4. Warranty Electronic File: Scan warranties and bonds and assemble complete warranty and bond submittal package into a single indexed electronic PDF file with links enabling navigation to each item. Provide bookmarked table of contents at beginning of document.
- D. Provide additional copies of each warranty to include in operation and maintenance manuals.

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SED 66-15-00-01-0-007-014  
SED 66-15-00-01-0-008-017  
SED 66-15-00-01-0-014-005

## PART 2 - PRODUCTS (Not Used)

## PART 3 - EXECUTION

### 3.1 CLEANING

- A. Comply with requirements of section 017419 Building, Exterior and site Cleaning

### 3.2 REPAIR OF THE WORK

- A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.
- B. Repair or remove and replace defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.

END OF SECTION 017700



## 017700F1 - Hazardous Material – Asbestos Certification

PROJECT: Peekskill City School District Reconstruction  
PROJECT NUMBER: HDG  
SED CONTROL NO.

To the best of my knowledge, information and belief, I hereby certify all work has been completed in accordance with the plans and specifications for the above referenced project and applicable requirements of the Building Code of New York State and State Education Department Building Standards.

No asbestos- containing materials (ACBM) or lead containing materials (LCM) were used or installed in the construction for the above referenced project.

---

Contractor Name

---

Contractor Signature

---

Title

---

Date

Project: \_\_\_\_\_

From (A/E): \_\_\_\_\_

To (Contractor): \_\_\_\_\_

Site Visit Date: \_\_\_\_\_

A/E Project Number: \_\_\_\_\_

Contract For: \_\_\_\_\_

The following items require the attention of the Contractor for completion or correction. This list may not be all-inclusive, and the failure to include any items on this list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

Item No.	Room No.	Location (Area)	Description	Correction/ Completion Date	Verification A/E Check

☐ Attachments

Signed by: \_\_\_\_\_

Date: \_\_\_\_\_

Copies: ☐ Owner ☐ Consultants ☐ \_\_\_\_\_ ☐ \_\_\_\_\_ ☐ \_\_\_\_\_ ☐ \_\_\_\_\_ ☐ File

## 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 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
  - 1. Operation and maintenance documentation directory.
  - 2. Emergency manual.
  - 3. Operation manuals for systems, subsystems, and equipment.
  - 4. Product maintenance manuals.
  - 5. Systems and equipment maintenance manuals.
- B. Related Requirements:
  - 1. Section 013300 "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 34 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 CLOSEOUT SUBMITTALS

- A. Manual Content: Operations and maintenance manual content is specified in individual Specification Sections to be reviewed at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.
  - 1. Architect will comment on whether content of operations and maintenance submittals are acceptable.
  - 2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.
- B. Format: Submit operations and maintenance manuals in the following format:
  - 1. PDF electronic file. Assemble each manual into a composite electronically indexed file. Submit on digital media acceptable to Architect.
    - a. Name each indexed document file in composite electronic index with applicable item name. Include a complete electronically linked operation and maintenance directory.
    - b. Enable inserted reviewer comments on draft submittals.
  - 2. 3 paper copies. Include a complete operation and maintenance directory. Enclose title pages and directories in clear plastic sleeves. Architect will return two copies.
- C. Initial Manual Submittal: Submit draft copy of each manual at least 30 days before commencing demonstration and training. Architect will comment on whether general scope and content of manual are acceptable.
- D. Final Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least 15 days before commencing demonstration and training. Architect will return copy with comments.
  - 1. Correct or revise each manual to comply with Architect's and Commissioning Authority's comments. Submit copies of each corrected manual within 15 days of receipt of Architect's comments and prior to commencing demonstration and training.

## PART 2 - PRODUCTS

### 2.1 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY

- A. Directory: Prepare a single, comprehensive directory of emergency, operation, and maintenance data and materials, listing items and their location to facilitate ready access to desired information. Include a section in the directory for each of the following:
  - 1. List of documents.
  - 2. List of systems.
  - 3. List of equipment.



4. Table of contents.

- B. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.
- C. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.
- D. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.
- E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents.

2.2 REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS

- A. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:
  - 1. Title page.
  - 2. Table of contents.
  - 3. Manual contents.
- B. Title Page: Include the following information:
  - 1. Subject matter included in manual.
  - 2. Name and address of Project.
  - 3. Name and address of Owner.
  - 4. Date of submittal.
  - 5. Name and contact information for Contractor.
  - 6. Name and contact information for Architect.
  - 7. Name and contact information for Commissioning Authority.
  - 8. Names and contact information for major consultants to the Architect that designed the systems contained in the manuals.
  - 9. Cross-reference to related systems in other operation and maintenance manuals.
- C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.
  - 1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.

- D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.
- E. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.
  - 1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
  - 2. File Names and Bookmarks: Enable bookmarking of individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.
- F. Manuals, Paper Copy: Submit manuals in the form of hard copy, bound and labeled volumes.
  - 1. Binders: Heavy-duty, three-ring, vinyl-covered, loose leaf 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. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter of contents, and indicate Specification Section number on bottom of spine. Indicate volume number for multiple-volume sets.
  - 2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section of the manual. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
  - 3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software storage media for computerized electronic equipment.
  - 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.

## 2.3 EMERGENCY MANUALS

- A. Content: Organize manual into a separate section for each of the following:
1. Type of emergency.
  2. Emergency instructions.
  3. Emergency procedures.
- B. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:
1. Fire.
  2. Flood.
  3. Gas leak
  4. Power failure.
  5. Water outage.
  6. System, subsystem, or equipment failure.
  7. Chemical release or spill.
  8. Water leak.
- C. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.
- D. Emergency Procedures: Include the following, as applicable:
1. Instructions on stopping.
  2. Shutdown instructions for each type of emergency.
  3. Operating instructions for conditions outside normal operating limits.
  4. Required sequences for electric or electronic systems.
  5. Special operating instructions and procedures.

## 2.4 OPERATION MANUALS

- A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:
1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
  2. Performance and design criteria if Contractor has delegated design responsibility.
  3. Operating standards.
  4. Operating procedures.
  5. Operating logs.
  6. Wiring diagrams.
  7. Control diagrams.
  8. Piped system diagrams.
  9. Precautions against improper use.
  10. License requirements including inspection and renewal dates.

B. Descriptions: Include the following:

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

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

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

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

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

## 2.5 PRODUCT MAINTENANCE MANUALS

A. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.

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

C. Product Information: Include the following, as applicable:

1. Product name and model number.
2. Manufacturer's name.
3. Color, pattern, and texture.

4. Material and chemical composition.
5. Reordering information for specially manufactured products.

D. Maintenance Procedures: Include manufacturer's written recommendations and the following:

1. Inspection procedures.
2. Types of cleaning agents to be used and methods of cleaning.
3. List of cleaning agents and methods of cleaning detrimental to product.
4. Schedule for routine cleaning and maintenance.

E. Repair instructions.

F. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.

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

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

## 2.6 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

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 and drawing or schedule designation or identifier where applicable.

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

1. Standard 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 video recording, 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 Documentation Directory: Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals.
- B. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.
- C. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.
- D. 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.

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SED 66-15-00-01-0-014-005

- E. 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.
- F. 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 Section 017839 "Project Record Documents."
- G. Comply with Section 017700 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

END OF SECTION 017823



## SECTION 017839 - PROJECT RECORD DOCUMENTS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Section includes administrative and procedural requirements for project record documents, including the following:
  - 1. Record Drawings.
  - 2. Record Specifications.
  - 3. Record Product Data.
  - 4. Miscellaneous record submittals.
- B. Related Requirements:
  - 1. Section 011000 "Summary Of Work" for coordinating project record documents covering the Work of multiple contracts.
  - 2. Section 017300 "Execution" for final property survey.
  - 3. Section 017700 "Closeout Procedures" for general closeout procedures.
  - 4. Section 017823 "Operation and Maintenance Data" for operation and maintenance manual requirements.

#### 1.3 CLOSEOUT SUBMITTALS

- A. Record Drawings: Comply with the following:
  - 1. Number of Copies: one set(s) of marked-up record prints. And PDF version on CD
- B. Record Specifications: Submit one paper copy and annotated PDF electronic files on CD of Project's Specifications, including addenda and contract modifications.
- C. Record Product Data: Submit one paper copy and annotated PDF electronic files on CD of each submittal.
  - 1. Where record Product Data are required as part of operation and maintenance manuals, submit duplicate marked-up Product Data as a component of manual.

- D. Miscellaneous Record Submittals: See other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Submit one paper copy annotated PDF electronic files and directories on CD of each submittal.
- E. Reports: Submit written report weekly indicating items incorporated into project record documents concurrent with progress of the Work, including revisions, concealed conditions, field changes, product selections, and other notations incorporated.

## PART 2 - PRODUCTS

### 2.1 RECORD DRAWINGS

- A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued.
  - 1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.
    - a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
    - b. Accurately record information in an acceptable drawing technique.
    - c. Record data as soon as possible after obtaining it.
    - d. Record and check the markup before enclosing concealed installations.
    - e. Cross-reference record prints to corresponding archive photographic documentation.
  - 2. Content: Types of items requiring marking include, but are not limited to, the following:
    - a. Dimensional changes to Drawings.
    - b. Revisions to details shown on Drawings.
    - c. Depths of foundations below first floor.
    - d. Locations and depths of underground utilities.
    - e. Revisions to routing of piping and conduits.
    - f. Revisions to electrical circuitry.
    - g. Actual equipment locations.
    - h. Duct size and routing.
    - i. Locations of concealed internal utilities.
    - j. Changes made by Change Order or Change Directive.
    - k. Changes made following Architect's written orders.
    - l. Details not on the original Contract Drawings.
    - m. Field records for variable and concealed conditions.
    - n. Record information on the Work that is shown only schematically.

3. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
  4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
  5. Mark important additional information that was either shown schematically or omitted from original Drawings.
  6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable:
- B. Record Drawings: Immediately before inspection for Certificate of Substantial Completion, review marked-up Record Prints with Architect and Owner's Representative. When authorized, prepare a full set of corrected marked up record drawings:
- C. Format: Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
1. Record Prints: Organize record prints and newly prepared record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
  2. Format: Annotated PDF electronic file with comment function enabled.
  3. Record Digital Data Files: Organize digital data information into separate electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each digital data file.
  4. Identification: As follows:
    - a. Project name.
    - b. Date.
    - c. Designation "PROJECT RECORD DRAWINGS."
    - d. Name of Architect.
    - e. Name of Contractor.

## 2.2 RECORD SPECIFICATIONS

- A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
  2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
  3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
  4. For each principal product, indicate whether record Product Data has been submitted in operation and maintenance manuals instead of submitted as record Product Data.
  5. Note related Change Orders and record Drawings where applicable.

- B. Format: Submit record Specifications as annotated PDF electronic file or scanned PDF electronic file(s) of marked-up paper copy of Specifications.

## 2.3 RECORD PRODUCT DATA

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

## 2.4 MISCELLANEOUS RECORD SUBMITTALS

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

## PART 3 - EXECUTION

### 3.1 RECORDING AND MAINTENANCE

- A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and revisions to project record documents as they occur; do not wait until end of Project.
- B. Maintenance of Record Documents and Samples: Store record documents and Samples in the field office apart from the Contract Documents used for construction. Do not use project record documents for construction purposes. Maintain record documents in good order and in a clean,

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dry, legible condition, protected from deterioration and loss. Provide access to project record documents for Architect's reference during normal working hours.

END OF SECTION 017839

## SECTION 017900 - DEMONSTRATION AND TRAINING

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This section applies to all contractors.
- B. Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:
  - 1. Demonstration of operation of systems, subsystems, and equipment.
  - 2. Training in operation and maintenance of systems, subsystems, and equipment.
  - 3. Demonstration and training video recordings.
  - 4. Divisions 2 through 34 Sections for specific requirements for demonstration and training for products in those Sections.

#### 1.3 INFORMATIONAL SUBMITTALS

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

#### 1.4 CLOSEOUT SUBMITTALS

- A. Demonstration and Training Video Recordings: Submit two copies within 7 days of end of each training module.
1. Identification: On each copy, provide an applied label with the following information:
    - a. Name of Project.
    - b. Name and address of videographer.
    - c. Name of Architect.
    - d. Name of Contractor.
    - e. Date of video recording.
  2. Transcript: Prepared and bound in format matching operation and maintenance manuals. Mark appropriate identification on front and spine of each binder. Include a cover sheet with same label information as the corresponding video recording. Include name of Project and date of video recording on each page.
  3. Transcript: Prepared in PDF electronic format. Include a cover sheet with same label information as the corresponding video recording and a table of contents with links to corresponding training components. Include name of Project and date of video recording on each page.
  4. At completion of training, submit complete training manual(s) for Owner's use prepared and bound in format matching operation and maintenance manuals] [in PDF electronic file format on compact disc.

#### 1.5 QUALITY ASSURANCE

- A. Facilitator Qualifications: A firm or individual experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this Project, and whose work has resulted in training or education with a record of successful learning performance.
- B. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Section 014000 "Quality Requirements," experienced in operation and maintenance procedures and training.
- C. Videographer Qualifications: A professional videographer who is experienced photographing demonstration and training events similar to those required.
- D. Preinstruction Conference: Conduct conference at Project site to comply with requirements in Section 013100 "Project Management and Coordination." Review methods and procedures related to demonstration and training including, but not limited to, the following:
1. Inspect and discuss locations and other facilities required for instruction.
  2. Review and finalize instruction schedule and verify availability of educational materials, instructors' personnel, audiovisual equipment, and facilities needed to avoid delays.
  3. Review required content of instruction.



4. For instruction that must occur outside, review weather and forecasted weather conditions and procedures to follow if conditions are unfavorable.

## 1.6 COORDINATION

- A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations and to ensure availability of Owner's personnel.
- B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.
- C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data has been reviewed and approved by Architect.

## PART 2 - PRODUCTS

### 2.1 INSTRUCTION PROGRAM

- A. Program Structure: Develop an instruction program that includes individual training modules for each system and for equipment not part of a system, as required by individual Specification Sections.
- B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following as applicable to the system, equipment, or component:
  1. Basis of System Design, Operational Requirements, and Criteria: Include the following:
    - a. System, subsystem, and equipment descriptions.
    - b. Performance and design criteria if Contractor is delegated design responsibility.
    - c. Operating standards.
    - d. Regulatory requirements.
    - e. Equipment function.
    - f. Operating characteristics.
    - g. Limiting conditions.
    - h. Performance curves.
  2. Documentation: Review the following items in detail:
    - a. Emergency manuals.
    - b. Operations manuals.
    - c. Maintenance manuals.
    - d. Project record documents.

- e. Identification systems.
  - f. Warranties and bonds.
  - g. Maintenance service agreements and similar continuing commitments.
- 3. Emergencies: Include the following, as applicable:
  - a. Instructions on meaning of warnings, trouble indications, and error messages.
  - b. Instructions on stopping.
  - c. Shutdown instructions for each type of emergency.
  - d. Operating instructions for conditions outside of normal operating limits.
  - e. Sequences for electric or electronic systems.
  - f. Special operating instructions and procedures.
- 4. Operations: Include the following, as applicable:
  - a. Startup procedures.
  - b. Equipment or system break-in procedures.
  - c. Routine and normal operating instructions.
  - d. Regulation and control procedures.
  - e. Control sequences.
  - f. Safety procedures.
  - g. Instructions on stopping.
  - h. Normal shutdown instructions.
  - i. Operating procedures for emergencies.
  - j. Operating procedures for system, subsystem, or equipment failure.
  - k. Seasonal and weekend operating instructions.
  - l. Required sequences for electric or electronic systems.
  - m. Special operating instructions and procedures.
- 5. Adjustments: Include the following:
  - a. Alignments.
  - b. Checking adjustments.
  - c. Noise and vibration adjustments.
  - d. Economy and efficiency adjustments.
- 6. Troubleshooting: Include the following:
  - a. Diagnostic instructions.
  - b. Test and inspection procedures.
- 7. Maintenance: Include the following:
  - a. Inspection procedures.
  - b. Types of cleaning agents to be used and methods of cleaning.
  - c. List of cleaning agents and methods of cleaning detrimental to product.
  - d. Procedures for routine cleaning
  - e. Procedures for preventive maintenance.

- f. Procedures for routine maintenance.
  - g. Instruction on use of special tools.
- 8. Repairs: Include the following:
  - a. Diagnosis instructions.
  - b. Repair instructions.
  - c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
  - d. Instructions for identifying parts and components.
  - e. Review of spare parts needed for operation and maintenance.

### PART 3 - EXECUTION

#### 3.1 PREPARATION

- A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a training manual organized in coordination with requirements in Section 017823 "Operation and Maintenance Data."
- B. Set up instructional equipment at instruction location.

#### 3.2 INSTRUCTION

- A. Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and Owner for number of participants, instruction times, and location.
- B. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
  - 1. Architect will furnish an instructor to describe basis of system design, operational requirements, criteria, and regulatory requirements.
  - 2. Owner will furnish an instructor to describe Owner's operational philosophy.
  - 3. Owner will furnish Contractor with names and positions of participants.
- C. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.
  - 1. Schedule training with Owner through Architect, with at least 7 days' advance notice.
- D. Training Location and Reference Material: Conduct training on-site in the completed and fully operational facility using the actual equipment in-place. Conduct training using final operation and maintenance data submittals.

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

### 3.3 DEMONSTRATION AND TRAINING VIDEO RECORDINGS

- A. General: Engage a qualified commercial videographer to record demonstration and training video recordings. Record each training module separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids, but not student practice.
  - 1. At beginning of each training module, record each chart containing learning objective and lesson outline.
- B. Video: Provide minimum 640 x 480 video resolution converted to format file type acceptable to Owner, on electronic media.
  - 1. Electronic Media: Read-only format compact disc acceptable to Owner, with commercial-grade graphic label.
  - 2. File Hierarchy: Organize folder structure and file locations according to project manual table of contents. Provide complete screen-based menu.
  - 3. File Names: Utilize file names based upon name of equipment generally described in video segment, as identified in Project specifications.
  - 4. Contractor and Installer Contact File: Using appropriate software, create a file for inclusion on the Equipment Demonstration and Training DVD that describes the following for each Contractor involved on the Project, arranged according to Project table of contents:
    - a. Name of Contractor/Installer.
    - b. Business address.
    - c. Business phone number.
    - d. Point of contact.
    - e. E-mail address.
- C. Recording: Mount camera on tripod before starting recording, unless otherwise necessary to adequately cover area of demonstration and training. Display continuous running time.
  - 1. Film training session(s) in segments not to exceed 15 minutes.
    - a. Produce segments to present a single significant piece of equipment per segment.
    - b. Organize segments with multiple pieces of equipment to follow order of Project Manual table of contents.
    - c. Where a training session on a particular piece of equipment exceeds 15 minutes, stop filming and pause training session. Begin training session again upon commencement of new filming segment.

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- D. Light Levels: Verify light levels are adequate to properly light equipment. Verify equipment markings are clearly visible prior to recording.
  - 1. Furnish additional portable lighting as required.
- E. Narration: Describe scenes on video recording by audio narration by microphone while or dubbing audio narration off-site after video recording is recorded. Include description of items being viewed.
- F. Transcript: Provide a transcript of the narration. Display images and running time captured from videotape opposite the corresponding narration segment.
- G. Preproduced Video Recordings: Provide video recordings used as a component of training modules in same format as recordings of live training.

END OF SECTION 017900

## 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 Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Removal of selected portions of building or structure.
  - 2. Shoring and bracing to protect existing building during construction.
- B. Related Requirements:
  - 1. Section 011000 "Summary" for restrictions on the use of the premises, Owner-occupancy requirements, and phasing requirements.
  - 2. Section 017300 "Execution" for cutting and patching procedures.
  - 3. Section 028213 "Asbestos Abatement" for hazardous material procedures.
  - 4. Section 028239 "Asbestos Monitoring"
  - 5. Section 028313 "Disturbance of LCM's"
  - 6. Section 028339 "Disturbance Monitoring of LCM's"

#### 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: Carefully detach from existing construction, in a manner to prevent damage.
- C. Remove and Reinstall: Detach items from existing construction, prepare for reuse, and reinstall where indicated.
- D. Existing to Remain: Existing items of construction that are not to be permanently removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.
- E. Existing units to be used for replication: Carefully detach from existing construction in a manner to prevent damage, prepare and deliver to approved terra cotta manufacturer.

#### 1.4 MATERIALS OWNERSHIP

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

#### 1.5 PREINSTALLATION MEETINGS

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

#### 1.6 SUBMITTALS

- A. Proposed Protection Measures: Submit report, including drawings, that indicates the measures proposed for protecting individuals and property for dust control and noise control. Indicate proposed locations and construction of barriers.
- B. Schedule of Selective Demolition Activities: Indicate the following:
  - 1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's on-site operations are uninterrupted.
  - 2. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.
- C. Inventory: Submit a list of items to be removed and salvaged and deliver to Owner's representative prior to start of demolition.
- D. Predemolition Photographs or Video: Submit before Work begins.

#### 1.7 CLOSEOUT SUBMITTALS

- A. Inventory: Submit a list of items that have been removed and salvaged.
- B. Landfill Records: Indicate receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.



## 1.8 QUALITY ASSURANCE

- A. Demolition firm qualifications: An experienced firm specializing in demolition work similar in material and extent of this project.
- B. Requirements: Comply with governing EPA notification regulations before beginning demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- C. Comply with ANSI/ASSE A10.6 and NFPA 241.
- D. Predemolition Conference: Conduct conference at Project site in accordance to requirements of Division Section 1 "Project Management and Coordination".
  - 1. Inspect and discuss condition of construction to be selectively demolished.
  - 2. Review methods and procedures to install shoring.
  - 3. Review and finalize protection requirements.
  - 4. Review procedures for noise and dust control.
  - 5. Review procedures for protection of existing construction.
  - 6. Finalize selective demolition schedule, and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
- E. Structural Load Limitations of Existing Structure: Review load limitations of existing building structural framing system related to selective demolition including the following:
  - 1. Original building construction drawings provided by owner.
  - 2. Condition of existing framing systems scheduled to remain prior to start of selective demolition and periodically during course of selective demolition.
  - 3. Support requirements for proposed demolition equipment, including existing framing systems and temporary shoring and bracing requirements.

## 1.9 FIELD CONDITIONS

- A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.
- B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
- C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- A. Hazardous Materials: Hazardous materials are present in buildings and structures to be selectively demolished. A report on the presence of hazardous materials is on file for review and use. Examine report to become aware of locations where hazardous materials are present.
  - 1. Hazardous material remediation is specified elsewhere in the Contract Documents.
  - 2. Do not disturb hazardous materials or items suspected of containing hazardous materials except under procedures specified elsewhere in the Contract Documents.

3. Hazardous materials will be removed by Owner under a separate contract.
- B. Storage or sale of removed items or materials on-site is not permitted.
- C. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
  1. Maintain fire-protection facilities in service during selective demolition operations.

#### 1.10 WARRANTY

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials so as not to void existing warranties. Notify warrantor before proceeding. Existing warranties include the following:
  1. Existing EPDM roofing system.
  2. Repairs of this system shall be provided by certified installer of warranted roofing system acceptable to system manufacturer.
- B. Notify warrantor on completion of selective demolition, and obtain documentation verifying that existing system has been inspected and warranty remains in effect. Submit documentation at Project closeout.

### PART 2 - PRODUCTS

#### 2.1 PERFORMANCE REQUIREMENTS

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

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.
- B. When unanticipated structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Architect.

- C. Perform a building condition survey by a New York State licensed professional engineer to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective building demolition operations.
  - 1. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.
- D. Survey of Existing Conditions: Record existing conditions by use of measured drawings, preconstruction photographs or preconstruction videotapes.
  - 1. Comply with requirements specified in Section 013233 "Photographic Documentation."
  - 2. Inventory and record the condition of items to be removed and salvaged. Provide photographs or video of conditions that might be misconstrued as damage caused by salvage operations.
  - 3. Before selective demolition or removal of existing building elements that will be reproduced or duplicated in final Work, make permanent record of measurements, materials, and construction details required to make exact reproduction.

### 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. Comply with requirements for access and protection specified in Section 015000 "Temporary Facilities and Controls."
- B. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
  - 1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
  - 2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
  - 3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
  - 4. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Section 015000 "Temporary Facilities and Controls."
- C. Temporary Shoring: Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
  - 1. Strengthen or add new supports when required during progress of selective demolition.

### 3.3 SELECTIVE DEMOLITION, GENERAL

- A. General: 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 existing construction 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.
  - 5. Remove decayed or unsuitable materials and promptly dispose of off-site.
  - 6. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
  - 7. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
  - 8. Dispose of demolished items and materials promptly.
- B. Do not demolish building elements beyond what is necessary to complete the work without Architect's approval.
- C. Removed and Salvaged Items:
  - 1. Clean salvaged items.
  - 2. Pack or crate items after cleaning. Identify contents of containers.
  - 3. Store items in a secure area until removed items are scheduled for shipping.
  - 4. Transport items to designated area on site as indicated on drawings or as designated by Owner's representative.
  - 5. Protect items from damage during transport and storage.
- D. Removed and Reinstalled Items:
  - 1. Clean and repair items to functional condition adequate for intended reuse.
  - 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.
- E. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable,

protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

- 3.4 Limited Exploratory Removals: Prior to commencement of removals of damaged terra cotta units identified in the drawings, contractor shall perform limited exploratory removals. The extent of the exploratory removals shall be adequate to observe all concealed construction including but not limited to existing brick and concrete back-up and embedded steel components.

1. Notify Architect and Engineer upon completion of exploratory removals.
2. Contractor shall provide wheeled lift access for Architect and Engineer to inspect exploratory openings and removals.

### 3.5 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

- A. Concealed Concrete or Grout: Remove in small sections. Using powered or hand tools, remove concrete or grout at areas being demolished to prepare for new anchors, reinforcement and terra cotta masonry units.
- B. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, then remove masonry between saw cuts.

### 3.6 DISPOSAL OF DEMOLISHED MATERIALS

- A. General: Except for items or materials indicated to be salvaged, remove demolished materials from Project site and legally dispose.
  1. Do not allow demolished materials to accumulate on-site.
  2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
  3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
- B. Burning: Not permitted.

### 3.7 CLEANING

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

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### 3.8 SELECTIVE DEMOLITION SCHEDULE

- A. Existing Items to Be Removed and Reinstalled or Repaired In-place: Steel lintels as indicated in drawings.
- B. Existing Items to Remain: Existing construction identified as to remain.

END OF SECTION 024119

## SECTION 028213 – ASBESTOS ABATEMENT

### PART 1 – GENERAL

#### 1.1 WORK SUMMARY

- A. The work specified herein shall be the construction of isolation barriers, protecting all non-removable items, removing all asbestos containing materials, and cleaning of the work area by persons trained, knowledgeable and qualified in the techniques of: abatement, handling, cleaning, disposal and working with or around, asbestos containing and asbestos-contaminated material. Those persons shall comply with all applicable Federal, State, and Local regulations including requirements of this specification, and shall be capable of and willing to perform the work of this Contract.

- B. “Large and small asbestos abatement projects as defined by 12NYCRR56 shall not be performed while the building is occupied”. Note, It is our interpretation that the term “building”, as referenced in this Section, means a wing or major section of a building that can be completely isolated from the rest of the building with sealed non combustible construction. The isolated portion of the building must contain exits that do not pass through the occupied portion and ventilation systems must be physically separated and sealed at the isolation barrier.

Exterior work such as roofing, flashing, siding, or soffit work may be performed on occupied buildings provided proper variances are in place as required, and complete isolation of ventilation systems and at windows is provided. Care must be taken to schedule work so that facility operations are not disrupted by excessive noise or visual distraction.

- C. The information provided in this specification is for the abatement of asbestos containing materials at the Oakside Elementary, Uriah Hill School, and Woodside Elementary Schools in the Peekskill City School District. The reproduction or use of information included in this specification for any other purpose is prohibited.

#### 1.2 RELATED DOCUMENTS

- A. Documents affecting the work of this Section include but are not limited to, general conditions, general requirements, supplementary conditions and documents in division 1 of these specifications.
- B. Section 028239: Asbestos Monitoring
- C. Section 028433: Abatement of PCB Containing Caulk Sealant



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### 1.3 QUALIFICATIONS

- A. Pre-Contract Submittals: Two days after bids are open; those bidders to whom award of contract is under consideration shall be required to submit, to the extent not already submitted with the bid, the following documentation:
1. Asbestos Contractors Resume: Shall include the following:
    - a. Contractor license issued by New York State Department of Labor.
    - b. The number of years engaged in asbestos removal.
    - c. Provide a list of projects performed within the past two years and include the dollar value of all projects. Provide project references to include owner, consultant, and air monitoring firms' name, contact person, address and phone number.
    - d. A list of owned equipment available to be used in the performance of the project.
    - e. An outline of the worker training course and medical surveillance program conducted by the contractor.
    - f. A standard operating procedures manual describing work practices and procedures, equipment, type of decontamination facilities, respirator program, special removal techniques, etc.
  2. Citations/Violations/Legal Proceedings - Submit a notarized statement describing:
    - a. Any citations, violations, criminal charges, or legal proceedings undertaken or issued by any law enforcement, regulatory agency, or consultant concerning performance on previous abatement contracts. Briefly describe the circumstances citing the project and involved persons and agencies as well as the outcome of any actions.
    - b. Any Stop Work Orders issued on projects within the past two years.
    - c. Any litigation or arbitration proceedings arising out of performance on past projects.
    - d. Any liquidated damages assessed within the last two years.
  3. Preliminary Schedule
    - a. Provide an estimate of manpower to be utilized and the time required for completion of each major work area. Include estimated size and number of crews and work shifts.
  4. The Contractor shall inform the Owner, by letter, that he is familiar with all aspects of the job. Any questions shall be addressed before submitting the proposal.
  5. The Contractor shall be held financially responsible for any misinterpretations in his estimating and bidding. All errors made in estimating, including costs and difficulties, are the sole responsibility of the contractor, and shall not result in additional expense to the Owner.
  6. The Owner assumes no responsibility for any conclusions or interpretations made by the Contractor based upon the information made available by the Owner.

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B. Pre-work Submittals. The asbestos abatement contractor shall submit to the Owner's Representative three (3) copies of the documents listed below a minimum of five work days prior to the pre-construction conference:

1. Progress Schedule:
  - a. Show the complete sequence of construction by activity and the sequencing of work within each phase or section of the work.
  - b. Show the dates for the beginning and completion of each major element of work including substantial completion dates for each work area, or phase.
  - c. Show projected percentage of completion for each item, as of the first day of each month.
  - d. Show final inspection dates.
2. Notifications: Submit notifications required by federal, state, and local regulations together with proof of timely transmittal to agencies requiring the notice (e.g., certified mail return receipt).
3. Permits: Submit copies of current valid permits required by state and local regulations, including arrangements for storage, transportation, and disposal of contaminated material.
4. Abatement Work Plan: Provide plans which clearly indicate all work areas (numbered sequentially) including the locations and types of all decontamination chambers, entrances and exits to the work area, type of abatement activity/technique, number and location of negative air units and exhaust including calculations, and the proposed location and construction of storage facilities and field office.
5. Equipment: Submit manufacturer's information about vacuums, negative air pressure equipment, respirators, and air supply equipment, etc. Provide certification that all equipment meets applicable requirements of OSHA and EPA.
6. Samples: Submit samples of warning notices to be posted, catalog descriptions of protective clothing, replacement materials, etc.
7. Worker Training and Medical Surveillance: The Contractor shall submit a list of the persons who will be employed by him and his subcontractors in the removal work. Present evidence that workers have received proper training required by the regulations and the medical examinations required by OSHA 29 CFR 1926.1101.
8. Logs: Specimen copies of daily progress log, visitor's log, and disposal log.
9. Material List: A complete materials list of all items proposed to be furnished and used under this contract.
10. Subcontractors List: The Contractor shall submit a list of all subcontractors he intends to use on the project.

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11. Material Safety Data Sheets (MSDS): Submit copies of MSDS for each chemical or material used for the project (encapsulant, surfactant, mastic remover, etc.).
  12. Project Supervisor: Submit the resume of the proposed Project Supervisor.
  13. Rental Notifications: Submit copies of notices sent to rental suppliers informing them of the nature of the work that the Contractor intends to use the equipment for an asbestos abatement project.
  14. Worker's Acknowledgments: Submit statements signed by each employee that the employee has received training in the proper handling of asbestos containing materials; understands the health implications and risks involved; and understands the use and limitations of the respiratory equipment to be used.
- C. Project close out submissions in addition to the requirements of Section 017000 of the specifications:
1. Submit copies of all waste disposal manifests, seals, and disposal logs.
  2. Submit OSHA compliance air monitoring records conducted during the work.
  3. Submit copies of the daily progress log.
  4. Submit copies of the Visitor's log.
  5. Submit Certificate of Visual Inspection.
  6. Submit a list of all employees utilized on the project with social security number and New York State Asbestos Handler Certificate number.
  7. Submit copies of any required Employee Statements such as Medical Examination Statement, Certificate of Worker's Release, or Employee Training Statement.
- D. The Contractor shall be financially responsible for:
1. All demolition associated with asbestos removal, asbestos removal and asbestos disposal costs.
  2. Installation of temporary electricity and lights.
  3. Standby electrician for temporary power.
  4. All plumbing work necessary for abatement.

#### 1.4 DESCRIPTION OF WORK ACTIVITIES

- A. The Peekskill City School District Reconstruction will include the abatement of asbestos containing materials. Asbestos containing materials that will be removed or disturbed during this project include:
1. Thermal system insulation materials that contain asbestos include pipe insulation and mudded fitting insulation.
  2. Miscellaneous materials that contain asbestos include gypsum board joint compound, vinyl floor tile mastics and exterior window/louver caulk.
  3. The number and location of containments and decontamination units will be as approved by the Owner.
  4. Multiple work areas with possible multiple mobilizations may be required for this project to coordinate post-abatement renovation activities in the buildings.
- B. Abatement Work Area Information – For the purpose of the description of work, the areas for abatement include the Main Level of Oakside Elementary, the Basement of Uriah Hill School, and the First Floor Level of Woodside Elementary. It includes:
1. Oakside Elementary – The work includes the removal and replacement of 12 unit ventilators and associated louvers and controls. The drywall joint compound and exterior window/louver caulk has tested positive for asbestos.
    - a. The abatement contractor shall remove all attachments to the drywall including but not limited to unit ventilator anchors, moldings, trim pieces, thermostats and patch the wall. Abatement contractor shall install all new attachments to the drywall. Coordinate work with the mechanical contractor. Area locations are indicated on drawing O-H.100.00 to provide the approximate locations of removal. The Contractor is responsible for verifying the amounts and locations of material.
    - b. The abatement contractor shall remove all louver caulk and clean and dispose of the louvers where indicated. The caulk for Rooms 213, 215, and 216 also contains PCB's, refer to specification section 028433 for additional requirements. Coordinate work with the mechanical contractor. Area locations are indicated on drawing O-H.100.00 to provide the approximate locations of removal. The Contractor is responsible for verifying the amounts and locations of material.

DWG #	Space ID Number	Room Description	Homogeneous Material Description	Abate Code #	Quantity
O-H.100.00	NA	Main Level	Drywall Joint Compound	1 and 2	150 sq. ft.
O-H.100.00	NA	Main Level	Exterior Louver Caulk	3	250 lin. ft.

2. Uriah Hill School – The work includes the installation of a new heating and ventilating unit and associated louver and controls. The drywall joint compound and pipe and fitting insulation has tested positive for asbestos.
  - a. The abatement contractor shall install all new attachments to the drywall. Coordinate work with the mechanical contractor. Area locations are indicated on drawing U-H.100.00 to provide the approximate locations of removal. The Contractor is responsible for verifying the amounts and locations of material.
  - b. The abatement contractor shall remove pipe and fitting insulation indicated to allow for connection of new heating pipes.

DWG #	Space ID Number	Room Description	Homogeneous Material Description	Abate Code #	Quantity
U-H.100.00	NA	Basement Level	Drywall Joint Compound	1	20 sq. ft.
U-H.100.00	NA	Basement Level	Pipe and Fitting Insulation	2	55 lin. ft.

3. Woodside Elementary – The work includes the removal and replacement of 23 unit ventilators and associated louvers and controls. The drywall joint compound, exterior window/louver caulk, and floor tile mastic has tested positive for asbestos.
  - a. The abatement contractor shall remove all attachments to the drywall including but not limited to unit ventilator anchors, moldings, trim pieces, thermostats and patch the wall. Abatement contractor shall install all new attachments to the drywall. Coordinate work with the mechanical contractor. Area locations are indicated on drawings W-H.101.00 and W-H.102.00 to provide the approximate locations of removal. The Contractor is responsible for verifying the amounts and locations of material.
  - b. The abatement contractor shall remove all louver caulk and clean and dispose of the louvers where indicated. Coordinate work with the mechanical contractor. Area locations are indicated on drawings W-H.101.00 and W-H.102.00 to provide the approximate locations of removal. The Contractor is responsible for verifying the amounts and locations of material.
  - c. The abatement contractor shall remove pipe and fitting insulation indicated to allow for work of other contracts.

DWG #	Space ID Number	Room Description	Homogeneous Material Description	Abate Code #	Quantity
W-H.101.00	NA	First Floor	Drywall Joint Compound	1 and 2	900 sq. ft.
W-H.101.00	NA	First Floor	Exterior Louver Caulk	3	200 lin. ft.
W-H.101.00	NA	First Floor	Pipe and Fitting Insulation	4	132 lin. ft.
W-H.102.00	NA	First Floor	Exterior Louver Caulk	3	40 lin. ft.
W-H.102.00	NA	First Floor	Pipe and Fitting Insulation	4	112 lin. ft.

- C. The Owner, Asbestos Project Monitor or other authorized representative has the authority during asbestos abatement activities to stop the work at any time the conditions are not within the Specifications or applicable regulations. The stoppage of work shall continue until conditions have been corrected to the satisfaction of the Owner, Asbestos Project Monitor or other authorized representative. Standby time required to resolve violations shall be at the Contractor's expense.

## 1.5 DEFINITIONS

- A. The following definitions apply to this project:

1. Abatement - Procedures to control fiber release from asbestos containing materials. This includes removal, encapsulation, enclosure, and repair. "Abatement Activities" shall mean all activities from the initiation of work area preparation through successful clearance air monitoring performed at the conclusion of an asbestos project or minor project.
2. Aggressive Sampling - A method of sampling in which the person collecting the air sample creates activity by the use of mechanical equipment during the sampling period to stir up settled dust and simulate activity in that area of the building.
3. AIHA - The American Industrial Hygiene Association, 475 Wolf Ledges Parkway, Akron, Ohio 44311.
4. Air Lock - A system for permitting entrance and exit while restricting air movement between a contaminated area and an uncontaminated area. It consists of two curtained doorways separated by a distance of at least 3 feet such that one passes through one doorway into the Air Lock, allowing the doorway sheeting to overlap and close off the opening before proceeding through the second doorway, thereby preventing flow-through contamination.
5. Air Sampling - The process of measuring the fiber content of a known volume of air collected during a specific period of time. The procedure utilized for asbestos follows the NIOSH Standard Analytical Method 7400, or the provisional method developed by the U.S. EPA that are utilized for lower detectability and specific fiber identification.

6. Ambient Air Monitoring - Shall mean measurement or determination of airborne asbestos fiber concentrations outside but in the general vicinity of the work site.
7. Amended Water - Water to which a surfactant has been added.
8. ANSI - The American National Standards Institute, 1430 Broadway, New York, New York 10018.
9. Area Air Sampling - Any form of air sampling or monitoring where the sampling device is placed at some stationary location.
10. Asbestos - Any hydrated mineral silicate separable into commercially usable fibers, including but not limited to chrysotile (serpentine), amosite (cummingtonite-grunerite), crocidolite (riebeckite), tremolite, anthophyllite and actinolite.
11. Asbestos-Contaminated Objects - shall mean any objects that have been contaminated by asbestos or asbestos containing material.
12. Asbestos Containing Material (ACM) - Asbestos or any material containing one percent or more asbestos by weight.
13. Asbestos Containing Waste (ACW) – Asbestos containing material or asbestos-contaminated objects requiring disposal.
14. Asbestos Project - Any form of work performed in connection with the alteration, renovation, modification, or demolition of a building or structure which will disturb an asbestos containing material.
15. Asbestos Removal Plan - A plan that will be undertaken so as to prevent asbestos from becoming airborne in the course of the alteration, renovation, modification or demolition of any building or structure.
16. Approved Safety and Health Program - A program that provides training in the handling and use of asbestos containing material, and safety and health risks inherent in such handling and use, together with methods for minimizing the exposure of workers and the public to asbestos fibers, and instruction in all applicable Federal, State and Local laws and regulations pertaining to asbestos related work.
17. ASTM - The American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.
18. Authorized Visitor - The building owner, his representative, and any representative of a regulatory or other agency having jurisdiction over the project.
19. Background Level Monitoring - A method used to determine airborne asbestos fiber concentrations inside and outside a building prior to starting an asbestos abatement project.



20. Baseline Monitoring - Shall mean a measurement or determination of airborne asbestos fiber concentrations inside the work place and outside a building prior to starting abatement activities.
21. Clean - Shall refer to a state deemed acceptable to the Building Owner and shall be based on visual, analytical and other appropriate methods.
22. Clean Room - An uncontaminated area or room that is a part of the worker decontamination enclosure with provisions for storage of workers' street clothes and protective equipment.
23. Clearance Air Monitoring - The employment of aggressive sampling techniques with a volume of air collected to determine the airborne concentration of residual fibers, and shall be performed as the final abatement activity.
24. Contractor - Any self-employed person, company, unincorporated association, firm, partnership or corporation and any owner or operator thereof, which engages in an asbestos project or employs persons engaged in an asbestos project.
25. Curtained Doorway - A device that consists of at least three overlapping sheets of plastic over an existing or temporarily framed doorway. One sheet shall be secured at the top and left side, the second sheet at the top and right side, and the third sheet at the top and left side. All sheets shall have weights attached to the bottom to insure that the sheets hang straight and maintain a seal over the doorway when not in use.
26. Decontamination Enclosure System - A series of connected rooms, separated from the work area and from each other by Air Locks, for the decontamination of workers, materials, and equipment.
27. Department - Any regulatory agency having jurisdiction over the project.
28. Disturb - Shall mean to alter, change, or stir, such as but not limited to the removal, encapsulation, enclosure, or repair of asbestos containing material.
29. Encapsulant (sealant) or Encapsulating Agent - A liquid material which can be applied to asbestos containing material and which temporarily controls the possible release of asbestos fibers from the material either by creating a membrane over the surface (bridging encapsulation) or by penetrating into the material and binding its components together (penetrating encapsulant).
30. Encapsulation - The coating or spraying of asbestos material with a sealant.
31. Enclosure - The construction of airtight walls and ceilings between the asbestos material and the facility environment, or around surfaces coated with asbestos materials, or any other appropriate scientific procedure as determined by the Department, which prevents the release of asbestos materials.

32. EPA - The Environmental Protection Agency, 401 M Street, S.W., Washington, D.C. 20460.
33. Equipment/Waste Decontamination Enclosure - That portion of a decontamination enclosure system designated for the controlled transfer of materials and equipment, consisting of airlocks, a washroom, and a holding area.
34. Equipment Room - A contaminated area or room that is part of the worker decontamination enclosure system with provisions for the storage of contaminated clothing and equipment.
35. Fiber - an acicular single crystal or a similarly elongated polycrystalline aggregate which displays some resemblance to organic fibers by having such properties as flexibility, high aspect ratio, silky luster, axial lineation, and others, and which has attained its shape primarily through growth rather than cleavage.
36. Fixed Object - A unit of equipment or furniture in the work area, which cannot be removed from the work area.
37. Friable Asbestos Material - Any material applied onto ceilings, walls, structural members, piping, ductwork, or any other part of the building structure which, when dry, may be crumbled, pulverized or reduced to powder by hand pressure.
38. Glovebag Technique - A method for removing friable asbestos containing material from heating, ventilation, and air conditioning (HVAC) ducts, short piping runs, valves, joints, elbows, and other non-planar surfaces in a non-contained work area. The glovebag assembly is a manufactured device consisting of a glovebag (constructed of 10-mil transparent plastic), two inward-projecting long-sleeve rubber gloves, one inward-projecting water-wand sleeve, an internal tool pouch, and an attached, labeled receptacle for asbestos waste. The glovebag is constructed and installed in such a manner that it surrounds the object or area to be decontaminated and contains all asbestos fibers released during the removal process.
39. HEPA Filter - A high efficiency particulate air filter capable of trapping and retaining 99.97 percent of particles (asbestos fibers) greater than 0.3 micrometers in mass median aerodynamic equivalent diameter.
40. HEPA Filter Equipped Unit - A portable local exhaust system equipped with HEPA filtration. The system shall be capable of creating a negative pressure differential between the outside and inside of the work area.
41. HEPA Vacuum Equipment - Vacuuming equipment with a high efficiency particulate air filter system.
42. Holding Area - A chamber in the equipment decontamination enclosure located between the washroom and an uncontaminated area.

43. Homogeneous Work Area - A site within the abatement work area that contains one type of asbestos containing material and where one type of abatement is used.
44. Incidental Exposure - Shall mean any occupational exposure to asbestos fibers caused by disturbing asbestos containing material during the performance of one's job other than during asbestos abatement activities.
45. Industrial Hygienist - The professional contracted or employed by the Building Owner to supervise and/or conduct air monitoring and analysis, perform inspections and act as the Owner's Representative.
46. Isolation Barrier - Shall mean the construction of partitions, the placement of solid materials, and the plasticizing of apertures to seal off the work place from surrounding areas and to contain asbestos fibers in the work area.
47. Log - Shall mean an official record of all activities that occurred during the project and it shall identify the Building Owner, Agent, Contractor, and Workers, and other pertinent information.
48. Monitoring - May Include:
  - a. Visual inspection for the presence of visible emissions.
  - b. Air monitoring performed in accordance with accepted methods.
  - c. Core samples of encapsulated or bridged materials.
49. Movable Object - A unit of equipment or furniture in the work area that can be removed from the work area.
50. NESHAPS - The National Emission Standards for Hazardous Air Pollutants (40 CFR Part 61).
51. NIOSH - The National Institute for Occupational Safety and Health CDC - NIOSH, Building J N.E., Room 3007, Atlanta, GA 30333.
52. Non-Asbestos Material - Materials manufactured without knowingly introducing asbestos containing materials and containing a maximum of 1% asbestos by weight.
53. Occupied Area - Area of the work site where abatement is not taking place and where personnel or occupants normally function, or where abatement project workers are not using personal protective equipment.
54. OSHA - The Occupational Safety and Health Administration, 200 Constitution Avenue, Washington, DC 20210.
55. Outside Air - The air outside buildings and structures.

56. Personal Air Monitoring - A method used to determine employees' exposure to airborne fibers. The sample is collected outside the respirator in the worker's breathing zone. This form of sampling is required by the OSHA asbestos standards (29 CFR 1926.1101).
57. Personal Protective Equipment - Appropriate clothing, headgear, eye protection, footwear and NIOSH approved respiratory protection acceptable to the department.
58. Plasticize - To cover floors and walls with fire retardant plastic sheeting or by using spray plastics.
59. Prior Experience - Experience required of the Contractor on asbestos projects of similar nature and scope to insure capability of performing the asbestos abatement in a satisfactory manner. Similarities shall be in areas related to material composition, project size, abatement methods required, number of employees and the engineering, work practice and personal protection controls required.
60. Removal - The stripping of any asbestos containing material from surfaces or components of a facility or taking out structural components in accordance with 40 CFR 61 Subsections A and M.
61. Renovation - Altering in any way one or more facility components. Operations in which load-supporting structural members are wrecked or taken out are excluded.
62. Respiratory Protection Standard - Respiratory protection provided to workers in accordance with of Personnel Protection Requirements OSHA 29 CFR 1926.1101 and CalOSHA General Industry Safety Orders Section 520B.
63. Shift - Shall mean a worker's, or simultaneous group of workers', complete daily term of work.
64. Shower Room - A room between the Clean Room and the Equipment Room in the Worker Decontamination Enclosure with hot and cold running water controllable at the tap and arranged for complete showering during decontamination.
65. Staging Area - The area near the Waste Transfer Air Lock where containerized asbestos waste has been placed prior to removal from the work area.
66. Strip - To remove friable asbestos materials from any part of the facility.
67. Structural Member - Any load-supporting member of a facility, such as beams and load-supporting walls, or any non-load-supporting member, such as ceiling and non-load-supporting walls.
68. Surfactant - A chemical wetting agent added to water to improve penetration.
69. Visible Emissions - Any emissions containing particulate asbestos material that are visually detectable without the aid of instruments.

70. Washrooms - A room between the Work Area and the Holding Area in the Equipment/Waste Decontamination Enclosure System where equipment and waste containers are wet cleaned and/or HEPA vacuumed prior to disposal.
71. Water Leaks - Special care and consideration will be given to prevent occurrences of water leaks. It is the contractor's responsibility to periodically monitor the exterior of the work area to confirm that no leaks have occurred. In the advent of a leak, all work will stop and the personnel devoted to locating, stopping and properly cleaning up the water leak. Work shall not commence inside the area until the cause of the water leak is documented and procedures to prevent further incidents are enacted.
72. Wet Cleaning - The process of eliminating asbestos contamination from building surfaces and objects by using cloths, mops, or other cleaning tools that have been dampened with water, and by afterward disposing of these cleaning tools as asbestos contaminated waste.
73. Work Area - Designated rooms, spaces, or areas of the project where asbestos abatement activities take place.
74. Work site - Premises where asbestos abatement activity is taking place, and may be composed of one or more work areas.
75. Worker Decontamination Unit - That portion of a Decontamination Enclosure System designated for controlled passage of workers, and other personnel and authorized visitors, consisting of a Clean Room, a Shower Room, and an Equipment Room separated from each other and from the work area by air locks and curtained doorways.

## 1.6 PERSONNEL QUALIFICATIONS

- A. All personnel of the Contractor's involved with asbestos work must be trained and tested prior to any work, possess an appropriate Asbestos Handlers Certificate, and shall be thoroughly familiar with the standard operating procedure of the Contractor for abatement work. All personnel shall undergo the medical examinations required by OSHA. The project supervisor and the foreman shall be thoroughly familiar with all applicable regulations and practices for asbestos work and shall have participated in at least two abatement projects, similar in size and scope, during the last two years. All personnel shall pass the respirator fit test. Anyone without the above qualifications shall not be allowed to work during the abatement phase at any time.
  1. The Abatement Contractor shall designate a full time Project Supervisor who shall be on-site at all times. If the Project Supervisor is not on site, all work shall be stopped. The Project Supervisor must be able to read and write English fluently, as well as communicate with his workers. The Project Supervisor shall remain until the project is complete and cannot be removed without the written consent of the Owner and the Environmental Consultant.
  2. Prior to the commencement of work, the Abatement Contractor shall submit the proposed Project Supervisor's resume to the Owner and Environmental Consultant for approval. The

Project Supervisor shall meet the requirements of a "Competent Person" as defined by OSHA 1926.1101 and have a minimum of one year on-the-job training. This person shall hold certification as an Asbestos Project Supervisor.

B. Project Supervisor Qualifications

1. Training and knowledge of applicable regulations and expertise in safety and environmental protection as evidenced by the participation in, successful completion of, and certification by a training course offered by an approved Asbestos Supervisor's course; with current certification by NYS Department of Labor.
2. Experience with abatement work as evidenced through participation in at least two asbestos abatement projects, similar in size and scope to this project.
3. Shall be fluent in English and must speak the language of all of the employees or have designated interpreters on each shift and provide a list of designated interpreters and their work schedule for the Owner.

C. The Supervisor shall:

1. Maintain a permanently bound project logbook that will:
  - a. Identify the facility, Owner's Representative, agent, Contractors and the project.
  - b. Define each work area.
  - c. Record completely all pertinent facts.
  - d. Record date, time and name after each entry.
  - e. Have a daily sign-in for each and every individual crossing into the work area. They must provide, in legible print, name (first and last), worker license number, the time and date entered and exited or proof of authorized visitor status.
  - f. Dates of inspections and documentation of passing.
  - g. A summary of work accomplished at the end of each shift.
  - h. Notes and inspections.
2. Shall see that the decontamination chambers are kept immaculate.
3. Shall ensure that sufficient personal protective equipment is stored in the clean room.
4. Shall survey the work area a minimum of two times per shift for proper housekeeping, safety precautions, barrier integrity and integrity of air hoses, and shall record objective observations.
5. Shall ensure that workers are wearing proper personal protective equipment and are trained in its use and shall instruct workers on evacuation procedures during air compressor breakdown.

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6. Shall ensure that all workers are certified and licensed.
7. Shall take precautions to prevent overstressing workers.

D. Workmen Qualifications

1. Training as evidenced by the participation in, successful completion of, and certification by an approved asbestos handler's course. All asbestos handlers shall have current certification by the New York State Department of Labor.
2. Familiarization with the standard operating procedures for asbestos abatement work.

1.7 NOTIFICATIONS, PERMITS, WARNING SIGNS, LABELS, AND POSTERS

- A. It is the specific responsibility of the Contractor to make, in proper and timely fashion, all necessary notifications to relevant federal, state, and local governing bodies and to obtain and comply with the provisions of all permits or applications required by the Work specified, as well as to make all required submittals required under those auspices. The Contractor shall indemnify the Owner and Owner's Representative from, and pay for all claims resulting from failure to adhere to these premises.
1. Provide the required ten working day notification to EPA on the current EPA notification of demolition and renovation form. Provide the required ten day notification to the New York State Department of Labor on Form DOSH-483, and any other state, regional, and local authority having jurisdiction on the project. Secure all the permits required for the work, including disposal of asbestos in an approved landfill.
  2. Erect warning signs around the work space and at every point of potential entry from the outside. Signs should be in accordance with OSHA standard 29 CFR 1926.1101 Paragraph k (1) (ii). The warning signs shall be a bright color so that they will be easily noticeable. The size of the sign and the size of the lettering shall be no less than the OSHA requirements.
  3. Provide the OSHA required labels, DOT required labels, and EPA Generator labels for all plastic bags and all drums utilized to transport contaminated material to the landfill.
  4. Provide any other signs, labels, warning, and posted instructions that are necessary to protect, inform and warn people of the hazard from asbestos exposure. This notification must be posted prior to the commencement of abatement activities. Post in a prominent and convenient place for the workers, a copy of the latest applicable regulations from OSHA, EPA, NIOSH and state of New York.
  5. Provide notification to all occupants of the work place and areas immediately adjacent to the asbestos project. Information provided in the notification shall include contractor,



project location and size, amount and type of ACM, abatement, dates of expected occurrence and the NYS Department of Labor telephone number.

#### 1.8 EMERGENCY PLANNING

- A. The emergency plan and procedure shall be developed by the Contractor prior to abatement initiation and agreed to by Contractor and Owner's Representative.
- B. Emergency procedures shall be in written form and prominently posted in the Clean Change Area and Equipment Room of the worker decontamination area. Everyone prior to entering the work area must read and sign these procedures to acknowledge receipt and understanding of work site layout, location of emergency exits and emergency procedures.
- C. Emergency planning shall include written notification to facility safety department of planned abatement activities, work schedule and layout of work area, particularly barriers that may affect response capabilities.
- D. Emergency planning shall include considerations of fire, explosion, toxic atmospheres, electrical hazards, slips, trips and falls, confined spaces and heat related injury. Written procedures shall be developed and employee training in procedures shall be provided.
- E. Employees shall be trained in evacuation procedures in the event of work place emergencies.
  - 1. For non-life threatening situations follow normal procedures with assistance from fellow workers if necessary, before exiting the work place to obtain proper medical treatment.
  - 2. For life-threatening injury or illness, worker decontamination shall take lower priority. After measures to stabilize the injured worker, remove him from the work place and secure proper medical treatment.
  - 3. Telephone numbers of all emergency response personnel shall be prominently posted in the Clean Change Area and Equipment Room, along with the location of the nearest telephone.

#### 1.9 RESPIRATORY SYSTEMS

- A. Provide all workers, foremen, superintendents, authorized visitors and Inspectors personally issued and marked respiratory equipment approved by NIOSH and OSHA. When using respirators with disposable filters, supply replacements as necessary.
- B. Where not in violation of NIOSH, OSHA, and any other regulatory requirements or other provisions of the project specifications, the Contractor shall provide the following minimum respiratory protection to the maximum use concentrations indicated. These requirements are based on the more stringent of the OSHA or NIOSH protection factors and a concentration inside the respirator of 0.01 f/cc.

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MSHA/NIOSH APPROVED  
 RESPIRATORY PROTECTION

MAXIMUM USE  
 CONCENTRATIONS

Half-Mask Air Purifying with HEPA Filters	0.1 f/cc
Full-Facepiece Air Purifying HEPA Filters and Quantitative Fit Test	0.5 f/cc
Powered Air Purifying (PAPR), Loose fitting Helmet or Hood, HEPA Filter	0.25 f/cc
Powered Air Purifying (PAPR), Full Facepiece, HEPA Filter	0.5 f/cc
Supplied Air, Continuous Flow, Loose fitting Helmet or Hood	0.25 f/cc
Supplied Air, Continuous Flow, Full Facepiece, HEPA Filter	0.5 f/cc
Full Facepiece, Supplied Air, Pressure Demand, HEPA Filter	10 f/cc
Full Facepiece, Supplied Air, Pressure Demand, with Aux. SCBA, Pressure Demand or Continuous Flow	>10 f/cc

C. Type "C" Respiratory Protection

1. When type "C" Respirators are employed, the Air Supply System shall provide Grade "D" breathing air in accordance with OSHA 29 CFR 1910.134 ANSI 286.1-1973 and Compressed Association Commodity Specification G-7.1 1976.
2. The compressed Air System for Type "C" Respirators shall have a compressor capacity that satisfies the respirator manufacturer's recommendations. The receiver shall have sufficient capacity to allow escape time for the respirator wearers in the event of compressor failure or malfunction. The Compressed Air System shall have a compressor failure alarm, high temperature alarm, carbon monoxide alarm and suitable in-line purifying sorbent beads and filters to assure Grade "D" Breathing Air, and have a minimum of 1 hour of reserve air for emergency evacuations.

3. Emergency evacuation procedures to be followed in the event of compressor failure shall be posted in the work area and shall be explained by the Asbestos Handler Supervisor to all Handlers prior to commencement of work.
4. Safety inspections for airline hoses shall be conducted as necessary with the maximum hose length being 300 feet.

#### 1.10 PERSONAL PROTECTIVE EQUIPMENT

- A. Provide to all workers, foremen, superintendents and authorized visitors and Inspectors protective disposable clothing consisting of full body coveralls, and head covers.
- B. Provide eye protection (contact lenses shall not be worn and spectacle kits which fit each personal respirator shall be issued) and hard hats and safety shoes as required by job conditions and safety regulations. Safety shoes and hard hats shall be approved in accordance with ANSI Z89.1 1969 and ANSI Z41.1 1967.
- C. Reusable footwear, hard hats and eye protection devices shall be left in the "Contaminated Equipment Room" until the end of the asbestos abatement work.
- D. All disposable protective clothing shall be discarded and disposed of as asbestos waste every time the wearer exits from the work space to the outside through the decontamination facilities.
- E. If it is absolutely necessary that non-disposable clothing be worn for the asbestos project, laundering services shall be conducted in accordance with 29 CFR 1926.1101.

#### 1.11 PERSONAL DECONTAMINATION ENCLOSURE SYSTEM

- A. For each abatement area, provide decontamination facilities located in an area agreed upon with the Owner's Representative. The decontamination facilities shall include a Decontamination Enclosure System for workers and visitors and a Decontamination Enclosure System for loading asbestos out of the work area for transportation to the landfill.
- B. The Decontamination Enclosure System for workers and visitors shall consist of three rooms equipped with Air Locks as follows: Clean Room at entrance, Air Lock, Shower Room, Air Lock, an Equipment Room, and Air Lock leading to the Work Area.
  1. The worker decontamination unit shall be constructed of appropriate framing and fully lined utilizing two layers of 6-mil fire-retardant polyethylene sheeting.
  2. In accordance with regulations, reinforced polyethylene sheeting shall be utilized for lining the floor of the decontamination enclosure unit.
- C. Provide or Post the following information in the Clean Room.

1. A copy of the U.S. Environmental Protection Agency Regulations for Asbestos, 40 CFR 61 Subparts A and M and a copy of OSHA Asbestos Regulations, 29 CFR 1926.1101, and a copy of NYS Department of labor industrial code rule 56 with any applicable or site specific variances.
  2. A list of telephone numbers for local hospital, local emergency squad, local fire department, the building owner (or representative) and NYS Department of Labor.
  3. A copy of all Material Safety Data Sheets (MSDS) for hazardous chemicals used during the asbestos project.
- D. Provide lockers for storage of street clothes of workers in the Clean Room. Provide in the same room uncontaminated disposable protective clothing and equipment. This room shall be used by workers and visitors to change from street clothes to disposable protective clothing and gear prior to entering into the contaminated area and to dress into street clothing after they have showered and dried in the Shower Room as they exit from the contaminated area.
- E. Provide walk-through type shower facilities (i.e. enter through one side of the shower and exit the opposite side) with hot and cold water so arranged as to provide complete showering of workers and visitors as they exit from the contaminated area. Make provisions to prevent contaminated water run-off from the Shower Room.
- F. There shall be one shower per 6 full-shift abatement personnel calculated on the basis of the largest shift.
- G. Provide the Equipment Room with storage for contaminated clothing and equipment. In this room, workers and visitors dispose of their disposable protective clothing, except the Respirator, as they prepare to enter the Shower Room.
- H. Provide heating and ventilation in the entire Decontamination System so that airflow will be from the outside towards work space.
- I. All water utilized during this project and contaminated by asbestos shall be filtered. The final filter should be of a 5 micron size. A system containing a series of several filters with progressively smaller pore sizes shall be used to avoid rapid clogging of the filtration system by large particles. Filtered waste water shall be discharged to a sanitary sewer. Used filters shall be disposed of as asbestos containing waste.
- 1.12 WASTE DECONTAMINATION ENCLOSURE SYSTEM
- A. For each abatement area, provide decontamination facilities located in an area agreed upon with the Owner's Representative. The decontamination facilities shall include a Decontamination Enclosure System for workers and visitors and Decontamination Enclosure System for loading asbestos out of the work area for transportation to the landfill.

- B. The Decontamination Enclosure System for transporting asbestos out of the Removal Area shall consist of an Air Lock from the Work Area leading into the Bag Wash and Wipe Room, and another Air Lock leading into the holding area.
  - 1. The waste wash-down room in the decontamination enclosure system shall be a walk-through type (i.e. enter through one side of the waste wash-down room and exit the opposite side).
  - 2. The waste decontamination unit shall be constructed of appropriate framing and fully lined utilizing 2 layers of 6-mil fire-retardant polyethylene sheeting.
  - 3. In accordance with regulations, reinforced polyethylene sheeting shall be utilized for lining the floor of the decontamination enclosure unit.
- C. The Bag Wash and Wipe Room shall be equipped with the facilities to wash and wipe the outside of the bags prior to removing them from the work area for transportation to the landfill. Make provisions to prevent any contaminated water run-off from the Bag Wash and Wipe Room.
- D. Provide heating and ventilation in the entire Decontamination System so that airflow will be from the outside towards work space.
- E. All water utilized during this project and contaminated by asbestos shall be filtered. The final filter should be of a 5 micron size. A system containing a series of several filters with progressively smaller pore sizes shall be used to avoid rapid clogging of the filtration system by large particles. Filtered waste water shall be discharged to a sanitary sewer. Used filters shall be disposed of as asbestos-contaminated waste.

#### 1.13 WORK PLACE ENTRY AND EXIT PROCEDURES

- A. Personnel Entry & Exit
  - 1. Provide all personnel throughout the abatement process with the specified protective clothing and gear. Ensure that all personnel entering and leaving the work place abide by the following procedures:
    - a. All workers and authorized personnel shall enter the work area through the worker Decontamination Enclosure System.
    - b. All personnel, before entering the work area, shall read and be familiar with all posted regulations, personal protection requirements including work place entry and exit procedures and emergency procedures. A sign off sheet shall be used to acknowledge that these have been reviewed and understood by all personnel prior to entry.
    - c. All personnel shall proceed first to the Clean Room, remove all street clothes and don appropriate personal protective clothing, equipment and respiratory protection, as deemed adequate for the job conditions.

- d. Personnel wearing designated personal protective clothing and equipment shall proceed from the Clean Room through the Shower Room and Equipment Room to the main work area.
  - e. While inside the work area there shall be no smoking, eating, drinking, chewing of gum or tobacco, or wearing of jewelry.
  - f. Before leaving the work area all personnel shall remove gross contamination from the outside of respirators and protective clothing by brushing and/or wet wiping procedures.
  - g. Personnel shall proceed to Equipment Room where they remove all protective clothing and equipment except respirators.
  - h. Reusable, contaminated footwear shall be stored in the Equipment Room when not in use in the work area.
  - i. Still wearing respirators, personnel shall proceed to the Shower Area, clean the outside of the respirators and the exposed face area under running water prior to removal of respirator, then shower and shampoo to remove residual asbestos contamination. Various types of respirators will require slight modification of these procedures. An airline respirator with HEPA filtered disconnect protection may be disconnected in the Equipment Room and worn into the Shower. A powered air-purifying respirator (PAPR) face piece will have to be disconnected from the filter/power pack assembly that is not waterproof, upon entering the shower. A negative pressure respirator may be worn into the shower. Cartridges must be replaced for each new entry into the work area.
  - j. After showering and drying off, proceed to the Clean Room and don clean clothing.
  - k. Personnel will not be allowed outside the decontamination unit at the work site when wearing protective clothing since no determination can be readily made concerning their purpose in that area.
2. These procedures shall be posted in the Clean Room and the Equipment Room.
- 1.14 EQUIPMENT and WASTE CONTAINER DECONTAMINATION and WASTE REMOVAL PROCEDURES
- A. Waste Container Pass-Out Procedures.
- 1. Asbestos contaminated waste that has been containerized shall be transported out of the work area through the waste Decontamination Enclosure.
  - 2. The following procedures shall be followed whenever equipment or containers are removed from the work area during a large asbestos project.
  - 3. Waste removal shall not occur during worker shift changes or when workers are showering or changing. Care shall be taken to prevent short-circuiting and cycling of air outward through the waste wash room.

4. Workers are to be stationed in each room/area of the decontamination enclosure to transfer/process the containers and equipment to or from adjacent sections. These workers are not to cross into the adjacent areas/rooms until the waste/equipment transfer is finished for that period and the workers have gone through decontamination as required by Subpart 1.14 of these specifications. The holding area workers shall have entered from uncontaminated areas with appropriate personal protective equipment; or prior to the start of waste transfer, these workers shall have exited the work area, fully decontaminated, and subsequently donned clean personal protective equipment.
5. External surfaces of contaminated containers and equipment shall be cleaned by wet cleaning and/or HEPA vacuuming in the work area before transferring such items into the decontamination enclosure system. Contaminated workers shall not enter the washroom during this procedure.
6. The cleaned containers of ACM and equipment shall be placed in uncontaminated leak-tight plastic bags or sheeting as the item's physical characteristics demand. Air volume shall be minimized and the bags or sheeting shall be sealed. Items that may puncture or tear the plastic bags or sheeting shall be placed in a hardwall container and sealed.
7. The clean recontainerized items shall be moved into the airlock for subsequent transfer to the holding area. The washroom workers shall not enter this airlock or the work area until waste removal is finished for that period.
8. Recontainerized items and cleaned equipment shall be removed from the airlock to the holding area by workers who have entered from uncontaminated areas with appropriate personal protective equipment.
9. The recontainerized items of ACM and cleaned, bagged equipment shall be placed in closed top, watertight plastic carts. These carts shall be held in the holding area pending removal. The carts shall be HEPA vacuumed or wet-cleaned following the removal of the containers of ACM from them.
10. The carts shall be stored in a holding area on the work site.

- B. At the end of a work period, the exit from the Worker Decontamination Enclosure system shall be secured to prevent unauthorized entry.

#### 1.15 DISPOSAL ACTIVITIES

##### A. Applicable Regulations

1. All asbestos waste shall be stored, transported and disposed of as per, but not limited to, the following Regulations:
  - a. NYS DEC 6 NYRCC part 360 and 364
  - b. USEPA NESHAPS 40 CFR 61



Hamlin Design Group  
PRJ 201 Oakside Elementary  
PRJ 202 Uriah Hill School  
PRJ 203 Woodside Elementary  
PRJ 204 Middle School

The City School District of Peekskill  
SED 66-15-00-01-0-005-020  
SED 66-15-00-01-0-007-014  
SED 66-15-00-01-0-008-017  
SED 66-15-00-01-0-014-005

- c. USEPA ASBESTOS WASTE MANAGEMENT GUIDANCE EPA/530-SW-85-007

B. Transportation and Disposal Site

1. The Contractor's Hauler and Disposal Site shall be approved by the owner.
2. The Contractor shall give 24 hour notification prior to removing any waste from the site. Waste shall be removed from site only during normal working hours unless otherwise specified. No waste may be taken from the site without authorization from the Owner's Consultant.
3. The Contractor shall have the Hauler estimate the date and time of arrival at the Disposal Site.
4. Upon arrival at the removal site, the Hauler must possess and present to the Owner's Consultant a valid New York State Department of Environmental Conservation part 364 asbestos hauler's permit. The Owner's Consultant may verify the authenticity of the hauler's permit with the proper authority.
5. The Hauler, with the Contractor and the Owner's Representative, shall inspect all material in the transport container prior to taking possession and signing the asbestos waste manifest.
6. The Contractor shall not permit any off-site transfers of the waste or allow the waste to be combined with any other off-site asbestos material. The Hauler must travel directly to the disposal site with no unauthorized stops.

C. Waste Storage Container

1. All waste containers shall be fully enclosed and lockable (i.e. enclosed dumpster, trailer, etc.). NO OPEN CONTAINERS WILL BE PERMITTED ON-SITE (i.e. open dumpster with canvas cover, etc.).
2. The container shall be plasticized and sealed with a minimum of one (1) layer of 6 mil. polyethylene on the sides and two (2) layers of 6 mil. polyethylene on the floor.
3. While on-site, the container shall be labeled with EPA Danger signs:

DANGER  
CONTAINS ASBESTOS FIBERS  
AVOID CREATING DUST  
CANCER AND LUNG DISEASE HAZARD

4. The New York State Department of Environmental Conservation Asbestos Hauler's Permit number shall be stenciled on both sides and back of the container. The container will not be permitted to leave the site without the proper identification.
5. Once the container is loaded at the site, the door(s) will be locked at all times.
6. Before the container is removed from the project site for transportation to the Disposal Site, the Owner's Consultant will confirm the container doors are locked. The locks shall be removed at the Disposal Site by the operator of the Disposal Facility.
7. The Owner may initiate random checks at the Disposal Site to insure that the procedures outlined herein are complied with.

D. Asbestos Waste Manifest

1. The manifest shall be completed by the Contractor and verified by the Owner's Consultant that all the information and amounts are accurate and the proper signatures are in place.
2. The manifest shall have the signatures of the Owner's Consultant, the Contractor, and the Hauler representatives prior to any waste being removed from the site. A copy of the completed manifest shall be retained by the Owner's Consultant and the Contractor and shall remain on site for inspection.
3. The Contractor shall maintain a waste disposal log which indicates load number, date and time left site, container size, quantity of ACM, Hauler, NYS DEC permit number, trailer and tractor license number, and date manifest was returned to Consultant.
4. Upon arrival at the Disposal Facility, the manifest shall be signed by the Disposal Facility operator to certify receipt of asbestos containing materials covered by the manifest.
5. The Disposal Facility operator shall return the manifest to the Owner's Consultant. Copies of the completed manifest are to be sent by the Disposal Facility operator to the Hauler and Contractor.

E. Compliance

1. Failure to adhere to these procedures shall constitute a material breach of the Contract and the Owner shall have the right to and may terminate the Contract provided, however, the failure of the Owner to so terminate shall not relieve the Contractor from future compliance.

1.16 ENGINEERING CONTROLS

- A. Provide supplied air to and exhaust air from the work area to maintain negative pressure. The ventilation system shall operate on a 24 hour basis throughout the abatement process until the work area clearance requirements are met. The ventilation system shall be in accordance with

EPA recommendations included in the "Guidance for Controlling Friable Asbestos Containing Materials in Buildings" and current OSHA standards.

- B. A static negative air pressure of 0.02 inches (minimum) water column shall be maintained at all times in the work area during abatement to ensure that contaminated air in the work area does not filter back to uncontaminated areas.
- C. In a multi-room abatement project, provide a sufficient number of supply and exhaust units to create a stream of air away from faces of the workers in each room, and in such a way as to not damage or compromise the integrity of the plastic isolation barriers.
- D. Install and initiate operation of HEPA filter ventilation units as needed to provide an air change in the work area, every 15 minutes. Four air changes per hour will be used to calculate the number of HEPA filter ventilation units needed to perform this project.
- E. Openings made in the enclosure system to accommodate these shall be made airtight with tape and/or caulking as needed.
- F. Where more than one unit is installed, they should be turned on one at a time, checking the integrity of wall barriers for secure attachment and need for additional reinforcement.
- G. A dedicated power supply for the negative pressure ventilating units shall be utilized.
- H. On electric power failure, all work must stop immediately, and shall not resume until power is restored and exhaust units are operating again. On extended power failure, (longer than 1 hour), the decontamination facilities shall be sealed air tight after the evacuation of personnel from the work area.
- I. HEPA filter ventilation units shall be in compliance with ANSI Z9.2 (1979), Local Exhaust Ventilation.

#### 1.17 MAINTENANCE OF WORK PLACE BARRIERS AND WORKER DECONTAMINATION ENCLOSURE SYSTEMS

- A. Following completion of the construction of all polyethylene barriers and Decontamination System Enclosures, a twelve hour settling period shall be allowed to insure that barriers will remain intact and secured to walls and fixtures before beginning actual work activities.
- B. All polyethylene barriers inside the work place, in the Worker Decontamination Enclosure System, in the Waste Container Pass-Out Air Lock, and at partitions constructed to isolate the work area from occupied areas, shall be inspected at least twice daily, including prior to the start of each day's abatement activities. The time of the inspections and conditions observed shall be documented in the daily project log.
- C. Damage and defects in the Enclosure System are to be repaired immediately upon discovery.

- D. Smoke tubes shall be used to test the effectiveness of the work area barrier and the Worker Decontamination Systems before abatement work begins with the negative pressure ventilation units in operation and at least once a day thereafter until the work is completed. Results and observations shall be documented in the project logbook.
- 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 barriers, and debris/residue cleaned up using appropriate HEPA vacuuming and wet cleaning procedures.
- F. If air samples collected outside of the work area during abatement activities indicate airborne fiber concentrations greater than 0.01 f/cc or pre-measured background levels (whichever is higher), work shall immediately stop for inspection and repair of barriers. Cleanup of surfaces outside of the work area, using HEPA vacuums or wet cleaning techniques, may be necessary.

#### 1.18 APPLICABLE PUBLICATIONS

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced on text by basic designation only.
  - 1. United States Department of Labor - OSHA Regulation 1926.1101. Asbestos. (Fed Reg Vol 59, No. 153, Wednesday August 10, 1994, Rules and Regulations).
  - 2. United States Department of Labor - OSHA.1910.1001 Asbestos. (Fed Reg Vol 59, No. 153, Wednesday August 10, 1994, Rules and Regulations).
  - 3. United States Department of Labor. OSHA Safety and Health Standards (20 CFR 1926/1910). Construction industry. (Most Current Edition).
  - 4. U.S. Environmental Protection Agency. 40 CFR Part 61, Subsection B: National Emission Standard for Asbestos, Asbestos Stripping, Work Practices, and Disposal of Asbestos Waste.
  - 5. U.S. Environmental Protection Agency. Asbestos Hazard Emergency Response Act.40CFR763, Subpart E, Asbestos Containing Materials in Schools
  - 6. U.S. Environmental Protection Agency. Guidance for Controlling Asbestos Containing Materials in Buildings. EPA 560-5-85-024, June 1985, and EPA 560/5-83-002, March 1983).
  - 7. U.S. Environmental Protection Agency. Asbestos Containing Materials in School buildings: A Guidance Document. (C00090 March 1979 Parts 1 & 2).
  - 8. New York State Department of Labor Industrial Code 56.

#### 1.19 ASBESTOS WASTE REQUIREMENTS

- A. The Contractor shall maintain compliance with all provisions of the following regulations: NYS DOL IC 56; USEPA, Asbestos Regulation 40 CFR 61.152, 29 CFR 1926.1101, 29 CFR 1910.1200 (F) of OSHA's Hazard Communication Standard, and other applicable standards.

Note: Any penalties incurred for failure to comply with any of the above regulations, will be the sole responsibility of the Contractor and his Sub-Contractors. The Owner claims no responsibility for fines imposed due to the negligence of the Contractor.

- B. Labeled ACM waste containers or bags shall not be used for non-asbestos containing debris or trash. Any material placed in labeled containers or bags, whether turned inside out or not, shall be handled and disposed of as asbestos containing waste (ACW).
- C. When presenting asbestos containing waste (ACW) for storage at the generation site, the Contractor shall:
1. Wet down ACW in a manner sufficient to prevent all visible emissions of dust into the air.
  2. Seal material in a leak tight container while wet.
  3. Keep ACW separate from any other waste.
- D. When presenting asbestos containing waste (ACW) for storage away from the site of generation, the Contractor shall:
1. Ensure that ACW has been properly packaged and labeled as per requirements above.
  2. Examine the containers of ACW to ensure that there are no breaks in the containers and that no visible dusts are being released into the air.
    - a. The examination shall be conducted in a manner reasonably calculated to minimize disturbance and damage to the container.
    - b. If examination reveals damage to a container of ACW the Contractor or person accepting the waste shall immediately wet down the ACW and re-package it into a clean leak tight container. The repackaging shall be conducted in a place and manner to minimize potential exposure to the general public. The subsequent repackaging shall be the financial responsibility of the Contractor and occur at no extra cost to the Owner.
- E. Keep asbestos containing waste (ACW) separate from any other waste.
- F. When storing asbestos containing waste (ACW) - The Contractor shall:
1. Ensure that the ACW has been sufficiently wet down in a leak tight container.
  2. Examine the integrity of the container's leak tight seal at a minimum of once per 24 hour period.

3. Re-wet and repackage any damaged containers.
  4. Maintain at storage site an adequate supply of spare leak tight containers.
  5. Maintain at storage site an adequate supply of amended water.
  6. Keep ACW separate from any other waste.
  7. Keep ACW in a secured, enclosed, and locked container.
  8. If the Contractor has intention of storing a quantity of asbestos containing waste (ACW) greater than or equal to 50 cubic yards, the Contractor shall:
    - a. Submit a written request and receive written approval from the Owner's Representative.
- G. When presenting asbestos containing waste (ACW) for transport, the contractor shall:
1. Ensure that ACW has been sufficiently wetted down.
  2. Examine the integrity of the container's air tight seal.
  3. Re-wet and re-package any damaged containers.
  4. Keep waste separate from all other wastes.
  5. Ensure that a person transporting asbestos waste holds a valid permit issued pursuant to law.
- H. When transporting Asbestos Containing Waste (ACW)
1. Examine the integrity of the container's leak tight seal at a minimum of once per 24 hour period.
  2. Re-wet and re-package any damaged containers.
  3. Keep ACW in a secured, enclosed, and locked container.
- I. When asbestos containing waste (ACW) is presented for disposal
1. The Contractor at the time of presenting for disposal of ACW shall:
    - a. Comply with all applicable orders issued pursuant to asbestos disposal.
    - b. Ensure that ACW has been sufficiently wet down.
    - c. Examine the integrity of the container's air tight seal.
    - d. Re-wet and re-package any damaged containers.
    - e. Keep waste separate from all other wastes.

J. Disposal of asbestos containing waste (ACW)

1. NO PERSON UNDER ANY CIRCUMSTANCES SHALL ABANDON ASBESTOS CONTAINING WASTE.
2. Disposal shall be at an approved landfill and a manifest form will be signed by the Landfill Owner documenting receipt and acceptance of the ACW which will be furnished to the Owner's Representative.

1.20 TEMPORARY FACILITIES, CONTROLS, OFFICE

A. A source of water and electricity will be provided at the site without any charge to the Contractor.

B. Temporary Electricity and Lighting.

1. Electrical connections from the source of the electricity to the work area shall be provided by the Contractor.
2. The Contractor shall provide all wiring, lighting, switches, outlets, etc., and shall be in accordance with national, state, local and Underwriters Laboratories requirements and installed by qualified and licensed individuals.
3. The Contractor shall be responsible for any damages caused by them to the Owner's electrical systems.
4. The Contractor shall utilize Ground Fault Interrupts, and undamaged, grounded extension cords
5. The Contractor shall have adequate lighting within the work area.
6. The Contractor shall take all appropriate precautions and steps necessary to protect all people from the hazards involved with electricity and liquids inside the work area.

C. Temporary Water

1. All connections to the Building's water system by the Contractor shall be equipped with Back Flow protection.
2. All fittings, valves, hoses, etc. utilized must be temperature and pressure rated for the project's conditions.

PART 2 – MATERIALS AND EQUIPMENT

2.1 MATERIALS AND EQUIPMENT

A. All materials subject to damage shall be stored off the ground, away from wet or damp surfaces, and under protective cover to prevent damage or contamination. Replacement materials shall be stored outside of the work area until abatement is completed.

1. Damaged and deteriorating materials shall not be used and shall be removed from the premises.



2. When asbestos containing material that has been used for insulation is removed, equivalent protection shall be provided with non-asbestos containing material, in conformity with all applicable NYS Codes.
- B. Plastic (polyethylene) sheeting, or spray-plastics, of 6-mil thickness or greater, in sizes to minimize the frequency of joints, shall be employed for containment. All polyethylene sheeting shall be fire-retardant.
- C. Duct tape or equivalent shall be capable of sealing joints of adjacent sheets of plastic, facilitating attachment of plastic sheets to finished or unfinished surfaces of dissimilar materials, and adhering under both dry and wet conditions, including during the use of amended water.
- D. Spray adhesive shall be capable of providing additional sealing of joints and facilitating attachment of plastic sheeting to finished or unfinished surfaces where needed. Adhesive shall be capable of adhering under dry and wet conditions, including during the use of amended water.
- E. The surfactant shall be a product that is non-toxic, non-carcinogenic, and is not an eye, respiratory system, or skin irritant.
- F. Airtight and watertight containers shall be provided to receive and retain any asbestos containing or contaminated materials for storage until disposal at a disposal site. The containers shall be labeled with the appropriate OSHA required labels (OSHA Regulation 29 CFR 1926.1101(k)), DOT required labels, and EPA Generator labels. Plastic bags used for waste storage or disposal shall be 6-mil in thickness minimum and be marked with the appropriate OSHA and DOT caution labels and the EPA Generator label.
- G. Provide adequate HEPA Filter equipped ventilation units, including HEPA filter replacements.
- H. Provide all tools, respirators and filter replacements necessary.
- I. Provide the necessary water filtration units, including filters to filter waste water through a 5 micron final filter.
- J. The Contractor shall have available ladders and/or scaffolds of sufficient dimension and quantity so that all work surfaces can be easily and safely reached by Inspectors. Scaffold joints and ends shall be sealed with tape to prevent incursion of asbestos fibers. Scaffolding shall comply with the New York State Building Code and OSHA requirements.

## PART 3 – EXECUTION

### 3.1 WORK AREA PREPARATION

- A. The Contractor shall provide notification to all occupants of the floor where abatement is scheduled and adjacent floors of the building of the scheduled asbestos project in accordance with NYS Code Rule 56.

- B. The work area shall be vacated by the occupants prior to work area preparation and until successful clearance air monitoring.
- C. The Contractor shall post caution signs meeting the specifications of OSHA Construction Standard Section 1926.1101 (k) at appropriate approaches to a location where airborne concentrations of asbestos may exceed ambient background levels. Signs shall be posted a distance sufficiently far enough away from the work area so as to permit an employee to read the sign and take the necessary protective measures to avoid exposure. Additional signs may need to be posted following construction of work place enclosure barriers.
- D. The Contractor shall have at least one supervisor at the job site at all times who can communicate effectively in English. Failure of this provision will result in stoppage of work, and will not resume until such a person is on the job site.
- E. The Contractor shall erect the decontamination enclosure system.
- F. The Contractor shall wet clean and remove all removable items from the work area. This includes furniture and mechanical objects that are movable. All remaining items shall be wet cleaned and protected.
- G. The Contractor shall shut down all existing electric power in the work areas. Provide and ensure safe installation of temporary power sources and equipment, giving special attention to any area of high humidity and/or sprayed water. Installation must comply with all applicable codes. All power to work areas shall be brought into the area through ground-fault interrupters positioned at the source.
- H. Where it is not practical or feasible to prepare the whole room as the regulated work area, due to the minor quantity of material scheduled for disturbance in each room, the Asbestos Abatement Contractor may establish the regulated work area utilizing tents and establishing negative pressure within the tents in accordance with the requirements of New York State Code Rule 56.

### 3.2 FLOOR PREPARATION

- A. Cover all remaining non-removable items within the removal area with two layers of fire retardant 6 mil polyethylene sheeting taped securely.
- B. Cover all pre-cleaned floors inside the work area, except when the floor covering is the only material scheduled for abatement, with two layers of fire retardant 6 mil (minimum) polyethylene sheeting or equivalent. Additional layers of sheeting may be utilized as drop cloths to aid in cleanup of bulk materials.
  - 1. 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 6 feet between seams is sufficient. Do not locate any seams at wall/floor joints.

2. Floor sheeting shall extend at least 12 inches up the side walls of the work area.
3. All wall/floor sheeting seams shall overlap a minimum of 12 inches, and be secured by first applying spray adhesive and then firmly securing with tape.
4. Contractor will be responsible for any water damage caused by the removal process to the floor(s) below.

### 3.3 WALL AND CEILING PREPARATION

- A. All "critical" barriers, those separating removal areas from non- removal areas, shall be constructed according to Subpart 3.5.
- B. Fill any holes, cracks or inlets into the work area with caulking or equivalent.
- C. Cover all walls and ceiling within the work area with two layers of fire retardant 6 mil polyethylene sheeting or equivalent, with the exception of the panels scheduled for removal.
  1. Each layer of polyethylene sheeting shall be taped securely to the wall/ceiling. Layers shall not be taped to each other.
  2. Plastic shall be sized to minimize seams. Seams shall be staggered and separated by at least a distance of six feet.
  3. Wall sheeting shall overlap floor sheeting by at least 12 inches beyond the wall/floor joint.
  4. Wall sheeting shall be secured so as to prevent it from falling away from walls. This may require additional support/attachments when negative pressure ventilation systems are turned on.
  5. Caulk or seal edges of sheeting at floor, ceiling, walls, and fixtures to form an air tight seal.
- D. Entrances to the work place that will not be used for worker entry or emergency exits shall be locked to prevent unauthorized entry.
- E. Refer to Subpart 1.18 for procedures to utilize in properly maintaining Work Place Barriers and Worker Decontamination Enclosure Systems.

### 3.4 EXPOSURE CONTROLS

- A. The Contractor shall install Enclosure Engineering Controls (refer to subpart 1.17) before any material is disturbed or removed.

### 3.5 CRITICAL BARRIER INSTALLATION

- A. The Contractor shall seal all openings from the work area to occupied areas of the building as per the following:
  - 1. Fire exits: Since they must be accessible at all times, equip each exit location with an emergency egress panel to be utilized only in emergencies.
  - 2. Critical Barriers: Barriers that separate the protected work area from unprotected non-work areas. These barriers shall be constructed of conventional 2" x 4" (minimum) wood or metal stud framing, 16" o.c. (maximum).
    - a. A solid construction material of at least 3/8" thickness shall be applied to the work side of the framing. The edges of the partition will be caulked at the floor, walls, ceiling and fixtures to form an air tight seal. The work area side of the partition will be caulked at the floor, walls, ceiling and fixtures to form an air tight seal. The work area side of the partition will be covered with two layers of at least six-mil fire retardant polyethylene sheeting with staggered joints and sealed. The critical barrier then becomes a floor, wall or ceiling surface requiring two layers of at least six-mil fire-retardant polyethylene sheeting (Subpart 3.2 or Subpart 3.3).
    - b. Critical barriers shall be put into place before any disturbance of the asbestos containing material.
- B. Additional barriers (i.e., sealing off of all openings, including but not limited to windows, corridors, doorways, barriers, skylights, ducts, grills, diffusers, and any other penetrations of the work place) shall be installed with 2 layers of fire retardant 6 mil plastic sheeting sealed with tape. All seams of HVAC or other system components that pass through the work place shall also be sealed.

### 3.6 ASBESTOS CONTAINING MATERIAL REMOVAL - GENERAL

- A. Gross Removal
  - 1. Wet all asbestos containing material with an amended water solution. Equipment used should be capable of providing a fine spray mist, in order to reduce airborne fiber concentrations when the material is disturbed. Adequately wet the material to the substrate; however, do not allow excessive water to accumulate in the work area. Keep all removed material wet until it can be containerized for disposal (to prevent fiber release).
  - 2. All items or obstructions shall be removed or positioned in ways, insofar as practical, so as to fully access the asbestos containing material.
  - 3. Once adequately wetted, the asbestos containing material shall be removed in manageable sections. Removal shall be by teams of people, who containerize all material before moving to a new location. All removal areas shall be periodically sprayed to maintain in a wet condition until all visible material has been cleaned up.

4. Material that is removed shall not be dropped or thrown.
5. Removal shall be performed in teams, broken down into:
  - a. Sprayer - in charge of adequately wetting the ACM.
  - b. Scrapers/Removers - responsible for the careful removal of the ACM.
  - c. Cleaners - responsible to immediately bag all asbestos waste which has just been removed.
  - d. Scrubbers - will scour the now bare surfaces and rid them of all visible dust and debris.
  - e. The team will move in an orderly fashion completing the four steps in each section before moving to a new section.
6. Containerized waste (6 mil polyethylene bags or hardwall containers) shall be sealed when full. Since wet material can be exceedingly heavy, containers shall not be overfilled. Containers shall be securely sealed to prevent accidental opening and leakage (i.e., tying tops of bags in an overhand knot or by taping in goose neck fashion, never with wire or cord). Bags shall be decontaminated on exterior surfaces by wet cleaning or HEPA vacuuming before being placed in clean containers. Bags may be placed in drums for staging and transportation to the landfill.
7. Following completion of gross removal, all visible residue on substrate shall be removed by means of brushes or sponges.
8. Upon completion of all Gross and Residue Removal, initiate Clean-Up Procedures.

### 3.7 CLEAN-UP PROCEDURES - GENERAL

- A. Clean up of visible accumulations of loose ACM shall occur whenever there is a sufficient amount to fill a single asbestos bag and at the end of each shift.
- B. ACM shall be collected utilizing rubber dust pans and rubber squeegees.
- C. HEPA vacuums shall not be used on wet materials unless specially designed for that purpose.
- D. Metal shovels shall not be used within the work area.
- E. Accumulations of dust shall be cleaned off all surfaces of the work area daily.

### 3.8 FINAL CLEAN-UP PROCEDURES

- A. After removal of all visible accumulations of ACM, the work areas shall be:
  1. HEPA vacuumed on dry surfaces.

2. A wet/dry shop vacuum (dedicated to asbestos abatement) may be used to pick up excess water and gross saturated debris.
  3. All surfaces shall be wet cleaned. Contractor will request and pass a visual inspection performed by the consultant before proceeding to the next step. Documentation of passing this inspection shall be recorded in a daily logbook.
  4. The Contractor shall encapsulate the polyethylene sheeting with a lockdown encapsulant. The abated surfaces shall not be encapsulated prior to each work area passing final air clearance sampling.
  5. The cleaned, exposed surface barrier shall be removed from wall and floor.
  6. The work area shall be vacated for 12 hours to allow for fibers to settle.
- B. Second Cleaning:
1. All objects and surfaces covered by the second layer of plastic shall be HEPA vacuumed and/or wet cleaned.
  2. The remaining plastic surface barriers will be removed and disposed of as asbestos contaminated waste, while the critical barriers remain in position.
  3. The areas shall be vacated for twelve (12) hours to allow fibers to settle.
  4. Negative air controls shall still be in operation.
- C. Third Cleaning:
1. A third cleaning shall be performed on all surfaces within the work site using HEPA vacuuming and/or wet cleaning.
  2. All containerized waste shall be removed from the work area and holding area.
  3. All tools and equipment shall be removed from work area and properly decontaminated in the decontamination enclosure system.
- D. Following successful completion of third cleaning, inform the Owner's Representative that work areas are ready for Clearance Air Monitoring.

END OF SECTION 028213

## SECTION 028239 – ASBESTOS MONITORING

### PART 1 – GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification Documents, apply to work of this Section.
- B. Section 028213: Asbestos Abatement.

#### 1.2 DESCRIPTION OF WORK

- A. The Owner will contract with an Asbestos Monitoring Firm for the project. The Asbestos Monitoring Firm will designate one individual who is a qualified certified Asbestos Project Monitor and Air Sampling Technician to represent the Asbestos Monitoring Firm during the removal program.
- B. The Project Monitor must be on the job site at all times during the abatement work. No Phase II asbestos regulated work area preparation, abatement or cleaning work will occur without the presence of the Project Monitor.
- C. The Project Monitor will conduct five milestone inspections.
  - 1. Pre-abatement inspection shall be conducted as follows:
    - a. Notification in writing to the Asbestos Monitoring Firm shall be made by the Abatement Contractor to request a pre-abatement inspection at least 48 hours in advance of the desired date of inspection. This inspection shall be requested each time another regulated work area is started.
    - b. The Project Monitor shall ensure that:
      - 1) The job site is properly prepared and that all containment measures are in place.
      - 2) All workers shall present to the inspector a valid asbestos handling certificate issued by the New York State Department of Labor.
      - 3) Measures for the disposal of removed asbestos material are in place and shall conform to the adopted standards.
      - 4) The Contractor has a list of emergency telephone numbers at the job site which shall include the monitoring firm employed by the Owner and telephone numbers for fire, police, emergency squad, local hospital and health officer, and the New York State Department of Labor.



- c. If all is in order, the Project Monitor shall issue a written notice to proceed in the field. If the job site is not in order, then any needed corrective action must be taken before any abatement work activity is to commence. Conditional approvals shall not be granted.
2. Progress inspections shall be conducted as follows:
  - a. Primary responsibility for ensuring that the asbestos abatement work progresses in accordance with these technical specifications rests with the Abatement Contractor. The Project Monitor shall continuously be present to observe the progress of work, perform a minimum of two inspections within each regulated work area daily, and perform required tests.
  - b. If the Project Monitor observes irregularities at any time, he shall direct the Abatement Contractor Supervisor to provide such corrective action as may be necessary. If the Contractor fails to take the corrective action required, or if the Contractor or any of their employees habitually and/or excessively violate the requirements of any regulation, or the specification, then the Project Monitor shall inform the Owner or other authorized representative having jurisdiction who shall issue a Stop Work Order to the Contractor and have the work site secured until all violations are corrected.
3. Final cleaning visual inspections shall be conducted as follows:
  - a. Notice for a final cleaning visual inspection shall be requested by the Abatement Contractor at least 48 hours in advance of the desired date of inspection.
  - b. The final cleaning visual inspection shall be conducted after completion of the final waiting/settling/drying period and prior to the collection of final clearance samples.
  - c. The Project Monitor visual inspection for completeness of abatement and completeness of cleanup shall be performed as per the provisions of the current ASTM Standard E1368 "Standard Practice for Visual Inspection of Asbestos Abatement Projects. It shall ensure that:
    - 1) The work site has been properly cleaned and is free of visible asbestos, asbestos-containing material, waste, debris, dust and residue.
    - 2) All removed asbestos has been properly placed in a locked secure container outside of the work area.
    - 3) There are no visible pools of liquid or condensation.
  - d. The Project Monitor and the Asbestos Abatement Contractor Supervisor shall record detailed findings of the visual inspection in the asbestos abatement contractor supervisor's daily log book.
  - e. If all is in order, the Project Monitor shall conduct final clearance sampling in accordance with all applicable regulations and Subpart 3.2 of this Section.
  - f. Upon receipt of written sample analysis reports that indicate airborne fiber levels meet or exceed clearance requirements, the Project Monitor will provide written notice of authorization to remove barriers from the job site.

4. Work Area Removal inspection shall be conducted as follows:
  - a. Upon notice by the Owner or by the Contractor and within 24 hours after the removal of the critical barriers and any temporary hardwall barriers that were used to establish the regulated abatement work area, an inspection shall be made to ensure that the abatement work in that area is complete and no visible signs of asbestos, asbestos-containing materials, materials or equipment associated with the abatement and no waste/debris remain. After satisfactory completion of the Work Area Removal Inspection, removal of the Decontamination Enclosures may begin.
5. Decontamination Enclosure Removal inspection shall be conducted as follows:
  - a. Upon notice by the Owner or by the Contractor and within 24 hours after the removal of the decontamination enclosure systems, a final inspection shall be made to ensure that no visible signs of asbestos, asbestos-containing materials, materials or equipment associated with the abatement and no waste/debris remain.
6. Violations:
  - a. The Project Monitor shall ensure that the work conforms to the specification. If it is found that the asbestos abatement work is being conducted in violation of the specifications the Project Monitor shall issue in writing a Stop Work Order to the Contractor and have the work site secured until all violations are abated. If the Contractor fails to correct the violation, the course of action listed under 1.2.C.2.b. will be followed.

## PART 2 – PRODUCTS (Not used)

## PART 3 – EXECUTION

### 3.1 AREA AIR MONITORING

- A. The Asbestos Monitoring Firm will perform the air monitoring for this project.
- B. Monitoring outside the work area shall be provided throughout removal operations to ensure that no outside contamination is occurring.
  1. The sampling zone for indoor air samples shall be representative of the building occupant's breathing zone.
  2. Outdoor ambient and baseline samplers shall be placed four feet to six feet above the ground surface in reasonable proximity to the building and away from obstructions and drafts that may unduly affect airflow.
  3. Samples shall have a chain-of-custody record.

4. Area air sampling shall be conducted as specified in the following documents except as restricted or modified herein:
  - a. Measuring airborne asbestos following an abatement action, USEPA document 600/4-85-049 (Nov. 1985).
  - b. Guidance for controlling asbestos-containing materials in building; USEPA Publication 560/5-85-024 (June 1984).
  - c. Asbestos Hazard Emergency Response Act of 1986 (AHERA), USEPA 40 CFR 763, Subpart E.
  - d. NIOSH Method 7400, Revised.
  - e. NYS DOL ICR 56.
- C. Filter cassettes and sampling train shall be assembled as specified in NIOSH Method 7400. The total volume shall be a volume sufficient to achieve a detection limit of 0.004 f/cc. A minimum sample volume of 1200 liters shall be collected; flow rate shall be calibrated between 3 and 15 liters per minute before and after sampling, and a record kept of this calibration.
- D. Prior to the asbestos abatement contractor's mobilization, background air samples shall be taken in accordance with NYS Industrial Code Rule 56-6. The samples shall be taken during normal occupancy activities and conditions at the site. Samplers shall be located inside the intended regulated abatement work area and outside of the intended regulated work area within ten feet of the anticipated locations of isolation or critical barriers. The number and location of background samples shall be sufficient to represent the entire work area and agreed upon by the Asbestos Monitoring Firm.
- E. Background and post-abatement clearance air monitoring samples for each large regulated asbestos abatement work area shall include 5 inside and 5 outside samples, at a minimum, to be taken. In addition to the five sample minimum, one representative sample shall be collected for every 5,000 square feet above 25,000 square feet of floor space.
- F. Background air monitoring samples for a small regulated asbestos abatement work area shall include 3 inside and 3 outside samples, at a minimum, to be taken. Post-abatement clearance air monitoring samples for a small regulated asbestos abatement work area shall include 5 inside and 5 outside samples, at a minimum, to be taken, in accordance with AHERA requirements.
- G. For minor regulated asbestos abatement work areas that are part of a small or large asbestos project, post-abatement clearance air samples will be collected. A minimum of 1 sample will be collected from inside the regulated work area and 1 sample will be collected outside the work area within 10 feet of the work area.
- H. The following minimum number of samples shall be provided during abatement for large regulated work areas. The frequency and duration shall be representative of the actual conditions. Air sampling shall be performed during work area preparation when the regulated work area includes the abatement of OSHA Class 1 and/or OSHA Class II friable materials. Air sampling is not required during work area preparation of large regulated work areas if only OSHA Class II non-friable materials are present in the work area.

1. Two area samples outside the regulated abatement work area in uncontaminated areas of the building, within ten feet of the isolation or critical barriers.
    - a. Primary location selection shall be within ten feet of isolation barriers.
    - b. When positive pressurized HVAC ducts are located within the regulated work area, one of these samples will be collected within ten feet of an HVAC diffuser, at the downstream side of the regulated work area.
    - c. Where the entire building is the regulated work area, one additional exterior ambient air sample shall be collected.
  2. One ambient air sample will be collected outside of the building.
  3. One sample within ten feet of and within proximity to each entrance or exit from the regulated work area, i.e., at the uncontaminated entrance to each worker decontamination and waste decontamination enclosure system.
  4. Once negative air systems have been established, one sample shall be collected in front of and within ten feet of each unobstructed negative pressure exhaust or bank of up to five exhausts.
  5. Once negative pressure air systems have been established, where exhaust ducts run through non-work areas of the building to access the exterior, one sample shall be collected within ten feet of the exhaust duct system.
- I. If the Contractor's barriers or other control methods are observed to malfunction and if the Contractor does not correct the problems immediately upon notification, the Project Monitor shall inform the Owner or other authorized representative. In such a situation additional area sampling of up to three samples per day shall be performed by the air monitoring company.
  - J. Criteria during preparation and abatement activities - If air samples collected outside of the work area during preparation or abatement activities indicate airborne fiber concentrations at or above 0.01 f/cc or the established background level, whichever is greater, as determined by Phase Contrast Microscopy (PCM), work shall stop immediately for inspection and repair of barriers and negative air ventilation systems as necessary. Clean-up of surfaces outside of the regulated work area using HEPA vacuums and wet cleaning techniques shall be performed prior to resuming preparation or abatement activities.
  - K. The turn-around time for analysis of the samples shall be a maximum of 48 hours from the time samples are collected. This requirement may be superseded by a site specific variance that requires a faster turn-around time for analysis.
  - L. The evaluation criteria shall be 0.01 fibers per cubic centimeter.
  - M. A series of smoke tests shall be performed at the decontamination unit entrance/exit, by the Project Monitor to ensure continuous negative air pressure during abatement activities.

- N. The Project Monitor shall calculate the required number of negative air filtration units for each work area. This calculation shall be made whenever the volume of the work area changes. The Project Monitor will alert the Contractor of any discrepancies between the number of units required and those in operation within the work area. If problems are identified and not corrected, the monitor shall inform the Owner or other authorized representative.
- O. The Project Monitor shall keep a record in a daily log of all on-site observations, and required activities of the Contractor.

### 3.2 POST-ABATEMENT FINAL AIR CLEARANCE TESTING

- A. Post-abatement testing shall be conducted as follows:
  - 1. After completion of the final cleaning, appropriate drying time and visual inspection, an aggressive final clearance air test shall be performed. This test is required to establish safe conditions for removal of critical barriers and to permit renovation activity to proceed. Sufficient time following clean-up activities shall be allowed so that all surfaces are dry during monitoring.
  - 2. Samplers shall be placed at random around the work area. If the number of rooms within the work area is equivalent to the number of required samples based on 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.
  - 3. The representative samplers placed outside the work area but within the building shall be located in uncontaminated areas within ten feet of the isolation barriers.
  - 4. The following aggressive sampling procedures shall be used within the work area during all clearance air monitoring:
    - a. Before starting the sampling pumps use forced air equipment (such as a one horsepower leaf blower) to direct exhaust air against all walls, ceilings, floors, ledges and other surfaces in the work area.
      - 1) This pre-sampling procedure shall take at least five minutes per 1,000 square feet of floor area.
      - 2) At a minimum, place a 20-inch fan 3 feet above the floor in the center of each room. (Use one fan per 10,000 cubic feet of room space). Place the fan on slow speed and point it toward the ceiling.
      - 3) Start the sampling pumps and sample for the required time or volume.
      - 4) Turn off the pumps and then the fan(s) when sampling is completed.

5. For post-abatement monitoring, area samples shall conform to the following schedule:

AREA SAMPLES FOR ANALYSIS BY	MINIMUM VOLUME	FLOW RATE
PCM	1200 Liters	5 to 15 l/min.
TEM	1800 Liters	5 to 9.9 l/min.

6. Each homogeneous work area that does not meet the clearance criteria shall be thoroughly recleaned using wet methods, with the negative pressure ventilation system in operation. A full set of samples shall be collected in the work area as described above. The process shall be repeated until the work site passes the test.
7. For an asbestos project with more than one homogeneous work area, the release criteria shall be applied to each work area.
8. Preparation and analysis of area samples by PCM shall be by NIOSH Method 7400.
9. Preparation and analysis of area samples by TEM shall be accordance with AHERA procedures.
10. Clearance and/or Re-occupancy Criteria
- The clearance criteria shall be applied to each homogeneous work area independently.
  - For TEM analysis, the clearance level of any work area shall be less than the average of 70 structures per square millimeter for the five samples collected inside the work area.
  - For PCM analysis, the clearance level is as follows:
    - If the background level of a work area was less than 0.01 f/cc, the clearance level for each sample collected inside the work area shall be less than 0.01 f/cc. The clearance level for each sample collected outside the work area shall be less than 0.01 f/cc or the background level, whichever is greater.
    - If the background level for the samples collected inside a work area was equal to or greater than 0.01f/cc, the clearance criteria shall be less than or equal to 0.01 f/cc for each sample collected inside the work area. .The clearance level for each sample collected outside the work area shall be less than 0.01 f/cc or the background level, whichever is greater.

- B. Final inspections shall be conducted by the Project Monitor as follows:

- Upon notice by the Owner or by the Contractor and within 48 hours after the removal of the remaining barriers and decontamination enclosures, a final inspection shall be made to ensure the absence of any visible signs of asbestos or asbestos-containing material.

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PRJ 202 Uriah Hill School  
PRJ 203 Woodside Elementary  
PRJ 204 Middle School

The City School District of Peekskill  
SED 66-15-00-01-0-005-020  
SED 66-15-00-01-0-007-014  
SED 66-15-00-01-0-008-017  
SED 66-15-00-01-0-014-005

2. The Project Monitor shall ensure that all asbestos waste and asbestos-contaminated waste has been removed from the work site in a registered vehicle by a registered waste hauler.

### 3.3 PERSONAL AIR MONITORING

- A. The Contractor shall be responsible for conducting personal sampling in accordance with applicable rules and regulations.
- B. In addition to the requirements of OSHA 1926.1101, the contractor shall be required to perform personal air monitoring during every work shift in each work area during which abatement activities occur in order to verify that appropriate respirator protection is being utilized.
- C. Results of the monitoring shall be returned to the site, at least verbally, and posted no later than 24 hours following the time the sample was collected. Written results shall be returned to the site and posted no more than five days after the monitoring was performed.
- D. Personal air samples shall be analyzed by a laboratory which holds certification by the New York State Department of Health's Environmental Laboratory Approval Program. The asbestos consultant must approve the laboratory the contractor intends to use.

END OF SECTION 028239



## SECTION 028433 - ABATEMENT OF PCB CONTAINING CAULK-SEALANT MATERIALS

### PART 1 - GENERAL

#### 1.1 SUMMARY:

- A. This section specifies the procedures for removal of existing polychlorinated biphenyls (PCB) containing caulking materials, and disposal of removed materials.
- B. Disturbance or dislocation of polychlorinated biphenyls (PCB) containing caulking materials may cause a health hazard to work persons and building occupants. Contractor shall appraise all of his workers, supervisory personnel, subcontractors and consultants who will be at job site of the seriousness of the hazard and of proper work procedures which must be followed.
- C. Where in the performance of the work, workers, supervisory personnel, subcontractors, or consultants may encounter, disturb or otherwise function in the immediate vicinity of polychlorinated biphenyls (PCB) containing caulking materials, appropriate, continuous measures as necessary to protect all building occupants from the hazard of exposure shall be taken. Such measures shall include the procedures and methods described herein, regulations of the U.S. Occupational Safety & Health Administration (OSHA), U.S. Environmental Protection Agency (EPA), the New York State Department of Labor, and the New York State Department of Environmental Conservation.
- D. The results of the testing for PCB containing caulking/sealants are listed in the Final Report of Environmental Services bound in the specifications.
- E. Test results reveal that the caulk contains asbestos. Refer to the Final Report of Environmental Services bound in the specifications.

#### 1.2 RELATED WORK SPECIFIED ELSEWHERE

- A. Final Report of Environmental Services.
- B. Summary of Work: Section 011000.
- C. Temporary Facilities And Controls: Section 015000.
- D. Cutting and Patching: Section 017329.
- E. Asbestos Abatement: Section 028213.

#### 1.3 REFERENCES

- A. TSCA (Toxic Substances Control Act)

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PRJ 201 Oakside Elementary  
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PRJ 203 Woodside Elementary  
PRJ 204 Middle School

The City School District of Peekskill  
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SED 66-15-00-01-0-007-014  
SED 66-15-00-01-0-008-017  
SED 66-15-00-01-0-014-005

- B. CERCLA (Federal “Superfund”)
- C. New York State Department of Environmental Conservation (DEC) 6NYCRR:
  - 1. Part 360 Solid Waste Management Facilities.
  - 2. Part 364 Waste Transporter Permits.
  - 3. Part 370 Hazardous Waste Management System-General.
  - 4. Part 371 Identification and Listing of Hazardous Wastes.
  - 5. Part 372 Hazardous Waste Manifest System and Related Standards for Generators, Transporters and Facilities.
  - 6. Part 373 Hazardous Waste Management Facilities.
- D. OSHA (Occupational Safety and Health Administration) CFR Title 29.
- E. EPA (Environmental Protection Agency)
- F. CDC (Center for Disease Control): Air Pollution and Respiratory Health.

#### 1.4 DEFINITIONS

- A. Authorized Personnel: Facility staff and all other personnel who are authorized officials of any regulating agency, be it State, Local, Federal or Private entity who possess legal authority for enforcement or inspection of the work.
- B. Containment: The enclosure within the building which establishes a contaminated area and surrounds the location where hazardous material remediation is taking place and establishes a PCB Control Work Area.
- C. Clearance Criteria: A Visual Inspection of all removal surfaces, performed by the independent testing lab employed by the Owner, conforming to all standards set forth by all authorities having jurisdiction, mentioned in the references.
- D. Fixed Object: Mechanical equipment, electrical equipment, fire detection systems, alarms, and all other fixed equipment, fixtures or other items which cannot be removed from the work area.
- E. HEPA: High Efficiency Particulate Absolute filtration efficiency of 99.97 percent down to 0.3 microns. Filtration provided on specialized vacuums and air filtration devices to trap particles.
- F. PCB Solid Hazardous Waste: Materials containing one or more PCB compounds totaling 50 parts per million (ppm) or greater.
- G. PPE: Personal Protective Equipment.

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SED 66-15-00-01-0-007-014  
SED 66-15-00-01-0-008-017  
SED 66-15-00-01-0-014-005

## 1.5 ABBREVIATIONS

- A. ASTM: American Society for Testing and Materials  
1916 Race Street  
Philadelphia, PA 19103
- B. CFR: Code of Federal Regulations  
Government Printing Office  
Washington, DC 20402
- C. DOT: New York State Department of Transportation  
Main Office, 50 Wolf Road  
Albany, NY 12232
- D. NIOSH: National Institute for Occupational Safety and Health  
Building J.N.E. Room 3007  
Atlanta, GA 30333
- E. OSHA: Occupational Safety and Health Administration  
200 Constitution Avenue  
Washington, DC 20210
- F. USEPA: United States Environmental Protection Agency  
401 M Street SW  
Washington, DC 20460

## 1.6 SUBMITTALS

- A. Product Data: Catalog sheets, specifications, and application instructions for any removal products, if used.
- B. Quality Control Submittals:
  - 1. Worker's Qualifications Data:
    - a. Name of each person who will be performing the Work and their employer's name, business address and telephone number.
    - b. Names and addresses of 3 similar projects that each person has worked on during the past 3 years and documentation of completion of appropriate PCB/Hazardous Waste training program and supervisors with appropriate PCB/Hazardous Waste supervisor training.
  - 2. Work Plan: Submit one copy of the work plan required under Quality Assurance Article.
  - 3. Waste Transporter Permit: One copy of transporter's current waste transporter permit.

- C. PCB Work Closeout Submittals:
  - 1. Disposal Site Receipts: Copy of waste shipment record and disposal site receipt showing the PCB-containing materials have been properly disposed of.

## 1.7 QUALITY ASSURANCE

- A. Contractor shall provide and assure that the quality of work practices and procedures are consistent with the below listed agencies. Contractor shall utilize the latest edition, including all addenda, revisions and supplements for all regulatory agencies codes, etc., including but not limited to:
  - 1. Environmental Protection Agency (EPA).
  - 2. Occupational Safety and Health Administration.
  - 3. State of New York codes and laws.
  - 4. All local codes.
- B. Worker's Qualifications: The persons performing PCB Caulk abatement and their supervisor shall be personally experienced in PCB abatement work and shall have been regularly employed by a company performing PCB abatement for a minimum of 3 years.
- C. Regulatory Requirements: Comply with the referenced standards.
- D. Pre-Work Conference: Before the Work of this Section is scheduled to commence, a conference will be held by the Owner's Representative at the Site for the purpose of reviewing the Contract Documents, discussing requirements for the Work, and reviewing the Work procedures.
  - 1. The conference shall be attended by the Contractor, the PCB Caulk removal subcontractor, and the testing/monitoring laboratory employed by the District.
- E. PCB Containing Caulk Removal Work Plan: At the conclusion of the pre-work conference, before the physical PCB containing caulk abatement Work begins, prepare a detailed PCB-containing material removal work plan.
  - 1. The work plan shall include, but not be limited to, a drawing indicating the location, size, and details of PCB Caulk Collection Areas (dropcloths etc.) staging areas for PCB caulk removal from identified area, location and details of containment, decontamination facilities, sequencing of window/caulk removal, work procedures, types of equipment, crew size, and emergency procedures for fire and medical emergencies.

## 1.8 PROJECT CONDITIONS

- A. Install 2 layers of 6 mil fire retardant polyethylene sheeting over the inside of all openings within 25 feet of the removal area to prevent contamination of the interior of the affected spaces.

- B. Provide 6 mil fire retardant polyethylene drop cloths to collect debris from removal operation. Remove caulk to the exterior and place into drum/container.
  - 1. Using wet methods, scrape all residual PCB containing caulking from rough building opening down to a bare, clean surface.
  - 2. Contractor shall collect all removed caulking and contaminated poly sheeting and properly drum/containerize for disposal or incineration in accordance with applicable State and Federal regulations.
- C. Remove polyethylene sheeting from openings after the Owner's testing/ monitoring laboratory has confirmed complete removal of PCB containing caulking. Include removed poly sheeting in disposal drum/container for disposal as PCB contaminated material.

#### 1.9 PERSONAL PROTECTIVE CLOTHING AND EQUIPMENT

- A. Workers must wear protective suits, protective gloves, eye protection and a minimum of half-face respirator with HEPA filter cartridge for all projects. Respiratory protection shall be in accordance with OSHA regulation 1910.134 and ANSI Z88.2.
- B. Workers must be trained as per OSHA and EPA requirements, have medical clearance and must have recently received pulmonary function test (PFT) and respirator fit tested by a trained professional.
  - 1. A personal air sampling program shall be in place as required by OSHA.
  - 2. The use of respirators must also follow a complete respiratory protection program as specified by OSHA.

#### 1.10 JOB CONDITIONS

- A. Posting of regulations: Display the following documents in the clean changing area, in public view, for the full duration of the work:
  - 1. Instructions for removing injured persons from work area.
  - 2. Post emergency action plan at the work site. This plan shall also include telephone numbers for hospital, doctor and Fire Company.

### PART 2 - PRODUCTS

#### 2.1 ABATEMENT PRODUCTS

- A. Disposal Drums: Metal or fiberboard with locking ring tops, with warning labels as required by OSHA, NYSDEC and/or EPA.
- B. Respirators:
  - 1. Type: Approved by the Mine Safety and Health Administration (MSHA), Department of Labor, or the National Institute for Occupational Safety and Health (NIOSH), Department of Health and Human Services.

- C. Vacuum Cleaners:
  - 1. Type: Vacuums equipped with HEPA filters.
- D. Plastic Sheets:
  - 1. Type: Minimum 6 mil., opaque, fire retardant polyethylene sheets.
  - 2. Floor Protective Layer: Minimum 10 mil., reinforced polyethylene sheets.

## 2.2 GENERAL EQUIPMENT

- A. A sufficient supply of disposable mops, rags, and sponges for work area decontamination shall be available.
- A. A sufficient supply of scaffolding, ladders, lifts, and hand tools, (e.g., scrapers, wire cutters, brushes, utility knives, wire saws, etc.) shall be provided as needed.

## 2.4 PERSONNEL PROTECTION

- A. Safety equipment (e.g., hard hats meeting the requirements of ANSI Standard Z89.1-1981, eye protection meeting the requirements of ANSI Standard Z87.1-1979, safety shoes meeting the requirements of ANSI Standard Z41.1-1967, disposable PVC gloves or other work gloves), shall be provided to all workers and authorized visitors.
- B. Nonskid footwear shall be provided to all abatement workers. Disposable clothing shall be adequately sealed to the footwear to prevent body contamination.

## PART 3 - EXECUTION

### 3.1 EMERGENCY PLANNING

- A. Description: The Contractor shall prepare an emergency preparedness plan detailing at least the information required in this section and in any applicable federal, state or local regulations.
- B. Details of Plan:
  - 1. Emergency planning shall be developed prior to abatement initiation and submitted to the Owner's representative for review.
  - 2. Emergency procedures shall be in written form and prominently posted in the clean change area of the worker decontamination area.
  - 3. Emergency planning shall include written notification of police, fire and emergency medical personnel of planned abatement activities, work schedule and layout of work area, particularly barriers that may affect response capabilities.

4. Emergency planning shall include considerations of fire, electrical hazards, slips, trips, and falls, spills or releases of hazardous materials and heat related injury. Written procedures shall be developed and employee training in procedures shall be provided.
5. Employees shall be trained in evacuation procedures in the event of work place emergencies.
  - a. For Non-Life-Threatening Situations: Employees injured or otherwise incapacitated shall decontaminate following normal procedures with assistance from fellow workers, if necessary, before exiting the work place to obtain proper medical treatment.
  - b. For Life-Threatening Injury or Illness: Worker decontamination shall take least priority. After measures to stabilize the injured worker, the injured worker shall be removed from the work place and secure proper medical treatment.

- C. Telephone numbers of all emergency response personnel shall be prominently posted in the clean area and equipment room, along with the location of the nearest telephone.

### 3.2 NOTIFICATION

- A. Notify the Owner's Representative a minimum of 5 working days prior to the start of PCB Caulk removal work.

### 3.3 EMPLOYEE PROTECTION

- A. Comply with all applicable Occupational Safety and Health Administration (OSHA) Requirements.

### 3.4 WORK AREA PROTECTION

- A. Protection of Existing Construction: Perform PCB caulk removal work without damage or contamination of adjacent areas and existing construction.

### 3.5 PCB-CONTAINING MATERIAL REMOVAL

- A. Perform removal of PCB-containing materials in accordance with approved PCB-containing material removal work plan.
- B. Use procedures and equipment as required to limit occupational and environmental exposure to PCB's when PCB-containing caulk is removed in accordance with referenced standards.
  1. Limit the production and dissemination of caulk debris as much as possible.
  2. Perform manual wet scraping to the maximum extent feasible.



### 3.6 CERTIFICATION OF ABATEMENT

- A. Schedule visual clearance inspection with the Owner's Representative at the site, when work area is ready for clearance testing.
- B. Owner's Representative will employ the services of an independent testing/monitoring lab to perform visual clearance inspection. Clearance Criteria requirements are specified in PART 1 of this Section.
  - 1. Prior to removal of any isolation barrier, the Owner's Representative will obtain a written affidavit and a final assessment report from the monitoring lab stating that the visual clearance assessment conforms to all standards set forth by all authorities having jurisdiction, mentioned in the references.
  - 2. Schedule a walk-through inspection with the Owner's Representative and obtain the Owner's Representative's written approval.
- C. The Owner's Representative shall have final determination of an acceptable clearance level.

### 3.7 DISPOSAL OF PCB CONTAINING CAULKING MATERIALS

- A. Properly containerized waste must be transported by a licensed hauler and shipped to an EPA approved PCB Recycling or incineration facility. Waste manifests must show chain of custody. Provide one copy of the waste manifests to the Owner.
- B. All contaminated waste shall be carefully loaded on trucks or other appropriate vehicles for transport. Before and during transport, care shall be exercised to insure that no unauthorized persons have access to the material.
- C. Transporters of the waste are prohibited from "back hauling" any freight after the disposition of the Owner's waste stream until decontamination of the vehicle and/or trailer is assured.

### 3.8 WASTE MANAGEMENT AND DISPOSAL

- A. The Contractor shall be responsible for all packaging, labeling, transport, disposal and record-keeping associated with PCB waste in accordance with all federal, state and local regulations.
- B. The Contractor shall ensure that the person transporting the waste holds a valid permit issued in accordance with appropriate federal, state, and local regulations.
- C. The Contractor shall provide to the transporter at the time of transfer appropriate shipping records as required by the federal, state and local regulations with a copy to the project engineer.

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- D. Contractor shall maintain proper follow up procedures to assure that waste materials have been received by the designated waste site in a timely manner and in accordance with all federal, state and local regulations.
- E. The Contractor shall assure that disposal of polychlorinated biphenyls (PCB) containing caulking material is at a facility approved to accept such waste and shall provide a tracking/manifest form signed by the landfill's authorized representative.

### 3.9 RESTORATION

- A. Remove temporary decontamination facilities and restore area designated for these facilities to its original condition or better.
- B. Where existing construction is damaged or contaminated, restore work to its original condition or better.

END OF SECTION 028433

## SECTION 030100 - CONCRETE PATCHING

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including general and supplementary conditions and Division 1 specification sections, apply to work of this section.

#### 1.2 DESCRIPTION OF WORK

- A. Extent of concrete repair work is indicated in drawings.
- B. Concrete repair work includes installing concrete patching material at existing interior concrete slab.

#### 1.3 DEFINITIONS

- A. Removal includes complete removal in designated areas and legal disposal of existing items except those noted to remain property of Owner.

#### 1.4 QUALITY ASSURANCE

- A. Protect surfaces from rapid drying.
- B. Do not apply materials if temperature is below 45°F.
- C. Do not apply materials if precipitation is expected within 48 hours of application, unless protection is provided.
- D. Use workers who are skilled and experienced in this type of work.
- E. Materials used must be compatible.
- F. Concrete Repair Specialist: Work shall be performed by a firm with minimum 5-years successful experience in comparable concrete repair projects and employing skilled personnel trained to use the repair products specified herein.

#### 1.5 SUBMITTALS

- A. Qualifications:

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1. Submit project experience for person(s) responsible for work to be performed under this section.

B. Product Data: Submit manufacturer's technical data for each product indicated, including recommendations for its application and installation instructions. Include certifications substantiating product complies with requirements.

#### 1.6 QUALIFICATION OF INSTALLERS

A. Provide at least one person who shall be present at all times during execution of the work of this section and is thoroughly familiar with the specified requirements and the materials and methods needed for their execution and who shall direct work performed under this section.

#### 1.7 PRODUCT HANDLING

A. Deliver materials to job site in original, new, and unopened packages and containers bearing the manufacturer's name and label.

B. Protect concrete repair systems before, during, and after installation and protect the work and materials of other trades. In the event of damage, immediately make repairs and replacements necessary to the approval of the Owner and at no additional cost.

#### 1.8 TESTING

A. Test patched areas after three days for soundness and delamination by sounding with a hammer. Repair all hollow-sounding areas by replacing the patch in the affected area at no cost to the Owner.

### PART 2 - PRODUCTS

#### 2.1 MATERIALS

A. General: The repair concrete shall be a blend of selected Portland cements, specially graded aggregates, admixtures for controlling setting time, and water reducers for workability and an organic accelerator.

B. The materials shall be non-combustible, both before and after cure.

C. The material shall be supplied as a factory-blended unit.

D. The Portland cement mortar must be place able from 1/4" to 1" in depth per lift for horizontal areas.

E. Products:

1. Concrete horizontal repair material: one component, rapid hardening, early strength gaining, cementitious, patching material for concrete.

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- a. "SikaQuick 1000" by Sika Corporation
    - b. Or equal
  2. Concrete patching material: one-component, early strength gaining, cementitious, patching material for horizontal repair of concrete.
    - a. "SikaRepair 222" by Sika Corporation.
    - b. Or equal
  3. Concrete Crack repair epoxy: 2-component, 100% solids, moisture-tolerant, low-viscosity, high-strength, multi-purpose, epoxy resin adhesive.
    - a. "SikaDur Crackfix" by Sika Corporation
    - b. Or equal.
- F. Aggregate shall conform to ASTM C-33. The material shall be extended with 30-lb. of a 3/8" (No.8 distribution per ASTM C-33, Table II) clean, well-graded, saturated surface dry aggregate, having low absorption, high density and non-reactive (reference ASTM C-1260, C-227, C-289).
- G. Bonding Grout for patching materials: As recommended by patching manufacturer.

### PART 3 - EXECUTION

#### 3.1 JOB CONDITIONS

- A. Examine conditions under which concrete shall be reconditioned. Do not proceed with work until unsatisfactory conditions are corrected.

#### 3.2 REMOVALS AND SURFACE PREPARATION

- A. Removals:
  1. Remove existing concrete by saw cutting. Make shallow cuts inside area to be removed.
  2. Remove concrete using 15- to 30-pound chipping hammers equipped with gad point bits. The surface profile after removals shall be roughened and suitable to receive patching material.
  3. Prior to placing patching materials, air blast cavities clean to remove sand and debris.

#### 3.3 MATERIAL INSTALLATION

- A. Apply materials in accordance to manufacturers written specifications.
- B. Apply bonding grout to surfaces to receive patching. Apply grout to a uniform thickness 1/16 to 1/8 inch thick in accordance to manufacturer's specifications.
- C. Place in lifts or other methods as recommended by the manufacturer. Apply smooth trowel finish to surface.

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- D. Protect and cure surface in accordance with the manufacturer's recommendations.

### 3.4 CLEANING

- A. Clean all concrete surfaces prior to patching and coating application in accordance with manufacturer's instructions.

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## SECTION 040120 - MAINTENANCE OF UNIT MASONRY

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Section includes maintenance of unit masonry consisting of brick clay masonry restoration and cleaning as follows:
  - 1. Repairing unit masonry, including replacing units at areas to receive new wall openings.
  - 2. Painting steel uncovered during the work.
  - 3. Reanchoring veneers.
  - 4. Repointing joints.
  - 5. Preliminary cleaning, including removing plant growth.
  - 6. Cleaning exposed unit masonry surfaces.
- B. Owner-Furnished Material: None provided.

#### 1.3 QUALITY ASSURANCE

- A. Restoration Qualifications: Engage experienced masonry restoration and cleaning contractor to perform work of this Section. Contractor shall have completed work similar in material, design, and extent to that indicated for this Project with a record of successful in-service performance. Experience installing standard unit masonry is not sufficient experience for masonry restoration work.
- B. Contractor shall provide field supervision and/or workmen performing actual work who are capable of providing self-supervision during times that clay masonry restoration and cleaning work is in progress.
- C. Cleaning and Repair Appearance Standard: Cleaned and repaired surfaces are to have a uniform appearance as viewed from 10 feet away by Architect. Perform additional general cleaning, and spot cleaning of small areas that are noticeably different, so that surface blends smoothly into surrounding areas.

#### 1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver masonry units to Project site strapped together in suitable packs or pallets or in heavy-duty cartons.
- B. Deliver other materials to Project site in manufacturer's original and unopened containers, labeled with manufacturer's name and type of products.



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- C. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- D. Store hydrated lime in manufacturer's original and unopened containers. Discard lime if containers have been damaged or have been opened for more than two days.
- E. Store lime putty covered with water in sealed containers.
- F. Store sand where grading and other required characteristics can be maintained and contamination avoided.

#### 1.5 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit masonry restoration and cleaning work to be performed according to manufacturers' written instructions and specified requirements.
- B. Repair masonry units and repoint mortar joints only when air temperature is between 40 and 90 deg F (4 and 32 deg C) and is predicted to remain so for at least 7 days after completion of the Work unless otherwise indicated.
- C. Hot-Weather Requirements: Protect masonry repair and mortar-joint pointing when temperature and humidity conditions produce excessive evaporation of water from mortar and repair materials. Provide artificial shade and wind breaks and use cooled materials as required to minimize evaporation. Do not apply mortar to substrates with temperatures of 90 deg F (32 deg C) and above unless otherwise indicated.
- D. For manufactured repair materials, perform work within the environmental limits set by each manufacturer.

#### 1.6 COORDINATION

- A. Coordinate masonry restoration and cleaning with public circulation patterns at Project site. Some work is near public circulation patterns. Public circulation patterns cannot be closed off entirely. Plan and execute the Work accordingly.

#### 1.7 SEQUENCING AND SCHEDULING

- A. Order replacement materials at earliest possible date to avoid delaying completion of the Work. Coordinate with Owner for salvaged replacement material availability. If matching brick materials are not available, contractor shall provide brick materials to match existing unit size and color as closely as possible.
- B. Perform masonry restoration work in the following sequence:
  - 1. Provide protection of existing traffic areas at areas of restoration and all areas utilized by contractor to prohibit damage.
  - 2. Remove plant growth from immediate area of restoration.
  - 3. Remove loose brick units and lintels. Salvage whole, undamaged brick units for re-installation. Clean as required.
  - 4. Rake out mortar from joints surrounding masonry to be replaced and from joints adjacent to masonry repairs along joints.

5. Repair masonry, including replacing existing masonry with new masonry materials.
6. Rake out mortar from joints to be repointed.
7. Point mortar joints.
8. Install backer rod and sealants to provide weathertight joints at adjacent materials.
9. Provide and maintain construction barricades to protect public safety. Provide weathertight and secure enclosure to protect building occupants and contents within at all times during project construction.
10. After repairs and repointing have been completed and cured, perform a final cleaning to remove residues from this work.

## PART 2 - PRODUCTS

### 2.1 MASONRY MATERIALS

- A. Face Brick: Provide face brick where required to complete masonry restoration work.
  1. Provide units with colors, color variation within units, surface texture, size, and shape to match existing brickwork and with physical properties within 10 percent of existing units.
- B. For existing brickwork that exhibits a range of colors or color variation within units, provide brick that proportionally matches that range and variation rather than brick that matches an individual color within that range.
- C. Building Brick: Provide building brick complying with ASTM C 62, of same vertical dimension as face brick, for masonry work concealed from view.
  1. Grade SW, MW, or NW for concealed backup.
- D. Salvaged Brick: Retain salvaged brick from areas of removal. Clean off residual mortar.

### 2.2 MORTAR MATERIALS

- A. Portland Cement: ASTM C 150, Type I or Type II, white or gray where required for color matching of exposed mortar.
  1. Provide cement containing not more than 0.60 percent total alkali when tested according to ASTM C 114.
- B. Hydrated Lime: ASTM C 207, Type S.
- C. Quicklime: ASTM C 5, pulverized lime.
- D. Mortar Sand: ASTM C 144 unless otherwise indicated.
  1. Color: Provide natural sand of color necessary to produce required mortar color.
  2. Match size, texture, and gradation of existing mortar sand as closely as possible. Blend several sands if necessary to achieve suitable match.
- E. Water: Potable.

## 2.3 CLEANING MATERIALS

- A. Water: Potable.
- B. Hot Water: Water heated to a temperature of 140 to 160 deg F (60 to 71 deg C).
- C. Acidic cleaners are prohibited.
- D. Job-Mixed Detergent Solution: Solution prepared by mixing 2 cups (0.5 L) of tetrasodium polyphosphate, 1/2 cup (125 mL) of laundry detergent, and 20 quarts (20 L) of hot water for every 5 gal. (20 L) of solution required.
- E. Job-Mixed Mold, Mildew, and Algae Remover: Solution prepared by mixing 2 cups (0.5 L) of tetrasodium polyphosphate, 5 quarts (5 L) of 5 percent sodium hypochlorite (bleach), and 15 quarts (15 L) of hot water for every 5 gal. (20 L) of solution required.
- F. Nonacidic Liquid Cleaner: Manufacturer's standard mildly alkaline liquid cleaner formulated for removing mold, mildew, and other organic soiling from ordinary building materials, including polished stone, brick, aluminum, plastics, and wood.
- G. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
  - 1. Dominion Restoration Products, Inc.; Bio-Cleanse.
  - 2. Dumond Chemicals, Inc.; Safe n' Easy Architectural Cleaner/Restorer.
  - 3. Price Research, Ltd.; Price Non-Acid Masonry Cleaner.
  - 4. PROSOCO; Enviro Klean 2010 All Surface Cleaner.

## 2.4 ACCESSORY MATERIALS

- A. Masonry Repair Anchors, Expansion Type: Mechanical fasteners designed for masonry veneer stabilization consisting of 1/4-inch- (6-mm-) diameter, Type 304 or Type 316 stainless-steel rod with brass expanding shells at each end and water-shedding washer in the middle. Expanding shells shall be designed to provide positive mechanical anchorage to veneer on one end and backup masonry on the other.
  - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work including, but are not limited to the following:
    - a. BLOK-LOK Limited; Torq-Lok.
    - b. Dur-O-Wal, a division of Dayton Superior; Dur-O-Wal Repair Anchor,
    - c. Hohmann & Barnard, Inc.; #521RA-B Restoration Anchor.
- B. Masonry Repair Anchors, Spiral Type: Type 304 or Type 316 stainless-steel spiral rods designed to anchor to backing and veneer. Anchors are flexible in plane of veneer but rigid perpendicular to it.
  - 1. Provide driven-in anchors designed to be installed in drilled holes and relying on screw effect rather than adhesive to secure them to backup and veneer.
  - 2. Products: Subject to compliance with requirements, provide available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. BLOK-LOK Limited; Spira-Lok.

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- b. Dur-O-Wal, a division of Dayton Superior; Dur-O-Flex Friction Pin Anchor.
- c. Heckmann Building Products Inc.; #391 Remedial Tie.
- d. Hohmann & Barnard, Inc.; Helix Spiro-Ties.

## 2.5 MORTAR MIXES

- A. Measurement and Mixing: Measure cementitious materials and sand in a dry condition by volume or equivalent weight. Do not measure by shovel; use known measure. Mix materials in a clean, mechanical batch mixer.
- B. Mixing Pointing Mortar: Thoroughly mix cementitious materials and sand together before adding any water. Then mix again adding only enough water to produce a damp, unworkable mix that will retain its form when pressed into a ball. Maintain mortar in this dampened condition for 15 to 30 minutes. Add remaining water in small portions until mortar reaches desired consistency. Use mortar within one hour of final mixing; do not re-temper or use partially hardened material.
- C. Do not use admixtures in mortar unless otherwise indicated.
- D. Mortar Proportions: Mix mortar materials in the following proportions:
  - 1. Pointing Mortar for Brick: 1 part portland cement, 2 parts lime, and 6 parts sand.
  - 2. Rebuilding (Setting) Mortar: Same as pointing mortar

## 2.6 CHEMICAL CLEANING SOLUTIONS

- A. Dilute chemical cleaners with water to produce solutions not exceeding concentration recommended by chemical-cleaner manufacturer.

## PART 3 - EXECUTION

### 3.1 PROTECTION

- A. Protect persons, motor vehicles, surrounding surfaces of building being restored, building site, plants, and surrounding buildings from harm resulting from masonry restoration work.
- B. Erect temporary protective covers over walkways and at points of pedestrian and vehicular entrance and exit that must remain in service during course of restoration and cleaning work.
- C. Comply with cleaner manufacturer's written instructions for protecting building and other surfaces against damage from exposure to its products. Prevent cleaning solutions from coming into contact with people, motor vehicles, landscaping, buildings, and other surfaces that could be harmed by such contact.
  - 1. Cover adjacent surfaces with materials that are proven to resist cleaners used unless cleaners being used will not damage adjacent surfaces.
  - 2. Keep wall wet below area being cleaned to prevent streaking from runoff.
  - 3. Do not clean masonry during winds of sufficient force to spread cleaning solutions to unprotected surfaces.
  - 4. Neutralize runoff from cleaning operations by legal means and in a manner that prevents soil erosion, undermining of paving and foundations, damage to

landscaping, and water penetration into building interiors.

- D. Prevent mortar from staining face of surrounding masonry and other surfaces.
  - 1. Cover sills, ledges, and projections to protect from mortar droppings.
  - 2. Keep wall area wet below rebuilding and pointing work to discourage mortar from adhering.
  - 3. Immediately remove mortar in contact with exposed masonry and other surfaces.
  - 4. Clean mortar splatters from scaffolding at end of each day.

### 3.2 BRICK REMOVAL AND REPLACEMENT

- A. At locations indicated for new wall openings, remove bricks that are damaged, spalled, or deteriorated or are to be reused. Carefully remove entire units from joint to joint, without damaging surrounding masonry, in a manner that permits replacement with full-size units.
  - 1. When removing single bricks, remove material from center of brick and work toward outside edges.
  - 2. Salvage and clean full brick units and return to owner.
- B. Support and protect remaining masonry that surrounds removal area. Maintain flashing, reinforcement, lintels, and adjoining construction in an undamaged condition.
- C. Notify Architect of unforeseen detrimental conditions including voids, cracks, bulges, and loose units in existing masonry backup, rusted metal, and other deteriorated items.
- D. Remove in an undamaged condition as many whole bricks as possible.
  - 1. Remove mortar, loose particles, and soil from brick by cleaning with hand chisels, brushes, and water.
  - 2. Remove sealants by cutting close to brick with utility knife and cleaning with solvents.
  - 3. Store salvaged brick for reuse. Store off ground, on skids, and protected from weather.
  - 4. Deliver cleaned brick not required for reuse to Owner unless otherwise indicated.
- E. Clean bricks surrounding removal areas by removing mortar, dust, and loose particles in preparation for replacement.
- F. Replace removed damaged brick with other removed brick and salvaged brick in good quality, where possible, or with new brick matching existing brick, including size. Do not use broken units unless they can be cut to usable size.
- G. Install replacement brick into bonding and coursing pattern of existing brick. If cutting is required, use a motor-driven saw designed to cut masonry with clean, sharp, unchipped edges.
  - 1. Maintain joint width for replacement units to match existing joints.
  - 2. Use setting buttons or shims to set units accurately spaced with uniform joints.
- H. Lay replacement brick with completely filled bed, head, and collar joints. Butter ends with sufficient mortar to fill head joints and shove into place. Wet both replacement and

surrounding bricks that have ASTM C 67 initial rates of absorption (suction) of more than 30 g/30 sq. in. per min. (30 g/194 sq. cm per min.). Use wetting methods that ensure that units are nearly saturated but surface is dry when laid.

1. Tool exposed mortar joints in repaired areas to match joints of surrounding existing brickwork.
2. Rake out mortar used for laying brick before mortar sets and point new mortar joints in repaired area to comply with requirements for repointing existing masonry, and at same time as repointing of surrounding area.
3. When mortar is sufficiently hard to support units, remove shims and other devices interfering with pointing of joints.

### 3.3 REANCHORING VENEERS

- A. Install masonry repair anchors in horizontal mortar joints and according to manufacturer's written instructions. Install at not more than 16 inches (400 mm) o.c. vertically and 32 inches (800 mm) o.c. horizontally unless otherwise indicated. Install at locations to avoid penetrating flashing.
- B. Recess anchors at least 5/8 inch (16 mm) from surface of mortar joint and fill recess with pointing mortar.

### 3.4 PAINTING STEEL UNCOVERED DURING THE WORK

- A. Inspect steel exposed during masonry removal. Where Architect determines that it is structural, or for other reasons cannot be totally removed, prepare and paint it as follows:
  1. Remove paint, rust, and other contaminants according to SSPC-SP 3, "Power Tool Cleaning as applicable to meet paint manufacturer's recommended preparation.
  2. Immediately paint exposed steel with two coats of antirust coating, following coating manufacturer's written instructions and without exceeding manufacturer's recommended rate of application (dry film thickness per coat).
    - a. If on inspection and rust removal, the cross section of a steel member is found to be reduced from rust by more than 1/16 inch (1.6 mm), notify Architect before proceeding.

### 3.5 REPOINTING MASONRY

- A. Rake out and repoint joints to the following extent:
  1. Joints where mortar is missing or where they contain holes.
  2. Cracked joints where cracks can be penetrated at least 1/4 inch (6 mm) by a knife blade 0.027 inch (0.7 mm) thick.
  3. Cracked joints where cracks are 1/8 inch (3 mm) or more in width and of any depth.
  4. Joints where they sound hollow when tapped by metal object.
  5. Joints where they are worn back 1/4 inch (6 mm) or more from surface.
  6. Joints where they are deteriorated to point that mortar can be easily removed by

- hand, without tools.
7. Joints where they have been filled with substances other than mortar.
  8. Joints indicated as sealant-filled joints.
- B. Do not rake out and repoint joints where not required.
- C. Rake out joints as follows:
1. Remove mortar from joints to depth of joint width plus 1/8 inch (3 mm) but not less than 1/2 inch (13 mm) or not less than that required to expose sound, unweathered mortar.
  2. Remove mortar from masonry surfaces within raked-out joints to provide reveals with square backs and to expose masonry for contact with pointing mortar. Brush, vacuum, or flush joints to remove dirt and loose debris.
  3. Do not spall edges of masonry units or widen joints. Replace or patch damaged masonry units.
    - a. Cut out mortar by hand with chisel and resilient mallet. Do not use power-operated grinders without Architect's written approval based on approved quality-control program.
    - b. Cut out center of mortar bed joints using angle grinders with diamond-impregnated metal blades. Remove remaining mortar by hand with chisel and resilient mallet. Strictly adhere to approved quality-control program.
- D. Notify Architect of unforeseen detrimental conditions including voids in mortar joints, cracks, loose masonry units, rotted wood, rusted metal, and other deteriorated items.
- E. Pointing with Mortar:
1. Rinse joint surfaces with water to remove dust and mortar particles. Time rinsing application so, at time of pointing, joint surfaces are damp but free of standing water. If rinse water dries, dampen joint surfaces before pointing.
  2. Apply pointing mortar first to areas where existing mortar was removed to depths greater than surrounding areas. Apply in layers not greater than 3/8 inch (9 mm) until a uniform depth is formed. Fully compact each layer thoroughly and allow it to become thumbprint hard before applying next layer.
  3. After low areas have been filled to same depth as remaining joints, point all joints by placing mortar in layers not greater than 3/8 inch (9 mm). Fully compact each layer and allow to become thumbprint hard before applying next layer. Where existing masonry units have worn or rounded edges, slightly recess finished mortar surface below face of masonry to avoid widened joint faces. Take care not to spread mortar beyond joint edges onto exposed masonry surfaces or to featheredge the mortar.
  4. When mortar is thumbprint hard, tool joints to match original appearance of joints as demonstrated in approved mockup. Remove excess mortar from edge of joint by brushing.
  5. Hairline cracking within the mortar or mortar separation at edge of a joint is unacceptable. Completely remove such mortar and repoint.

### 3.6 CLEANING MASONRY, GENERAL



- A. Proceed with cleaning in an orderly manner; work from top to bottom of each scaffold width and from one end of each elevation to the other. Ensure that dirty residues and rinse water will not wash over cleaned, dry surfaces.
- B. Do not use wire brushes or brushes that are not resistant to chemical cleaner being used. Do not use plastic-bristle brushes if natural-fiber brushes will resist chemical cleaner being used.
- C. Water Application Methods:
  - 1. Water-Spray Applications: Unless otherwise indicated, hold spray nozzle at least 6 inches (150 mm) from surface of masonry and apply water in horizontal back and forth sweeping motion, overlapping previous strokes to produce uniform coverage.

### 3.7 PRELIMINARY CLEANING

- A. Removing Plant Growth: Completely remove visible plant, moss, and shrub growth from masonry surfaces. Carefully remove plants, creepers, and vegetation by cutting at roots and allowing to dry as long as possible before removal. Remove loose soil and debris from open masonry joints to whatever depth they occur.

### 3.8 CLEANING BRICKWORK

- A. Cold-Water Wash: Use cold water applied by low- pressure spray.
- B. Hot-Water Wash: Use hot water applied by low-pressure spray.
- C. Detergent Cleaning:
  - 1. Wet masonry with cold or hot water applied by low-pressure spray.
  - 2. Scrub masonry with detergent solution using medium-soft brushes until soil is thoroughly dislodged and can be removed by rinsing. Use small brushes to remove soil from mortar joints and crevices. Dip brush in solution often to ensure that adequate fresh detergent is used and that masonry surface remains wet.
  - 3. Rinse with cold or hot water applied by low-pressure spray to remove detergent solution and soil.
- D. Mold, Mildew, and Algae Removal:
  - 1. Wet masonry with cold or hot water applied by low-pressure spray.
  - 2. Apply mold, mildew, and algae remover by brush or low-pressure spray.
  - 3. Scrub masonry with medium-soft brushes until mold, mildew, and algae are thoroughly dislodged and can be removed by rinsing. Use small brushes for mortar joints and crevices. Dip brush in mold, mildew, and algae remover often to ensure that adequate fresh cleaner is used and that masonry surface remains wet.
  - 4. Rinse with cold or hot water applied by low-pressure spray to remove mold, mildew, and algae remover and soil.

END OF SECTION 040120

## SECTION 042000 - UNIT MASONRY

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Section Includes:

1. Concrete masonry units.
2. Brick masonry units.
3. Stone trim units.
4. Mortar and grout.
5. Steel reinforcing bars.
6. Masonry-joint reinforcement.
7. Embedded flashing.
8. Miscellaneous masonry accessories.
9. Cavity wall insulation.

#### 1.2 SECTION REQUIREMENTS

- A. Allowances: Furnish face brick and cracked mortar under the Unit Price Schedule specified in Section 012100 "Allowances."

#### 1.3 RELATED REQUIREMENTS

- A. Section 040120 "Maintenance of Unit Masonry" for repair of unit masonry.
- B. Section 055000 "Metal Fabrications" for furnishing steel lintels and shelf angles for unit masonry.
- C. Section 076200 "Sheet Metal Flashing and Trim"

#### 1.4 REFERENCES

- A. ASTM C1232 Standard Terminology of Masonry.
- B. ASTM C1180 Standard Terminology of Mortar and Grout for Unit Masonry.
- C. ACI 117-10 Standard Specifications for Tolerances for Concrete Construction and Materials.

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- D. ASTM A36/A36M-08 Standard Specifications for Carbon Structural Steel.
- E. ASTM A82/A82M-07 Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.
- F. ASTM A123/A123M-12 Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- G. ASTM A153/A153M-09 Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
- H. ASTM A185/A185M-07 Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.
- I. ASTM A240/A240M-12 Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet and Strip for Pressure Vessels and for General Applications.
- J. ASTM A307-12 Standard Specifications for Carbon Steel Bolts, Studs, and Threaded Rod, 60,000 PSI Tensile Strength.
- K. ASTM A416/A416M-12a Standard Specifications for Steel Strand, Uncoated Seven-Wire for Pre-Stressed Concrete.
- L. ASTM A421/A421M-10 Standard Specifications for Uncoated Stress-Relieved Steel Wire for Prestressed Concrete.
- M. ASTM A480/A480M-12 Standard Specifications for General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet and Strip.
- N. ASTM A496/A496M-07 Standard Specifications for Steel Wire, Deformed for Concrete Reinforcement.
- O. ASTM A497/A497M-07 Standard Specification for Steel Welded Wire Reinforcement, Deformed, for Concrete.
- P. ASTM A510/A510M-11 Standard Specification for General Requirements for Wire Rods and Coarse Round Wire, Carbon Steel.
- Q. ASTM A580/A580M-12a Standard Specification for Stainless Steel Wire.
- R. ASTM A641/A641M-09a Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.
- S. ASTM A653/A653M-11 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- T. ASTM A775/A775M-07b Standard Specification for Epoxy-Coated Steel Reinforcing Bars.

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- U. ASTM A884/A884M-12 Standard Specification for Epoxy-Coated Steel Wire and Welded Wire Reinforcement.
- V. ASTM A899-9 1 (2007) Standard Specification for Steel Wire, Epoxy-Coated.
- W. ASTM A95 1/A951M-1 1 Standard Specification for Steel Wire for Masonry Joint Reinforcement.
- X. ASTM A1008/A1008M-12a Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable.
- Y. ASTM B 117-11 Standard Practice for Operating Salt Spray (Fog) Apparatus.
- Z. ASTM C34-12 Standard Specification for Structural Clay Load Bearing Wall Tile.
- AA. ASTM C55-1 1 Standard Specification for Concrete Building Brick.
- BB. ASTM C62-12 Standard Specification for Building Brick (Solid Masonry Units Made from Clay or Shale).
- CC. ASTM C67-12 Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile.
- DD. ASTM C73-10 Standard Specification for Calcium Silicate Brick (Sand-Lime Brick).
- EE. ASTM C90-12 Standard Specification for Load Bearing Concrete Masonry Units.
- FF. ASTM C109/C109M-12 Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2 inch or [50 mm] Cube Specimens).
- GG. ASTM C126-12a Standard Specification for Ceramic Glazed Structural Clay Facing Tile, Facing Brick, and Solid Masonry Units.
- HH. ASTM C129-11 Standard Specification for Non-Loadbearing Concrete Masonry Units.
- II. ASTM C143/C143M-12 Standard Test Method for Slump of Hydraulic-Cement Concrete.
- JJ. ASTM C 144-11 Standard Specification for Aggregate for Masonry Mortar.
- KK. ASTM C150/C150M-12 Standard Specification for Portland Cement.
- LL. ASTM C12-10 Standard Specification for Structural Clay Facing Tile.
- MM. ASTM C216-12a Standard Specification for Facing Brick (Solid Masonry Units Made from Clay or Shale).
- NN. ASTM C270-12a Standard Specification for Mortar for Unit Masonry.

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- OO. ASTM C476-10 Standard Specification for Grout for Masonry.
- PP. ASTM C568/C568M-10 Standard Specification for Limestone Dimension Stone.
- QQ. ASTM C616/C616M-10 Standard Specification for Quartz-Based Dimension Stone.
- RR. ASTM C652-1 2a Standard Specification for Hollow Brick (Hollow Masonry Units Made from Clay or Shale)
- SS. ASTM C7 44-11 Standard Specification for Prefaced Concrete and Calcium Silicate Masonry Units.
- TT. ASTM C901-10 Standard Specification for Prefabricated Masonry Panels.
- UU. ASTM C920-11 Standard Specification for Elastomeric Joint Sealants.
- VV. ASTM C1006-07 Standard Test Method for Splitting Tensile Strength of Masonry Units.
- WW. ASTM C1019-11 Standard Test Method for Sampling and Testing Grout.
- XX. ASTM C1072-12 Standard Tests Method for Measurement of Masonry Flexural Bond Strength.
- YY. ASTM C1088-12 Standard Specification for Thin Veneer Brick Units Made from Clay or Shale.
- ZZ. ASTM C1314-12 Standard Test Method for Compressive Strength of Masonry Prisms.
- AAA. ASTM C 1405-12 Standard Specification for Glazed Brick (Single Fired, Brick Units).
- BBB. ASTM C1532/C1532M-12 Standard Practice for Selection, Removal and Shipment of Manufactured Masonry Units and Masonry Specimens from Existing Construction.
- CCC. ASTM C161/C1611M-09 Standard Test Method for Slump Flow of Self-Consolidating Concrete.
- DDD. ASTM C1634-11 Standard Specification for Concrete Facing Brick.
- EEE. ASTM D610-08 (2012) Standard Practice for liting Degree of Rusting on Painted Steel Surfaces.
- FFF. ASTM D994/D994M-1 1 Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type).
- GGG. ASTM D1056-07 Standard Specification for Flexible Cellular Materials - Sponge or Expanded Rubber.
- HHH. ASTM D1187/D1187M-97 (2011) Standard Specification for Asphalt-Base Emulsions for Use as Protective Coatings for Metal.

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- III. ASTM E72-10 Standard Test Methods of Conducting Tests of Panels for Building Construction.
- JJJ. ASTM E328-02 (2008) Standard Test Methods for Stress Relaxation Tests for Materials and Structures.
- KKK. ASTM E518/E518M-10 Standard Test Methods for Flexural Bond Strength of Masonry.
- LLL. ASTM E519/E519M-10 Standard Test Method for Diagonal Tension (Shear) in Masonry Assemblages.
- MMM. AWS D 1.4/D1.4M:2011 Structural Welding Code-Reinforcing Steel.
- NNN. ASTM E 119-18ce1 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2000 National Concrete Masonry Association (NCMA)

OOO. NCMA TEK References:

1. NCMA TEK 1-1F (2012) ASTM Specifications for Concrete Masonry Units.
2. NCMA TEK 1-2C (2010) Specifications for Masonry Structures.
3. NCMA TEK 8-2A Removal of Stains from Concrete Masonry.
4. NCMA TEK 8-3A Control and Removal of Efflorescence.
5. NCMA TEK 8-4A Cleaning Concrete Masonry.
6. NCMA TEK 9-1A Mortars for Concrete Masonry.
7. NCMA TEK 9-4A Grout for Concrete Masonry.
8. NCMA TEK 10-1 Design of Concrete Masonry for Crack Control.
9. NCMA TEK 14-5A Loadbearing Concrete Masonry Wall Design.
10. NCMA TEK 14-6 Concrete Masonry Bond Patterns.
11. NCMA TEK 16-1A Multi-Wythe Concrete Masonry Walls.
12. NCMA TEK 19-1 Water Repellants for Concrete Masonry Walls.
13. NCMA TEK 19-2B Details for Building Dry Concrete Masonry Walls.
14. NCMA TEK 19-5A Flashing For Concrete Masonry Walls.
15. NCMA TEK 19-6A Joint Sealants for Concrete Masonry Walls.

## 1.5 INFORMATIONAL SUBMITTALS

- A. List of Materials Used in Constructing Mockups: List generic product names together with manufacturers, manufacturers' product names, model numbers, lot numbers, batch numbers, source of supply, and other information as required to identify materials used. Include mix proportions for mortar and grout and source of aggregates.
1. Submittal is for information only. Neither receipt of list nor approval of mockup constitutes approval of deviations from the Contract Documents unless such deviations are specifically brought to the attention of Architect and approved in writing.
- B. Qualification Data: For testing agency.
- C. Material Certificates: For each type and size of the following:

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1. Masonry units.
    - a. Include material test reports substantiating compliance with requirements.
    - b. For brick and concrete masonry units, include size-variation data verifying that actual range of sizes falls within specified tolerances.
    - c. For exposed brick, include test report for efflorescence according to ASTM C 67.
    - d. For concrete masonry units include data and calculations establishing average net-area compressive strength of units.
  2. Show sizes, profiles, coursing, and locations of special shapes.
  3. Reinforcing Steel: Detail bending, lap lengths, and placement of unit masonry reinforcing bars. Comply with ACI 315
  4. Samples for face brick.
  5. Integral water repellant used in CMUs.
  6. Cementitious materials. Include name of manufacturer, brand name, and type.
  7. Mortar admixtures.
  8. Mix designs: Preblended, dry mortar mixes. Include description of type and proportions of ingredients in accordance to ASTM C270
  9. Grout mixes. Include description of type and proportions of ingredients in accordance to ASTM C476.
  10. Reinforcing bars.
  11. Joint reinforcement.
  12. Anchors, ties, and metal accessories.
  13. Material Certificates: For each type of product indicated. Include statements of material properties indicating compliance with requirements.
- D. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.
1. Include test reports for mortar mixes required to comply with property specification. Test according to ASTM C 109/C 109M for compressive strength, ASTM C 1506 for water retention, and ASTM C 91 for air content.
  2. Include test reports, according to ASTM C 1019, for grout mixes required to comply with compressive strength requirement.
- E. Statement of Compressive Strength of Masonry: For each combination of masonry unit type and mortar type, provide statement of average net-area compressive strength of masonry units, mortar type, and resulting net-area compressive strength of masonry determined according to Tables 1 and 2 in ACI 530.1/ASCE 6/TMS 602.
- F. Cold-Weather and Hot-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with requirements.
- G. Provide clay masonry units that comply with ASTM C62 or ASTM C216.
- H. Joint reinforcement: Provide ladder type joint reinforcement in accordance to ASTM A951.
- I. Samples for Initial Selection:
1. Decorative CMUs, in the form of small-scale units.
  2. Pre-faced CMUs.



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3. Concrete face brick, in the form of small-scale units.
4. Clay brick.
5. Colored mortar.
6. Weep vents/cavity cell vents.

## 1.6 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Qualified according to ASTM C 1093 for testing indicated.

## 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.
- B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- D. Deliver preblended, dry mortar mix in moisture-resistant containers. Store preblended, dry mortar mix in delivery containers on elevated platforms in a dry location or in covered weatherproof dispensing silos.
- E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

## 1.8 FIELD CONDITIONS

- A. Protection of Masonry-Mandatory: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work or during inclement or precipitous weather. Cover partially completed masonry when construction is not in progress.
  1. Extend cover a minimum of 24 inches (600 mm) down both sides of walls, and hold cover securely in place.
- B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least three days after building masonry walls or columns.
- C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
  1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
  2. Protect sills, ledges, and projections from mortar droppings.

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3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
  4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.
- D. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.
1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F (4 deg C) and higher and will remain so until masonry has dried, but not less than seven days after completing cleaning.
- E. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from single source from single manufacturer for each product required.
- B. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from single manufacturer for each cementitious component and from single source or producer for each aggregate.

### 2.2 PERFORMANCE REQUIREMENTS

- A. Provide unit masonry that develops indicated net-area compressive strengths at 28 days.
- B. Comply with ACI 530.1/ASCE 6/TMS 602.
- C. Determine net-area compressive strength of masonry by testing masonry prisms according to ASTM C 1314.

## 2.3 BRICK MASONRY UNITS

- A. Brick Masonry Units: ASTM C62, ASTM C216 or ASTM C652
1. Grade: SW
  2. Type: FBX
  3. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 3500 psi (24.13 MPa).
  4. Initial Rate of Absorption: Less than 30 g/30 sq. in. (30 g/194 sq. cm) per minute when tested according to ASTM C 67.
  5. Efflorescence: Provide brick that has been tested according to ASTM C 67 and is rated "not effloresced."
  6. Size: Match to existing units where used to infill existing masonry, matching color range, texture, and size of existing adjacent brickwork.
- B. Compressive strength of masonry based on the compressive strength of clay masonry units and type of mortar used in construction.
1. Use Table 1 to determine the compressive strength of clay masonry based on the strength of the units and the type of mortar specified. The following requirements apply to masonry:
    - a. Units are sampled and tested to verify conformance with ASTM C216, or ASTM C652.
    - b. Thickness of bed joints does not exceed 5/8 in. (15.9 mm).
    - c. For grouted masonry, the grout conforms to Article 2.2

TABLE 1		
Net area compressive strength of clay masonry, psi (MPa)	Net area compressive strength of clay masonry units, psi (MPa)	
	Type M or S mortar	Type N mortar
1,000 (6.90)	1,700 (11.72)	2,100 (14.48)
1,500 (10.34)	3,350 (23.10)	4,150 (28.61)
2,000 (13.79)	4,950 (34.13)	6,200 (42.75)
2,500 (17.24)	6,600 (45.51)	8,250 (56.88)
3,000 (20.69)	8,250 (56.88)	10,300 (71.02)
3,500 (24.13)	9,900 (68.26)	-
4,000 (27.58)	11,500 (79.29)	-

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- C. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Stiles and Hart Brick Co., PO Box 367, Bridgewater, MA
  2. Redland Brick Inc., Williamsport, MD
  3. Glen-Gery Corp., Wyomissing, PA
  4. Belden Brick, Canton, OH
  5. Or equal to match existing brick units.

## 2.4 CONCRETE MASONRY UNITS (CMU)

- A. Concrete Masonry Units: ASTM C 90; Density Classification, Normal Weight.
1. Special shapes for lintels, corners, jambs, sash, control joints, and other special conditions.
  2. Square-edged units for outside corners unless otherwise indicated.
  3. Backup CMU and interior wall CMU size:
    - a. Standard size: 8"x8"x16"
    - b. Pattern and Texture: Standard, smooth face finish.
  4. Veneer CMU for exterior walls size:
    - a. Oversize/Monumental: 4"x16"x24"
    - b. Pattern and Texture: Standard pattern, ground-face finish.
    - c. Special Aggregate: Provide units made with aggregate matching aggregate in Architect's sample.
- B. Compressive strength of masonry based on the compressive strength of concrete masonry units and type of mortar used in construction.
1. Use Table 2 to determine the compressive strength of concrete masonry based on the strength of the units and the type of mortar specified. The following requirements apply to masonry:
    - a. Units are sampled and tested to verify conformance with ASTM C90
    - b. Thickness of bed joints does not exceed 5/8 in. (15.9 mm).

TABLE 2		
Net area compressive strength of concrete masonry, psi (MPa)	Net area compressive strength of ASTM C90 concrete masonry units, psi (MPa)	
	Type M or S mortar	Type N mortar
1,700 (11.72)	-	1,900 (13.10)
1,900 (13.10)	1,900 (13.10)	2,350 ( 16.20)
2,000 (13.79)	2,000 (13.79)	2,650 (18.27)
2,250 (15.51)	2,600 (17.93)	3,400 (23.44)
2,500 (17.24)	3,250 (22.41)	4,350 (28.96)
2,750 (18.96)	3,900 (26.89)	-
3,000 (20.69)	4,500 (31.03)	
For units of less than 4 in. ( 102 mm) nominal height, use 85 percent of the values listed		

2. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - a. Dagastino Building Blocks Inc, 1111 Altamont Avenue, Schenectady New York
  - b. Duke Concrete Products Inc, 50 Duke Industrial Park, Queensbury, New York
  - c. Westbrook Concrete Block Co., P.O. Box 700, Westbrook, Connecticut
  - d. Oldcastle/Echelon Masonry 900 Ashwood Pkwy, Atlanta Ga
  - e. Or equal
3. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 2000 psi (13.79 MPa).
4. Density Classification: Normal weight.
5. Size (Width): Manufactured to dimensions specified in "CMUs" Paragraph.

## 2.5 MASONRY LINTELS

- A. Concrete Masonry Lintels: At masonry opening locations not designated to receive structural steel lintels, provide prefabricated masonry lintels made from bond beam CMUs matching adjacent CMUs in color, texture, and density classification, with continuous #5 steel reinforcing bars placed in manufactured troughs and filled with coarse grout.

## 2.6 INTEGRAL WATER REPELLENT

- A. Provide concrete masonry units made with integral water repellent.
1. Integral Water Repellent: Liquid polymeric, integral water-repellent admixture that does not reduce flexural bond strength. Units made with integral water repellent, when tested according to ASTM E 514/E 514M as a wall assembly made with mortar containing integral water-repellent manufacturer's mortar additive, with test period extended to 24 hours, shall show no visible water or leaks on the back of test specimen.
    - a. Krete H.Q. Plus by Krete Industries, Inc.; Butler, Wisconsin
    - b. Chemstrong AquaShield by Great Eastern Technologies, LLC, Yardville, NJ.
    - c. Grace DRY-BLOCK by Grace Construction Products, Cambridge, Mass.
    - d. Or equal.

## 2.7 MORTAR AND GROUT MIXES

- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated.
- B. Mortar for Unit Masonry: Comply with ASTM C 270, Proportion Specification. Provide the following types of mortar for applications stated unless another type is indicated or needed to provide required compressive strength of masonry.
1. Use portland cement-lime or masonry cement mortar.
  2. Do not use calcium chloride in mortar.
  3. For masonry below grade or in contact with earth, use Type M.
  4. For reinforced masonry, use Type S.
  5. For exterior masonry, use portland cement-lime mortar.
  6. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.
  7. For interior non-load-bearing partitions, and for other applications where another type is not indicated, use Type N.
  8. Colored Mortar:
    - a. For face brick, use colored cement or cement-lime mix to match existing mortar color adjacent.
    - b. For CMU veneer, use colored cement or cement-lime mix to match existing mortar color adjacent.
    - c. Unless indicated otherwise in submittals or shop drawings, match to colors selected by Architect from manufacturers standard color palette.
- C. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.
- D. Pigmented Mortar: Use colored cement product or select and proportion pigments with other ingredients to produce color required. Do not add pigments to colored cement products.
1. Pigments shall not exceed 10 percent of portland cement by weight.

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2. Pigments shall not exceed 5 percent of masonry cement or mortar cement by weight.
  3. Insert materials and proportions used for sample in first subparagraph below if known.
  4. Mix to match Architect's sample or existing mortar color.
  5. Application: Use pigmented mortar for exposed mortar joints with the following units:
    - a. Veneer CMUs.
    - b. Face brick.
- E. Water-Repellent Admixture: Liquid water-repellent mortar admixture intended for use with CMUs containing integral water repellent from same manufacturer.
1. Krete H.Q. Plus by Krete Industries, Inc.; Butler, Wisconsin
  2. Chemstrong AquaShield by Great Eastern Technologies, LLC, Yardville, NJ.
  3. Grace DRY-BLOCK by Grace Construction Products, Cambridge, Mass.
  4. Or equal.
- F. Grout for Unit Masonry: Comply with ASTM C 476.
1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with Table 1.15.1 in ACI 530.1/ASCE 6/TMS 602 for dimensions of grout spaces and pour height.
  2. Proportion grout in accordance with ASTM C 476, Table 1 for specified 28-day compressive strength indicated, but not less than 2000 psi (14 MPa)].
  3. Provide grout with a slump of 8 to 11 inches (203 to 279 mm as measured according to ASTM C 143/C 143M.
- G. Water: Potable

## 2.8 REINFORCEMENT, TIES, AND ANCHORS

- A. Masonry Joint Reinforcement, General: ASTM A 951/A 951M.
- B. Exterior Multiwythe Masonry walls: Stainless Steel Reinforcing. Stainless Steel shall be Type 304 as follows:
1. Joint Reinforcement: ASTM A580/A580M, ladder type.
  2. Plate and bent bar anchors: ASTM A480/A480M and ASTM A666
  3. Sheet metal anchors and ties: ASTM A480/A480M and ASTM A240/A240M
  4. Wires and anchors: ASTM A580/A580M
- C. Interior walls: Hot-dip galvanized, carbon steel.
1. Single-Wythe Masonry: Ladder type.
- D. Wire Ties, General: Unless otherwise indicated, size wire ties to extend at least halfway through veneer but with at least 5/8-inch (16-mm) cover on outside face. Outer ends of wires are bent 90 degrees and extend 2 inches (50 mm) parallel to face of veneer.
- E. Individual Wire Ties: Rectangular units with closed ends and not less than 4 inches (100 mm) wide.
1. Z-shaped ties with ends bent 90 degrees to provide hooks not less than 2 inches (50 mm) long may be used for masonry constructed from solid units.



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2. Where wythes do not align or are of different materials, use adjustable ties with pintle-and-eye connections having a maximum adjustment of 1-1/4 inches (32 mm).
  3. Wire: Fabricate from 3/16-inch- (4.76-mm-) minimum and 1/4-inch- (6.35-mm-) maximum diameter, stainless-steel wire.
- F. Corrugated-Metal Ties: 7/8 inch (22 mm) wide with corrugations having a wavelength of 7.6 to 12.7 mm and an amplitude of 0.06 to 0.10 inch (1.5 to 2.5 mm) and made from 0.031-inch- (0.79-mm-) thick, stainless-steel sheet or 0.062-inch- (1.59 mm-) thick, stainless-steel sheet.
- G. Rigid Anchors: Fabricate from steel bars 1-1/2 inches (38 mm) wide by 1/4 inch (6.35 mm) thick by 24 inches (610 mm) long, with ends turned up 2 inches (51 mm) or with cross pins unless otherwise indicated.
- H. Screw Attached Adjustable Masonry-Veneer Anchors:
1. General: Provide anchors that allow vertical adjustment but resist a 200-lbf load per TMS 402/602-16 in tension or compression perpendicular to plane of wall without deforming or developing play and maintaining wire specifications per ASTM A1064/1064M.
  2. Anchor: Stainless-steel barrel bolt for anchoring into masonry or concrete with bolt length to match thickness of continuous thermal insulation, two-piece adjustable masonry veneer anchors with thermal break connector and/or washers to seal insulation and vapor barrier for attachment to masonry, and acceptable to authorities having jurisdiction. Provide anchor manufacturer's standard thermal gaskets and pintle hook wire.
  3. Products: One of the following:
    - a. Hohmann & Barnard, Inc.; Thermal Concrete 2-Seal Wing Nut Anchor and double pintle wire tie.
    - b. Heckmann Building Products Inc.; Pos-I-Tie with thermal clip/double pintle wire tie.
    - c. Or equal

## 2.9 EMBEDDED FLASHING MATERIALS

- A. Metal Flashing: Provide metal flashing complying with SMACNA's "Architectural Sheet Metal Manual" and as follows:
1. Stainless Steel: ASTM A 240/A 240M, Type 304, 0.016 inch (0.40 mm) thick.
  2. Fabricate continuous flashings in sections 96 inches (2400 mm) long minimum, but not exceeding 12 feet (3.7 m). Provide splice plates at joints of formed, smooth metal flashing.
  3. Fabricate through-wall metal flashing embedded in masonry from stainless steel, with ribs at 3-inch (76-mm) intervals along length of flashing to provide an integral mortar bond.
    - a. Products: Subject to compliance with requirements, provide one of the following available products that may be incorporated into the Work include, but are not limited to, the following:
      - 1) Cheney Flashing Company; Cheney Flashing (Dovetail) or Cheney 3-Way Flashing (Sawtooth).

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- 2) Keystone Flashing Company, Inc.; Keystone 3-Way Interlocking Thruwall Flashing.
    - 3) Sandell Manufacturing Co., Inc.; Mechanically Keyed Flashing.
    - 4) Hohmann and Barnard Inc., MFL-STF Metal Sawtooth Flashing.
  4. Fabricate through-wall flashing with drip edge where indicated. Fabricate by extending flashing 1/2 inch (13 mm) out from wall, with outer edge bent down 30 degrees and hemmed.
  5. Fabricate through-wall flashing with sealant stop unless otherwise indicated. Fabricate by bending metal back on itself 3/4 inch (19 mm) at exterior face of wall and down into joint 1/4 inch (6 mm) to form a stop for retaining sealant backer rod.
  6. Fabricate metal drip edges for ribbed metal flashing from plain metal flashing of same metal as ribbed flashing and extending at least 3 inches (76 mm) into wall with hemmed inner edge to receive ribbed flashing and form a hooked seam. Form hem on upper surface of metal so that completed seam sheds water.
  7. Fabricate metal drip edges from stainless steel. Extend at least 3 inches (76 mm) into wall and 1/2 inch (13 mm) out from wall, with outer edge bent down 30 degrees and hemmed.
  8. Fabricate metal expansion-joint strips from stainless steel.
- B. Flexible Flashing: Use the following unless otherwise indicated:
1. Self Adhering Stainless Steel Flashing Type 304 stainless steel fabric bonded with adhesive and release liner.
    - a. Products: Subject to compliance with requirements, provide one of the following available products that may be incorporated into the Work include, but are not limited to, the following:
      - 1) York Manufacturing; York 304 Self Adhering Stainless Steel flashing.
      - 2) Hohmann and Barnard Inc., Mighty Flash SA Stainless Steel flashing.
      - 3) Or equal
- C. Application: Unless otherwise indicated, use the following:
1. Where flashing is indicated to receive counterflashing, use metal flashing.
  2. Where flashing is indicated to be turned down at or beyond the wall face, use metal flashing.
  3. Where flashing is partly exposed and is indicated to terminate at the wall face, use metal flashing **with** a drip.
  4. Where flashing is fully concealed, use metal flashing or flexible flashing.

## 2.10 MISCELLANEOUS MASONRY ACCESSORIES

- A. Compressible Filler: Premolded strips complying with ASTM D 1056, Grade 2A1.
- B. Preformed Control-Joint Gaskets: Designed to fit standard sash block and to maintain lateral stability in masonry wall; made from styrene-butadiene rubber or PVC.
- C. Bond-Breaker Strips: Asphalt-saturated, organic roofing felt complying with ASTM D 226, Type I (No. 15 asphalt felt).

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- D. Cellular Plastic Weep/Vent: One-piece, flexible extrusion made from UV-resistant polypropylene copolymer, full height and width of head joint and depth 1/8 inch (3 mm) less than depth of outer wythe, in color selected from manufacturer's standard.
  - 1. Products: Subject to compliance with requirements, provide one of the following available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Dayton Superior Corporation, Dur-O-Wal Division; Cell Vents.
    - b. Heckmann Building Products Inc.; No. 85 Cell Vent.
    - c. Hohmann & Barnard, Inc.; Quadro-Vent.
- E. Cavity Drainage Material: Free-draining polymer mesh, full depth of cavity with dovetail shaped notches that prevent mortar clogging.
  - 1. Products: Subject to compliance with requirements, provide one of the following available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Advanced Building Products Inc.; Mortar Break or Mortar Break II.
    - b. Dayton Superior Corporation, Dur-O-Wal Division; Polytite Mortar Stop.
    - c. Mortar Net USA, Ltd.; Mortar Net.
- F. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells and hold reinforcing bars in center of cells. Units are formed from 0.148-inch (3.77-mm) steel wire, hot-dip galvanized after fabrication. Provide units designed for number of bars indicated.
  - 1. Products: Subject to compliance with requirements, provide one of the following available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Dayton Superior Corporation, Dur-O-Wal Division; D/A 810, D/A 812 or D/A 817.
    - b. Heckmann Building Products Inc.; No. 376 Rebar Positioner.
    - c. Hohmann & Barnard, Inc.; #RB or #RB-Twin Rebar Positioner.
    - d. Wire-Bond; O-Ring or Double O-Ring Rebar Positioner.

## 2.11 MISCELLANEOUS ANCHORS

- A. Anchor Bolts: Headed or L-shaped steel bolts complying with ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers; hot-dip galvanized to comply with ASTM A 153/A 153M, Class C; of dimensions indicated.
- B. Postinstalled Anchors: Torque-controlled expansion anchors or chemical anchors.
  - 1. Load Capacity: Capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.

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2. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941 (ASTM F 1941M), Class Fe/Zn 5 unless otherwise indicated.
3. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 (A1) or Group 2 (A4) stainless-steel bolts, ASTM F 593 (ASTM F 738M), and nuts, ASTM F 594 (ASTM F 836M).

## 2.12 CAVITY-WALL INSULATION

- A. Extruded-Polystyrene Board Insulation: ASTM C 578, Type X, closed-cell moisture resistant rigid foam board.
  1. Edge Condition: Square
  2. Water Absorption (ASTM C272): Maximum.0.10 percent by volume.
  3. Surface Burning Characteristics (ASTM E 84): Flame spread less than 25, smoke developed less than 450, certified by independent third party such as Underwriters Laboratories.
  4. Thermal Resistance (180 day real-time aging as mandated by ASTM C578, measured per ASTM C 518) with 90% lifetime limited warranty on thermal resistance.
    - a. Thermal resistance: R-values (hr x ft<sup>2</sup> x oF/ Btu) 5.4 and 5.0 per inch of thickness. Measured at 40°F and 75°F mean temperature respectively in accordance with test method ASTM C518.
  5. Adhesive: Type recommended by insulation board manufacturer for application indicated.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
  1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
  2. Verify that foundations are within tolerances specified.
  3. Verify that reinforcing dowels are properly placed.
  4. Verify that substrates are free of substances that impair mortar bond.
- B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping connections.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION, GENERAL

- A. Thickness: Build cavity and composite walls and other masonry construction to full thickness shown. Build single-wythe walls to actual widths of masonry units, using units of widths indicated.
- B. Build chases and recesses to accommodate items specified in this and other Sections.
- C. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match construction immediately adjacent to opening.
- D. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.
- E. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures. Mix units from several pallets or cubes as they are placed.
- F. Matching Existing Masonry: Match coursing, bonding, color, and texture of existing masonry.
- G. Wetting of Brick: Wet brick before laying if initial rate of absorption exceeds 30 g/30 sq. in. (30 g/194 sq. cm) per minute when tested according to ASTM C 67. Allow units to absorb water so they are damp but not wet at time of laying.
- H. Cut masonry units with saw. Install with cut surfaces and, where possible, cut edges concealed.
- I. Mix units for exposed unit masonry from several pallets or cubes as they are placed to produce uniform blend of colors and textures.
- J. Stopping and Resuming Work: Rack back units; do not tooth.
- K. Fill cores in hollow concrete masonry units with grout 24 inches (600 mm) under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.
- L. Build non-load-bearing interior partitions full height and install compressible filler in joint between top of partition and underside of structure above.
- M. Tool exposed joints slightly concave when thumbprint hard unless otherwise indicated.
- N. Keep cavities clean of mortar droppings and other materials during construction.

### 3.3 TOLERANCES

- A. Dimensions and Locations of Elements:
  - 1. For dimensions in cross section or elevation, do not vary by more than plus 1/2 inch (12 mm) or minus 1/4 inch (6 mm).

2. For location of elements in plan, do not vary from that indicated by more than plus or minus 1/2 inch (12 mm).
3. For location of elements in elevation, do not vary from that indicated by more than plus or minus 1/4 inch (6 mm) in a story height or 1/2 inch (12 mm) total.

B. Lines and Levels:

1. For bed joints and top surfaces of bearing walls, do not vary from level by more than 1/4 inch in 10 feet (6 mm in 3 m), or 1/2-inch (12-mm) maximum.
2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2-inch (12-mm) maximum.
3. For vertical lines and surfaces, do not vary from plumb by more than 1/4 inch in 10 feet (6 mm in 3 m), 3/8 inch in 20 feet (9 mm in 6 m), or 1/2-inch (12-mm) maximum.
4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2-inch (12-mm) maximum.
5. For lines and surfaces, do not vary from straight by more than 1/4 inch in 10 feet (6 mm in 3 m), 3/8 inch in 20 feet (9 mm in 6 m), or 1/2-inch (12-mm) maximum.
6. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet ((6 mm in 3 m),) or 1/2-inch (12-mm) maximum.
7. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch (1.5 mm) except due to warpage of masonry units within tolerances specified for warpage of units.

C. Joints:

1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch (3 mm), with a maximum thickness limited to 1/2 inch (12 mm).
2. For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch (3 mm).
3. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch (9 mm) or minus 1/4 inch (6 mm).
4. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch (3 mm).[ Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8 inch (3 mm).]
5. For exposed bed joints and head joints of stacked bond, do not vary from a straight line by more than 1/16 inch (1.5 mm) from one masonry unit to the next.

### 3.4 LAYING MASONRY WALLS

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.

- B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond or stack bond indicated on Drawings; do not use units with less-than-nominal 4-inch (100-mm) horizontal face dimensions at corners or jambs.
- C. Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than 4 inches (100 mm). Bond and interlock each course of each wythe at corners. Do not use units with less-than-nominal 4-inch (100-mm) horizontal face dimensions at corners or jambs.
- D. Stopping and Resuming Work: Stop work by stepping back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.
- E. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.
- F. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.
- G. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below, and rod mortar or grout into core.
- H. Fill cores in hollow CMUs with grout 24 inches (600 mm) under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.
- I. Build nonload-bearing interior partitions full height of story to underside of solid floor or roof structure above unless otherwise indicated.
  - 1. Install compressible filler in joint between top of partition and underside of structure above.
  - 2. Spacing in first subparagraph below is an example only.
  - 3. Fasten partition top anchors to structure above and build into top of partition.
  - 4. At fire-rated partitions, treat joint between top of partition and underside of structure above to comply with Section 078446 "Fire-Resistive Joint Systems."

### 3.5 MORTAR BEDDING AND JOINTING

- A. Lay brick and CMUs as follows:
  - 1. Bed face shells in mortar and make head joints of depth equal to bed joints.
  - 2. Bed webs in mortar in all courses of piers, columns, and pilasters.
  - 3. Bed webs in mortar in grouted masonry, including starting course on footings.
  - 4. Fully bed entire units, including areas under cells, at starting course on footings where cells are not grouted.
  - 5. Fully bed units and fill cells with mortar at anchors and ties as needed to fully embed anchors and ties in mortar.
- B. Lay solid masonry units and brick with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.



- C. Set stone trim units in full bed of mortar with full vertical joints. Fill dowel, anchor, and similar holes.
  - 1. Clean soiled surfaces with fiber brush and soap powder and rinse thoroughly with clear water.
  - 2. Allow cleaned surfaces to dry before setting.
  - 3. Wet joint surfaces thoroughly before applying mortar.
  - 4. Rake out mortar joints for pointing with sealant.
- D. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.
- E. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint) unless otherwise indicated.
- F. Cut joints flush where indicated to receive waterproofing, cavity wall insulation and air barriers unless otherwise indicated.

### 3.6 CAVITY WALLS

- A. Bond wythes of cavity walls together in accordance to the following:
  - 1. Masonry Joint Reinforcement: Comply with requirements for Masonry-Joint Reinforcement.
  - 2. Masonry Veneer Anchors: Comply with requirements for anchoring masonry veneers.
- B. Bond wythes of cavity walls together using bonding system indicated on Drawings.
- C. Keep cavities clean of mortar droppings and other materials during construction. Bevel beds away from cavity, to minimize mortar protrusions into cavity. Do not attempt to trowel or remove mortar fins protruding into cavity.
- D. Parge cavity face of backup wythe in a single coat approximately 3/8 inch (10 mm) thick. Trowel face of parge coat smooth.
- E. Apply air barrier to face of backup wythe to comply Section 072726 "Fluid-Applied Membrane Air Barriers."
- F. Installing Cavity-Wall Insulation: Place small dabs of adhesive, spaced approximately 12 inches (300 mm) o.c. both ways, on inside face of insulation boards, or attach with plastic fasteners designed for this purpose. Fit courses of insulation between wall ties and other confining obstructions in cavity, with edges butted tightly both ways. Press units firmly against inside wythe of masonry or other construction as shown.
  - 1. Fill cracks and open gaps in insulation with crack sealer compatible with insulation and masonry.

### 3.7 ANCHORED MASONRY VENEERS

- A. Anchor masonry veneers to masonry backup with seismic masonry-veneer anchors to comply with the following requirements:
  - 1. Fasten screw-attached and seismic anchors through sheathing to masonry backup with metal fasteners of type indicated.
  - 2. Embed tie sections in masonry joints.
  - 3. Locate anchor sections to allow maximum vertical differential movement of ties up and down.
  - 4. Space anchors as indicated, but not more than 32 inches (813 mm) o.c. vertically and 25 inches (635 mm) o.c. horizontally, with not less than one anchor for each 2.67 sq. ft. (0.25 sq. m) of wall area. Install additional anchors within 12 inches (305 mm) of openings and at intervals, not exceeding 36 inches (914 mm), around perimeter.
- B. Provide not less than 2 inches (50 mm) of airspace between back of masonry veneer and face of insulation.
  - 1. Keep airspace clean of mortar droppings and other materials during construction. Bevel beds away from airspace, to minimize mortar protrusions into airspace. Do not attempt to trowel or remove mortar fins protruding into airspace.

### 3.8 MASONRY-JOINT REINFORCEMENT

- A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch (16 mm) on exterior side of walls, 1/2 inch (13 mm) elsewhere. Lap reinforcement a minimum of 6 inches (150 mm).
  - 1. Space reinforcement not more than 16 inches (406 mm) o.c.
  - 2. Space reinforcement not more than 8 inches (203 mm) o.c. in foundation walls and parapet walls.
  - 3. Provide reinforcement not more than 8 inches (203 mm) above and below wall openings and extending 12 inches (305 mm) beyond openings in addition to continuous reinforcement.
- B. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.
- C. Provide continuity at wall intersections by using prefabricated T-shaped units.
- D. Provide continuity at corners by using prefabricated L-shaped units.
- E. Cut and bend reinforcing units as directed by manufacturer for continuity at corners, returns, offsets, column fireproofing, pipe enclosures, and other special conditions.

### 3.9 ANCHORING MASONRY TO STRUCTURAL STEEL AND CONCRETE

- A. Anchor masonry to structural steel and concrete, where masonry abuts or faces structural steel or concrete, to comply with the following:

1. Provide an open space not less than 2 inches (50 mm) wide between masonry and structural steel or concrete unless otherwise indicated. Keep open space free of mortar and other rigid materials.
2. Anchor masonry with anchors embedded in masonry joints and attached to structure.
3. Space anchors as indicated, but not more than 24 inches (610 mm) o.c. vertically and 36 inches (915 mm) o.c. horizontally.

### 3.10 CONTROL AND EXPANSION JOINTS

- A. General: Install control- and expansion-joint materials in unit masonry as masonry progresses. Do not allow materials to span control and expansion joints without provision to allow for in-plane wall or partition movement.
- B. Form control joints in concrete masonry using one of the following methods:
  1. Fit bond-breaker strips into hollow contour in ends of CMUs on one side of control joint. Fill resultant core with grout, and rake out joints in exposed faces for application of sealant.
  2. Install preformed control-joint gaskets designed to fit standard sash block.
  3. Install interlocking units designed for control joints. Install bond-breaker strips at joint. Keep head joints free and clear of mortar, or rake out joint for application of sealant.
  4. Install temporary foam-plastic filler in head joints, and remove filler when unit masonry is complete for application of sealant.

### 3.11 LINTELS

- A. Install lintels where indicated.
- B. Minimum bearing of 8 inches (200 mm) at each jamb unless otherwise indicated.

### 3.12 FLASHING, WEEP HOLES, AND CAVITY VENTS

- A. General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated. Install cavity vents at shelf angles, ledges, and other obstructions to upward flow of air in cavities, and where indicated.
- B. Install flashing as follows unless otherwise indicated:
  1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.
  2. At multiwythe masonry walls, including cavity walls, extend flashing through outer wythe, turned up a minimum of 8 inches (200 mm), and through inner wythe to within 1/2 inch (13 mm) of the interior face of wall in exposed masonry. Where interior face of

wall is to receive furring or framing, carry flashing completely through inner wythe and turn flashing up approximately 2 inches (50 mm) on interior face.

3. At masonry-veneer walls, extend flashing through veneer, across airspace behind veneer, and up face of sheathing at least 8 inches (200 mm); with upper edge tucked under water-resistive air barrier, lapping at least 4 inches (100 mm). Fasten upper edge of flexible flashing to sheathing through termination bar.
  4. At lintels, extend flashing a minimum of 6 inches (150 mm) into masonry at each end. At heads and sills, extend flashing 6 inches (150 mm) at ends and turn up not less than 2 inches (50 mm) to form end dams.
  5. Interlock end joints of ribbed sheet metal flashing by overlapping ribs not less than 1-1/2 inches (38 mm) or as recommended by flashing manufacturer, and seal lap with elastomeric sealant complying with requirements in Section 079200 "Joint Sealants" for application indicated.
  6. Install metal drip edges with ribbed sheet metal flashing by interlocking hemmed edges to form hooked seam. Seal seam with elastomeric sealant complying with requirements in Section 079200 "Joint Sealants" for application indicated.
  7. Install metal drip edges beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch (13 mm) back from outside face of wall, and adhere flexible flashing to top of metal drip edge.
  8. Install metal flashing termination beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch (13 mm) back from outside face of wall, and adhere flexible flashing to top of metal flashing termination.
  9. Cut flexible flashing off flush with face of wall after masonry wall construction is completed.
- C. Install single-wythe CMU flashing system in bed joints of CMU walls where indicated to comply with manufacturer's written instructions. Install CMU cell pans with upturned edges located below face shells and webs of CMUs above and with weep spouts aligned with face of wall. Install CMU web covers so that they cover upturned edges of CMU cell pans at CMU webs and extend from face shell to face shell.
- D. Install reglets and nailers for flashing and other related construction where they are shown to be built into masonry.
- E. Install cavity vents in head joints in exterior wythes at spacing indicated. Use specified weep/cavity vent products to form cavity vents.
1. Close cavities off vertically and horizontally with blocking in manner indicated. Install through-wall flashing and weep holes above horizontal blocking.

### 3.13 REINFORCED UNIT MASONRY INSTALLATION

- A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.
1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace,

- tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
  - 2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other loads that may be placed on them during construction.
- B. Placing Reinforcement: Comply with requirements in TMS 602/ACI 530.1/ASCE 6.
- C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.
- 1. Comply with requirements in TMS 602/ACI 530.1/ASCE 6 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
  - 2. Limit height of vertical grout pours to not more than 12.67 ft. (3.86 m).

### 3.14 CAVITY WALL INSULATION

- A. Examine the areas and conditions under which work of this section will be installed. Verify that adjacent materials are dry and ready to receive insulation.
- B. Provide written report listing conditions detrimental to performance of work in this section. Do not proceed with installation until unsatisfactory conditions have been corrected.
- C. Preparation: Clean substrates of substances harmful to insulation or vapor retarders, including removing projections capable of puncturing vapor retarders or of interfering with insulation attachment.
- D. Installation General: Comply with insulation manufacturer's written instructions applicable to products and application indicated.
- 1. Install insulation that is undamaged, dry, and unsoiled.
  - 2. Extend insulation in thickness indicated to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
  - 3. Apply single layer of insulation boards to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness.
- E. Fit courses of 16" wide insulation boards horizontally between 16" o.c. horizontal continuous joint reinforcing/adjustable wall tie eyes. Snugly friction fit insulation in place, between the wall tie eyes. Push the insulation back tightly against the back-up wall surface, with edges butted tightly in both directions. Secure insulation in place by inserting the adjustable brick tie pintel into the wall tie eye.

### 3.15 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Owner will engage special inspectors to perform tests and inspections and prepare reports. Allow inspectors access to scaffolding and work areas as needed to perform

tests and inspections. Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense.

- B. Inspections: Special inspections according to Level C in TMS 402/ACI 530/ASCE 5.
  - 1. Begin masonry construction only after inspectors have verified proportions of site-prepared mortar.
  - 2. Place grout only after inspectors have verified compliance of grout spaces and of grades, sizes, and locations of reinforcement.
  - 3. Place grout only after inspectors have verified proportions of site-prepared grout.
- C. Testing Prior to Construction: One set of tests.
- D. Testing Frequency: One set of tests for each 5000 sq. ft. (464 sq. m) of wall area or portion thereof.
- E. Clay Masonry Unit Test: For each type of unit provided, according to ASTM C 67 for compressive strength.
- F. Concrete Masonry Unit Test: For each type of unit provided, according to ASTM C 140 for compressive strength.
- G. Mortar Aggregate Ratio Test (Proportion Specification): For each mix provided, according to ASTM C 780.
- H. Mortar Test (Property Specification): For each mix provided, according to ASTM C 780. Test mortar for mortar air content and compressive strength.
- I. Grout Test (Compressive Strength): For each mix provided, according to ASTM C 1019.
- J. Prism Test: For each type of construction provided, according to ASTM C 1314 at 7 days and at 28 days.

### 3.16 REPAIRING, POINTING, AND CLEANING

- A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.
- B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.
- C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.
- D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:

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1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
3. Protect adjacent stone and nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
5. Clean brick by bucket-and-brush hand-cleaning method described in BIA Technical Notes 20.
6. Clean concrete masonry by applicable cleaning methods indicated in NCMA TEK 8-4A.
7. Clean masonry with a proprietary acidic cleaner applied according to manufacturer's written instructions.
8. Clean limestone units to comply with recommendations in ILI's "Indiana Limestone Handbook."

### 3.17 MASONRY WASTE DISPOSAL

- A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.
- B. Waste Disposal as Fill Material: Prohibited.
- C. Masonry Waste: Remove masonry waste and legally dispose of off Owner's property.

END OF SECTION 042000



## SECTION 055000 - METAL FABRICATIONS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Products furnished, but not installed, under this Section include the following:
  - 1. Loose steel lintels.
  - 2. Anchor bolts and wedge-type inserts indicated to be cast into concrete or built into unit masonry.
  - 3. Steel weld plates and angles for casting into concrete for applications where they are not specified in other Sections.
- B. Related Requirements:
  - 1. Section 030100 "Concrete Patching" for installing anchor bolts, wedge-type inserts, and other items cast into concrete.
  - 2. Section 042000 "Unit Masonry" for installing loose lintels, anchor bolts, and other items built into unit masonry.

#### 1.3 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.
- B. Coordinate installation of metal fabrications that are anchored to or that receive other work. 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.

#### 1.4 ACTION SUBMITTALS

- A. Product Data: For the following:
  - 1. Loose steel lintels.

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## 1.5 INFORMATIONAL SUBMITTALS

- A. Mill Certificates: Signed by stainless-steel manufacturers, certifying that products furnished comply with requirements.
- B. Welding certificates.
- C. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.
- D. Research/Evaluation Reports: For post-installed anchors, from ICC-ES.

## 1.6 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- B. Welding Qualifications: Qualify procedures and personnel according to the following:
  - 1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
  - 2. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum."
  - 3. AWS D1.6/D1.6M, "Structural Welding Code - Stainless Steel."

## 1.7 FIELD CONDITIONS

- A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication.

# PART 2 - PRODUCTS

## 2.1 METALS

- A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.
- B. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- C. Stainless-Steel Sheet, Strip, and Plate: ASTM A 240/A 240M or ASTM A 666, Type 304.
- D. Stainless-Steel Bars and Shapes: ASTM A 276, Type 304.

## 2.2 FASTENERS

- A. General: Unless otherwise indicated, provide Type 304 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633 or ASTM F 1941 (ASTM F 1941M), Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.
- B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with hex nuts, ASTM A 563 (ASTM A 563M); and, where indicated, flat washers.
- C. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 325, Type 3 (ASTM A 325M, Type 3); with hex nuts, ASTM A 563, Grade C3 (ASTM A 563M, Class 8S3); and, where indicated, flat washers.
- D. Stainless-Steel Bolts and Nuts: Regular hexagon-head annealed stainless-steel bolts, ASTM F 593 (ASTM F 738M); with hex nuts, ASTM F 594 (ASTM F 836M); and, where indicated, flat washers; Alloy Group 1 (A1).
- E. Anchor Bolts: ASTM F 1554, Grade 36, of dimensions indicated; with nuts, ASTM A 563 (ASTM A 563M); and, where indicated, flat washers.
  - 1. Hot-dip galvanize or provide mechanically deposited, zinc coating where item being fastened is indicated to be galvanized.
- F. Anchors, General: Anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488/E 488M, conducted by a qualified independent testing agency.
- G. Cast-in-Place Anchors in Concrete: Either threaded type or wedge type unless otherwise indicated; galvanized ferrous castings, either ASTM A 47/A 47M malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as needed, all hot-dip galvanized per ASTM F 2329.
- H. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors.
  - 1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941 (ASTM F 1941M), Class Fe/Zn 5, unless otherwise indicated.
  - 2. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 (A1) stainless-steel bolts, ASTM F 593, and nuts, ASTM F 594.

## 2.3 MISCELLANEOUS MATERIALS

- A. Low-Emitting Materials: Paints and coatings shall comply with the testing and product requirements of the California Department of Public Health's (formerly, the California

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Department of Health Services') "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

- B. Shop Primers: Provide primers that comply with Section 099101 "Construction Painting."
- C. Shop Primer for Galvanized Steel: Primer formulated for exterior use over zinc-coated metal and compatible with finish paint systems indicated.
- D. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.
- E. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187/D 1187M.
- F. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107/C 1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.
- G. Concrete: Comply with requirements in Section 033000 "Cast-in-Place Concrete" for normal-weight, air-entrained, concrete with a minimum 28-day compressive strength of 3000 psi (20 MPa).

## 2.4 MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.
- B. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.
  - 1. Furnish inserts for units installed after concrete is placed.
- C. Galvanize miscellaneous framing and supports where indicated.
- D. Prime miscellaneous framing and supports with primer specified in Section 099101 "Construction Painting".

## 2.5 MISCELLANEOUS STEEL TRIM

- A. Unless otherwise indicated, fabricate units from steel shapes, plates, and bars of profiles shown with continuously welded joints and smooth exposed edges. Miter corners and use concealed field splices where possible.
- B. Provide cutouts, fittings, and anchorages as needed to coordinate assembly and installation with other work.
  - 1. Provide with integrally welded steel strap anchors for embedding in concrete or masonry construction.

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- C. Prime miscellaneous steel trim with primer specified in Section 099101 "Construction Painting."

## 2.6 LOOSE BEARING AND LEVELING PLATES

- A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill plates to receive anchor bolts and for grouting.
- B. Galvanize plates.

## 2.7 LOOSE STEEL LINTELS

- A. Fabricate loose steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated. Fabricate in single lengths for each opening unless otherwise indicated. Weld adjoining members together to form a single unit where indicated.
- B. Size loose lintels to provide bearing length at each side of openings equal to 1/12 of clear span, but not less than 8 inches (200 mm) unless otherwise indicated.
- C. Galvanize loose steel lintels located in exterior walls.

## 2.8 FINISHES, GENERAL

- A. Complete mechanical finishes of flat sheet metal surfaces before fabrication where possible. After fabrication, finish all joints, bends, abrasions, and other surface blemishes to match sheet finish.
- B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- C. Finish metal fabrications after assembly.
- D. Finish exposed surfaces to remove tool and die marks and stretch lines, and to blend into surrounding surface.

## 2.9 STEEL AND IRON FINISHES

- A. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A 153/A 153M for steel and iron hardware and with ASTM A 123/A 123M for other steel and iron products.

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1. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.
- B. Preparation for Shop Priming Galvanized Items: After galvanizing, thoroughly clean railings of grease, dirt, oil, flux, and other foreign matter, and treat with metallic phosphate process.
- C. Shop prime iron and steel items unless they are to be embedded in concrete, sprayed-on fireproofing, or masonry, or unless otherwise indicated.
- A. Shop prime with primers specified in Section 099101 "Construction Painting."
- B. Preparation for Shop Priming: Prepare surfaces to comply with requirements indicated below:
  1. Exterior Items: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
  2. Items Indicated to Receive Zinc-Rich Primer: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
  3. Items Indicated to Receive Primers Specified in Section 099600 "High-Performance Coatings": SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
  4. Other Items: SSPC-SP 3, "Power Tool Cleaning."
- C. Shop Priming: Apply shop primer to comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.
  1. Stripe paint corners, crevices, bolts, welds, and sharp edges.

## PART 3 - EXECUTION

### 3.1 INSTALLATION, GENERAL

- A. Locate and place metal items level and plumb and in alignment with adjacent construction.
- B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- C. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.
- D. Corrosion Protection: Coat concealed surfaces of aluminum that come into contact with grout, concrete, masonry, wood, or dissimilar metals with the following:
  1. Cast Aluminum: Heavy coat of bituminous paint.
  2. Extruded Aluminum: Two coats of clear lacquer.

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### 3.2 INSTALLING BEARING AND LEVELING PLATES

- A. Clean concrete and masonry bearing surfaces of bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of plates.
- B. Set bearing and leveling plates on wedges, shims, or leveling nuts. After bearing members have been positioned and plumbed, tighten anchor bolts. Do not remove wedges or shims but, if protruding, cut off flush with edge of bearing plate before packing with nonshrink grout. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

### 3.3 ADJUSTING AND CLEANING

- A. Unless otherwise indicated, clean metals by washing thoroughly with water and soap, rinsing with clean water, and drying with soft cloths.
- B. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
  - 1. Apply by brush or spray to provide a minimum 2.0-mil (0.05-mm) dry film thickness.
- C. Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in Section 099101 "Construction Painting."
- D. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780/A 780M.

END OF SECTION 055000



## SECTION 061000 - ROUGH CARPENTRY

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Framing with dimension lumber.
  - 2. Rooftop equipment bases and support curbs.
  - 4. Wood blocking and nailers.
  - 5. Plywood sheathing and backing panels.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
  - 1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
  - 2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials based on testing by a qualified independent testing agency.
  - 3. For fire-retardant treatments, include physical properties of treated lumber both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D 5664.
  - 4. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
  - 5. Include copies of warranties from chemical treatment manufacturers for each type of treatment.
- B. Evaluation Reports: For the following, from ICC-ES:
  - 1. Wood-preservative-treated wood.
  - 2. Power-driven fasteners.
  - 3. Powder-actuated fasteners.

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4. Expansion anchors.
5. Stainless Steel Concrete screw anchors

#### 1.4 DELIVERY, STORAGE, AND HANDLING

- A. Stack lumber flat with spacers beneath and between each bundle to provide air circulation. Protect lumber from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

### PART 2 - PRODUCTS

#### 2.1 WOOD PRODUCTS, GENERAL

- A. Lumber: Provide dressed lumber, S4S, marked with grade stamp of inspection agency.
- B. Maximum Moisture Content of Lumber: 15 percent for 2-inch nominal (38-mm actual) thickness or less unless otherwise indicated.

#### 2.2 TREATED MATERIALS

- A. Preservative-Treated Materials: AWWA U1; Use Category UC2 for interior construction not in contact with the ground, Use Category UC3b for exterior construction not in contact with the ground, and Use Category UC4a for items in contact with the ground.
  1. Use treatment containing no arsenic or chromium. Do not use inorganic boron (SBX) for sill plates.
  2. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent.
  3. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.
- B. Provide preservative-treated materials for items indicated on Drawings, and the following:
  1. Wood floor plates that are installed over concrete slabs-on-grade or in direct contact with masonry construction.
- C. Fire-Retardant-Treated Materials: Products with a flame-spread index of 25 or less when tested according to ASTM E 84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than **10.5 feet (3.2 m)** beyond the centerline of the burners at any time during the test.
  1. Use Exterior type for exterior locations and where indicated.
  2. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent.
  3. Identify with appropriate classification marking of a testing and inspecting agency acceptable to authorities having jurisdiction.

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## 2.3 MISCELLANEOUS LUMBER

- A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:
  - 1. Blocking.
  - 2. Nailers.
  - 3. Rooftop equipment bases and support curbs.
  - 4. Cants.
  - 5. Furring.
  - 6. Grounds.
  - 7. Utility shelving.
- B. For items of dimension lumber size, provide Construction, or No. 2 grade with 15 percent maximum moisture content of any species. Provide for nailers, blocking, and similar members.
- C. Utility Shelving: Eastern white, Idaho white, lodgepole, ponderosa, or sugar pine, Premium or 2 Common (Sterling): NeLMA, NLGA, WCLIB, or WWPA with 15 percent maximum moisture content.
- D. For blocking not used for attachment of other construction, Utility, Stud, or No. 3 grade lumber of any species may be used provided that it is cut and selected to eliminate defects that will interfere with its attachment and purpose.
- E. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.

## 2.4 PLYWOOD SHEATHING AND BACKING PANELS

- A. Sheathing Panels (exterior): Plywood, Pressure treated, CDX, not less than 5/8-inch nominal thickness.
  - 1. Span rating: Not less than 16/0
  - 2. Preservative Treatment by Pressure Process: AWP A U1; Use Category UC3b for exterior construction not in contact with the ground.
  - 3. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
- B. Mark plywood with appropriate classification marking of an inspection agency acceptable to authorities having jurisdiction.
- C. Application: Treat all plywood unless otherwise indicated and plywood in contact with masonry or concrete or used with roofing, flashing, vapor barriers, and waterproofing.
- D. Backing panels (interior): Plywood, Interior, AC, not less than 5/8-inch nominal thickness.

## 2.5 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
  - 1. Where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M or Type 304 stainless steel.
- B. Power-Driven Fasteners: NES NER-272.
- C. Wood Screws: ASME B18.6.1.
- D. Lag Bolts: ASME B18.2.1 (ASME B18.2.3.8M).
- E. Concrete screw anchors: 410 stainless steel concrete screw fasteners complying with ACI 318-14 and corrosion resistance per ASTM B117
- F. Bolts: Steel bolts complying with ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers.
- G. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry assemblies and equal to four times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.
  - 1. Material: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.
  - 2. Material: Stainless steel with bolts and nuts complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2 (ASTM F 738M and ASTM F 836M, Grade A1 or A4).
- H. Allowable Design Loads: Provide products with allowable design loads, as published by manufacturer, that meet or exceed those of products of manufacturers listed. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit. Locate nailers, blocking, and similar supports to comply with requirements for attaching other construction.

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- B. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.
- C. Install plywood sheathing and backing panels by fastening to masonry, studs or metal clip angles.
- D. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.
- E. Sort and select lumber so that natural characteristics will not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.
- F. Do not splice structural members between supports unless otherwise indicated.
- G. Securely attach rough carpentry to substrates, complying with the following:
  - 1. NES NER-272 for power-driven fasteners.
  - 2. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.

### 3.2 PROTECTION

- A. Protect rough carpentry from weather. If, despite protection, rough carpentry becomes sufficiently wet that moisture content exceeds that specified, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION 061000

## SECTION 076200 - SHEET METAL FLASHING AND TRIM

### PART 1 - GENERAL

#### 1.1 SECTION REQUIREMENTS

- A. Submittals: Product Data.
- B. Comply with SMACNA's "Architectural Sheet Metal Manual." Conform to dimensions and profiles shown unless more stringent requirements are indicated.
- C. Coordinate installation of sheet metal flashing and trim with interfacing and adjoining construction to provide a leakproof, secure, and noncorrosive installation.

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Wall penetration sheet metal fabrications.
- B. Related Requirements:
  - 1. Section 061000 "Rough Carpentry" for wood nailers, curbs, and blocking.
  - 2. Section 079200 "Joint Sealants".

#### 1.3 COORDINATION

- A. Coordinate sheet metal flashing and trim installation with adjoining roofing and wall materials, joints, and seams to provide leakproof, secure, and noncorrosive installation.

#### 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each manufactured product and accessory.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage. Store sheet metal flashing and trim materials away from uncured concrete and masonry.

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- B. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to extent necessary for period of sheet metal flashing and trim installation.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. General: Sheet metal flashing and trim assemblies shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.
- B. Sheet Metal Standard for Flashing and Trim: Comply with NRCA's "The NRCA Roofing Manual" and [SMACNA's "Architectural Sheet Metal Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated.
- C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
  - 1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

### 2.2 SHEET METAL

- A. Aluminum Sheet: ASTM B 209 (ASTM B 209M), alloy as standard with manufacturer for finish required, not less than 0.032 inch (0.8 mm) thick; and with mill finish.
- B. Stainless-Steel Sheet: ASTM A 240/A 240M, Type 304, with No. 2D finish; not less than 0.016 inch (0.4 mm) thick.

### 2.3 ACCESSORIES

- A. Felt Underlayment: ASTM D 226, Type I (No. 15), asphalt-saturated organic felts.
- B. Self-Adhering Sheet Underlayment, High Temperature: Butyl or SBS-modified asphalt; slip-resisting-polyethylene surfaced; with release paper backing; cold applied. Stable after testing at 240 deg F (116 deg C) and passes after testing at minus 20 deg F (29 deg C); ASTM D 1970.
- C. Slip Sheet: Building paper, 3-lb/100 sq. ft. (0.16-kg/sq. m) minimum, rosin sized.
- D. Fasteners: Self-tapping screws, self-locking rivets and bolts, and other suitable fasteners.



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1. Fasteners for Aluminum Sheet: Aluminum or Series 300 stainless steel.
  2. Fasteners for Stainless-Steel Sheet: Series 300 stainless steel.
- E. Elastomeric Sealant: ASTM C 920, elastomeric polyurethane or silicone polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
- F. Butyl Sealant: ASTM C 1311, solvent-release butyl rubber sealant.
- G. Epoxy Seam Sealer: Two-part, noncorrosive, aluminum seam-cementing compound, recommended by aluminum manufacturer for exterior nonmoving joints, including riveted joints.
- H. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D 1187.

## 2.4 FABRICATION

- A. Fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to the design, dimensions, metal, and other characteristics of the item indicated.
- B. Expansion Provisions: Where lapped expansion provisions cannot be used, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with butyl sealant concealed within joints.
- C. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to tolerances specified in MCA's "Guide Specification for Residential Metal Roofing."
- D. Sealant Joints: Where movable, nonexpansion-type joints are required, form metal to provide for proper installation of elastomeric sealant according to cited sheet metal standard.
- E. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.
- F. Fabricate cleats and attachment devices of sizes as recommended by cited sheet metal standard and by FM Global Property Loss Prevention Data Sheet 1-49 for application, but not less than thickness of metal being secured.
- G. Seams: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use.
- H. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer.

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## 2.5 WALL PENETRATION SHEET METAL FABRICATIONS

- A. Base Flashing: Shop fabricate interior and exterior corners. Fabricate from the following materials:
  - 1. Aluminum: 0.040 inch (1.02 mm) thick.
- B. Counterflashing: Shop fabricate interior and exterior corners. Fabricate from the following materials:
  - 1. Aluminum: 0.032 inch (0.81 mm) thick.
- C. Flashing Receivers: Fabricate from the following materials:
  - 1. Aluminum: 0.032 inch (0.81 mm) thick.

## 2.6 MISCELLANEOUS SHEET METAL FABRICATIONS

- A. Equipment Support Flashing: Fabricate from the following materials:
  - 1. Stainless Steel: 0.019 inch (0.48 mm) thick.

# PART 3 - EXECUTION

## 3.1 INSTALLATION

- A. Comply with SMACNA's "Architectural Sheet Metal Manual." Allow for thermal expansion; set true to line and level. Install Work with laps, joints, and seams permanently watertight and weatherproof; conceal fasteners where possible.
- B. Use fasteners, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
- C. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate elastomeric sealant to comply with SMACNA standards.
- D. Fabricate nonmoving seams in sheet metal with flat-lock seams. For aluminum, form seams and seal with epoxy seam sealer. Rivet joints for additional strength.
- E. Aluminum Flashing and Trim: Coat back side of aluminum flashing and trim with bituminous coating where it will contact wood, ferrous metal, or cementitious construction.
- F. Separate dissimilar metals with a bituminous coating or polymer-modified, bituminous sheet underlayment.

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### 3.2 CLEANING AND PROTECTION

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Clean off excess sealants.
- C. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of sheet metal flashing and trim installation, remove unused materials and clean finished surfaces as recommended by sheet metal flashing and trim manufacturer. Maintain sheet metal flashing and trim in clean condition during construction.
- D. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 076200

## SECTION 078413 – PENETRATION FIRESTOPPING

### 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 through-penetration firestop systems for penetrations through the following fire-resistance-rated assemblies, including both empty openings and openings containing penetrating items:
  - 1. Floors, walls and partitions.
- B. Fire Resistive Joint Systems Insulation installed in conjunction with firestopping or smoke containment systems.

#### 1.3 REFERENCES

- A. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- B. ASTM E 119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
- C. ASTM C 553 - Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications.
- D. ASTM C 612 - Standard Specification for Mineral Fiber Block and Board Thermal Insulation.
- E. ASTM E 814 - Standard Test Method for Fire Tests of Through-Penetration Fire Stops.
- F. ASTM E 1399 - Standard Test Method for Cyclic Movement and Measuring the Minimum and Maximum Joint Widths of Architectural Joint Systems.
- G. ASTM E 1529 - Standard Test Methods for Determining Effects of Large Hydrocarbon Pool Fires on Structural Members and Assemblies.
- H. ASTM E 1725 - Standard Test Methods for Fire Tests of Fire-Resistive Barrier Systems for Electrical System Components.
- I. ASTM E 2307 - Standard Test Method for Determining Fire Resistance of Perimeter Fire Barrier Systems Using Intermediate-Scale, Multi-story Test Apparatus. UL 1479 - Standard for Fire Tests of Through-Penetration Firestops; 1994.
- J. UL 1709 - Rapid Rise Fire Tests of Protection Materials for Structural Steel; 1994.
- K. ANSI/UL 2079 - Tests for Fire Resistance of Building Joint Systems; 1998.
- L. UL 1479 Fire Tests of Through-Penetration Firestops.
- M. UL Building Materials Directory; Through-Penetration Firestops Systems (XHEZ), and Fill, Void or Cavity Materials (XHHW).
  - 1. International Code Congress (ICC):

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- 2. International Building Code (IBC).
- 3. International Residential Code (IRC).

- N. NFPA 101 - Life Safety Code.
- O. NFPA 70 - National Electrical Code.

#### 1.4 DEFINITIONS

- A. Construction Gap: An open joint between adjacent rated assemblies; may be a moving joint or static opening, without penetrating items.
- B. Firestop System: Specific firestop material or materials, which when installed in openings in a specific rated assembly, achieve the performance required.
- C. Firestopping: Result of installation of firestop system.
- D. Listing: The current, published listing of a system in a qualified listing agency's directory.
- E. Listing Agency: Independent testing agency that has conducted tests and classified firestop systems for particular applications, which conducts routine in-plant follow-up inspections, and which lists tested systems in a published directory.
- F. Penetrating Item: Any item (pipe, duct, conduit, cable, etc.) that passes completely through a rated assembly through an opening of any size.
- G. Rated Assembly: A wall, floor, roof/ceiling, or other construction which is required to have an hourly fire rating or a smoke resistance rating.
- H. Through Penetration: A hole through a rated assembly made to accommodate the passage of a penetrating item or an empty hole made for another purpose and not repairable using the original materials of construction.

#### 1.5 PERFORMANCE REQUIREMENTS

- A. General: For the following constructions, provide through-penetration firestop systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of assembly penetrated.
- B. Listing Agency: Provide systems that are listed by at least one the following:
  - 1. Underwriters Laboratories Inc. (UL), in "Fire Resistance Directory" categories as appropriate.
  - 2. Any other qualified independent testing and inspection agency that conducts periodic follow-up inspections and is acceptable to authorities having jurisdiction.
- C. Furnish products identical to those tested for classification by listing agency.
- D. Mark product packing with classification marking of listing agency.
- E. Materials: Use only products specifically listed for use in listed systems.
- F. Unlisted Systems: Where firestop systems not listed by any listing agency are required due to project conditions, submit a substitution proposal with evidence specified.

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- G. For through-penetration firestop systems exposed to view, traffic, moisture, and physical damage, provide products that after curing do not deteriorate when exposed to these conditions both during and after construction.
  - 1. For piping penetrations for plumbing, provide moisture-resistant through-penetration firestop systems.
- H. For through-penetration firestop systems exposed to view, provide products with flame-spread ratings of less than 25 and smoke-developed ratings of less than 450, as determined per ASTM E 84.
- I. Compatibility: Provide products that are compatible with each other, with the substrates forming openings, and with the items, if any, penetrating the firestopping, under the conditions represented by this project, based on testing and field performance demonstrated by manufacturer.
- J. Firestopping material must be asbestos-free and capable of maintaining an effective barrier against flame, smoke and gases in compliance with the requirements of ASTM and UL standards cited in this section.
- K. Firestopping materials must meet and be acceptable for use by all building codes and NFPA codes cited in this section.
- L. Materials must be suitable for the firestopping of penetrations made by steel, glass, plastic and insulated pipe.
- M. All firestops must be 2 hour rated, but in no case less than the rating of the time-rated floor or wall assembly.

#### 1.6 SUBMITTALS

- A. Product Data: For each type of through-penetration firestop system product indicated.
- B. Shop Drawings: For each through-penetration firestop system, show each kind of construction condition penetrated, relationships to adjoining construction, and kind of penetrating item. Include firestop design designation of testing and inspecting agency acceptable to authorities having jurisdiction that evidences compliance with requirements for each condition indicated.
  - 1. Submit documentation, including illustrations, from a qualified testing and inspecting agency that is applicable to each through-penetration firestop system configuration for construction and penetrating items.
- C. Where Project conditions require modification of qualified testing and inspecting agency's illustration to suit a particular through-penetration firestop condition, submit illustration, with modifications marked, approved by through-penetration firestop system manufacturer's fire-protection engineer. Performance Data:
  - 1. Submit appropriate research reports or evaluation data for products listed in this section.
  - 2. Prior to project closeout, Contractor shall certify that all products installed pursuant to this section do not contain Asbestos or Polychlorinated Biphenyls (PCB).
- D. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

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- E. Product Certificates: Signed by manufacturers of through-penetration firestop system products certifying that products furnished comply with requirements.
- F. Product Test Reports: From a qualified testing agency indicating through-penetration firestop system complies with requirements, based on comprehensive testing of current products.

## 1.7 QUALITY ASSURANCE

- 1. Installer Qualifications: An experienced installer who has completed through-penetration firestop systems similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance. Insulation products listed in this section shall be installed by a single organization with at least five (5) years experience successfully installing insulation on projects of similar type and scope as specified in this section.
- 2. If the installation of the curtain wall is the responsibility of a different installer, coordinate specified installations prior to commencement of work to ensure the complete system meets the specified ratings.
- 3. Certification per FM 4991 or by the Firestop Contractors International Association (FCIA).
- B. Source Limitations: Obtain through-penetration firestop systems, for each kind of penetration and construction condition indicated, from a single manufacturer.
- C. Fire-Test-Response Characteristics: Provide through-penetration firestop systems that comply with the following requirements and those specified in "Performance Requirements" Article:
  - 1. Through-penetration firestop systems are identical to those tested per ASTM E 814. Provide rated systems complying with the following requirements:.
  - 2. Through-penetration firestop system products bear classification marking of qualified testing and inspecting agency.
- D. Fire- Test-Response Characteristics: Provide insulation and related materials with the fire-test-response characteristics indicated, as determined by testing identical products per test method indicated below by Underwriters Laboratories (UL) or another testing and inspecting agency acceptable to authorities having jurisdiction.
  - 1. Identify materials appropriate markings of applicable testing and inspecting agency.
  - 2. Surface-Burning Characteristics: ASTM E84. Unfaced material will have a maximum flame spread and smoke-developed of 0. Faced material will have maximum flame spread and smoke-developed of 25 and 0 respectively.
  - 3. Fire-Resistance Ratings:
    - a. ASTM E 119 and ASTM E 2307. ASTM E 2307 only pertains to Perimeter fire containment not construction joints and poke-throughs and penetrations.
    - b. Combustion Characteristics: Rated as non combustible as defined by NFPA standard 220 when tested in accordance with ASTM E 136
- E. Manufacturer's identification tags or marks are not acceptable on surfaces where products are considered to be finish material.
  - 1. Evidence of patching after removal of tags or marks is not acceptable.



## 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver through-penetration firestop system products to Project site in original, unopened containers or packages with intact and legible manufacturers' labels identifying product and manufacturer; date of manufacture; lot number; shelf life, if applicable; qualified testing and inspecting agency's classification marking applicable to Project; curing time; and mixing instructions for multi-component materials.
- B. Protect adjacent work of other trades from damage. Clean substrates of substances harmful to insulation or vapor retarders, including removal of projections which might puncture vapor retarders. In cold weather, during installation of smoke seal compound, temperatures within the building shall be maintained above 55oF. Provide adequate ventilation to carry-off excess moisture.
- C. Store and handle materials for through-penetration firestop systems to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes. When installing or otherwise handling insulation products, wear a NIOSH approved dust mask or respirator, gloves and long sleeved, loose fitting clothing closed at the neck and wrists. Wear safety glasses when installing.

## 1.9 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install through-penetration firestop systems when ambient or substrate temperatures are outside limits permitted by through-penetration firestop system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.
- B. Ventilate through-penetration firestop systems per manufacturer's written instructions by natural means or, where this is inadequate, forced-air circulation.
- C. Protect adjacent work of other trades from damage. Clean substrates of substances harmful to insulation or vapor retarders, including removal of projections which might puncture vapor retarders. In cold weather, during installation of smoke seal compound, temperatures within the building shall be maintained above 55oF. Provide adequate ventilation to carry-off excess moisture.

## 1.10 COORDINATION

- A. Coordinate construction of openings and penetrating items to ensure that through-penetration firestop systems are installed according to specified requirements.
- B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate through-penetration firestop systems.

## 1.11 WARRANTY

- A. At project closeout, provide to the owner or owners representative an executed copy of the manufacturer's warranty document outlining the terms, conditions, and exclusions of their Standard Limited Warranty against Manufacturing Defect.

# PART 2 - PRODUCTS

## 2.1 PRODUCTS AND MANUFACTURERS

- A. Available Products: Subject to compliance with requirements, through-penetration firestop systems that may be incorporated into the Work include, but are not limited to, those systems indicated.
- B. Basis-of-Design Product: The design for through-penetration firestop systems is based on products named in the Through-Penetration Firestop Schedule at the end of Part 3 by design designation of a

qualified testing and inspecting agency. Subject to compliance with requirements, provide the named product by one of the following:

1. 3M Fire Protection Products.
2. Hilti Firestop Systems.
3. Or equal.

C. Basis-of-Design Product: The design for building insulation for thermal and acoustical applications, fire resistive joint systems and perimeter fire containment systems. is based on products or systems named in the design documents. Subject to compliance with requirements, provide the named product by one of the following:

1. Thermafiber
2. Or equal

## 2.2 SCOPE/APPLICATION

A. Provide installed firestopping that limits the spread of fire, heat, smoke, and gasses through otherwise unprotected openings in rated assemblies, including walls, partitions, floors, roof/ceilings, etc.

B. Provide firestop systems listed for the specific combination of fire rated construction, type of penetrating item, annular space requirements, and fire rating, and the following criteria:

1. F-Rating: Equal to or greater than the fire-resistance rating of the assembly in which the firestopping will be installed.
2. T-Rating: In habitable areas where penetrating items are exposed to potential contact with materials on fire side(s) of rated assembly, T-rating must equal its F-rating.
3. Wall Penetrations: Systems must be symmetrical, with the same rating from both sides of the wall.
4. Cold Smoke Resistance: L-rating of 1 cfm per linear foot (5.5 cu m/h/m), maximum.
5. Testing: Determine ratings in accordance with ASTM E 814 or UL 1479.

C. Provide firestopping systems listed for the specific combination of fire-rated construction type, configuration, gap dimensions, and fire rating, and the following criteria:

1. Fire resistance rating must be equal to or greater than that of the assembly in which it is to be installed.
2. Movement capability must be appropriate to the potential movement of the gap, demonstrated by testing in accordance with ASTM E 1399 for minimum of 500 cycles at 10 cycles per minute.
3. Cold Smoke Resistance: L-rating of 1 cfm per linear foot (5.5 cu m/h/m), maximum.
4. Determine ratings in accordance with UL 2079.

## 2.3 FIRESTOPPING, GENERAL

A. Compatibility: Provide through-penetration firestop systems that are compatible with one another, with the substrates forming openings, and with the items, if any, penetrating through-penetration

firestop systems, under conditions of service and application, as demonstrated by through-penetration firestop system manufacturer based on testing and field experience.

- B. Accessories: Provide components for each through-penetration firestop system that are needed to install fill materials and to comply with "Performance Requirements" Article. Use only components specified by through-penetration firestop system manufacturer and approved by the qualified testing and inspecting agency for firestop systems indicated. Accessories include, but are not limited to, the following items:

1. Permanent forming/damming/backing materials, including the following:
  - a. Slag-/rock-wool-fiber insulation.
  - b. Sealants used in combination with other forming/damming/backing materials to prevent leakage of fill materials in liquid state.
  - c. Fillers for sealants.
2. Temporary forming materials.
3. Substrate primers.
4. Collars.
5. Steel sleeves.

#### 2.4 FILL MATERIALS

- A. General: Provide through-penetration firestop systems containing the types of fill materials indicated by reference to the types of materials described. Fill materials are those referred to in directories of the referenced testing and inspecting agencies as fill, void, or cavity materials.

#### 2.5 PERIMETER FIRE CONTAINMENT

- A. General: Where required for gaps between the perimeter edge of fire-resistance-rated floor assemblies, head of wall connections, cavities formed by metal decking flutes, and non-fire-resistance-rated exterior curtain walls, provide a perimeter fire-containment system with the fire test response characteristics indicated, as determined by testing identical systems per the UL or another testing and inspecting agency accountable to authorities having jurisdiction. If no tested system exists, an engineering judgment as specified by the International Firestop Council must accompany the design.

- B. Safing Insulation:

1. Type: Thermafiber Safing Insulation.
2. R-Value: 4.2 per inch.
3. Standard Density: 4.0 pcf (actual).

- C. Smoke Barrier: Smoke sealant as listed in the appropriate fire assembly and approved by the Manufacturer.

#### 2.6 FIRE RESISTIVE JOINT SYSTEMS IN RATED ASSEMBLIES

- A. Insulation:

1. Type: Thermafiber Safing Insulation for construction joint application.

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2. Type: Thermafiber Sound Attenuation Fire Blanket (SAFB) for head of wall applications.
  - a. R-Value: 3.7 per inch.
  - b. Density: 2.5 pcf (nominal).
3. Thickness: As required to adequately fill wall cavities, joints and voids without undue compression, tearing, separation or distortion of material.
4. Facing: Unfaced.

## 2.7 FIRESTOPPING OF THROUGH PENETRATIONS IN RATED ASSEMBLIES

- A. Safing Insulation:
  1. Type: Thermafiber Safing Insulation.
  2. Thickness: As noted in tested designs.
  3. Facing: Unfaced.
  4. Standard Density: 4.0 pcf (actual).
- B. Smoke Barrier: Smoke sealant as listed in the appropriate fire assembly and approved by the Manufacturer.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Surface Cleaning: Clean out openings immediately before installing through-penetration firestop systems to comply with written recommendations of firestop system manufacturer and the following requirements:
  1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of through-penetration firestop systems.
  2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with through-penetration firestop systems. Remove loose particles remaining from cleaning operation.
  3. Remove laitance and form-release agents from concrete.
- B. Priming: Prime substrates where recommended in writing by through-penetration firestop system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.
- C. Masking Tape: Use masking tape to prevent through-penetration firestop systems from contacting adjoining surfaces that will remain exposed on completion of Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears

from firestop system materials. Remove tape as soon as possible without disturbing firestop system's seal with substrates.

### 3.3 THROUGH PENETRATION SYSTEM INSTALLATION

- A. General: Install through-penetration firestop systems to comply with "Performance Requirements" Article and firestop system manufacturer's written installation instructions and published drawings for products and applications indicated.
- B. Install forming/damming/backing materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
  - 1. After installing fill materials, remove combustible forming materials and other accessories not indicated as permanent components of firestop systems.
- C. Install fill materials for firestop systems by proven techniques to produce the following results:
  - 1. Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items as required to achieve fire-resistance ratings indicated.
  - 2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
  - 3. For fill materials that will remain exposed after completing Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

### 3.4 SAFING INSULATION

- A. Install safing insulation in accordance with manufacturer's instructions.
- B. Install safing insulation of proper size in safe off area between curtain wall insulation and floor slabs as prescribed by the tested assembly.
- C. Safing insulation direction and compression as well as the absence of safing Z-clips are prescribed by the tested assembly.
- D. Install Safing insulation of proper density and size into construction joints (Head-of-wall, floor-to-floor, floor-to-wall, etc.) as prescribed by the tested assembly.
- E. Install Safing insulation of proper density and size into poke-throughs and penetrations as prescribed by the tested assembly.

### 3.5 IDENTIFICATION

- A. Identify through-penetration firestop systems with pressure-sensitive, self-adhesive, preprinted vinyl labels. Attach labels permanently to surfaces of penetrated construction on both sides of each firestop system installation where labels will be visible to anyone seeking to remove penetrating items or firestop systems. Include the following information on labels:
  - 1. The words: "Warning--Through-Penetration Firestop System--Do Not Disturb. Notify Building Management of Any Damage."
  - 2. Contractor's name, address, and phone number.
  - 3. Through-penetration firestop system designation of applicable testing and inspecting agency.

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4. Date of installation.
5. Through-penetration firestop system manufacturer's name.

### 3.6 CLEANING AND PROTECTION

- A. Clean off excess fill materials adjacent to openings as Work progresses by methods and with cleaning materials that are approved in writing by through-penetration firestop system manufacturers and that do not damage materials in which openings occur.
- B. Provide final protection and maintain conditions during and after installation that ensure through-penetration firestop systems are without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated through-penetration firestop systems immediately and install new materials to produce through-penetration firestop systems complying with specified requirements.

### 3.7 THROUGH-PENETRATION FIRESTOP SYSTEM SCHEDULE

- A. Firestop systems designs listed in this schedule are 3M Fire Protection Products designations as a basis of design. Other manufacturer design systems are not listed in this schedule. Systems by other manufacturers, which are equal to design and performance of the listed systems are allowed as an 'or equal' product. Provide cross reference documentation to indicate product design classifications between manufacturers.
  1. HWS 0007: Fluted Steel Deck with Concrete Wall / FB-2000 or FB-2000+ / 2 Hour Rating.
  2. WL 2002: Plastic Pipe through a Gypsum Wall Board Assembly / FS-195+, PPD's / 2 Hour Rating.
  3. WL 2003: Various Plastic Pipes through a Gypsum Wallboard Assembly / FS-195+ / 2 Hour Rating.
  4. CAJ 2001: 6 inch Max. Dia. Plastic Pipe/Conduit through a Concrete Floor / FS-195+, PPD's / 2 Hour Rating.
  5. CAJ 2002: 4 inch Max. Dia. Plastic Pipe/Conduit through a Concrete Floor / FS-195+ / 2 Hour Rating.
  6. CAJ 1044: 30 inch Steel Or Cast Iron, 6 inch Conduit, 6 inch Copper, 4 inch EMT, 16 inch Steel Sleeve Optional Through A Concrete Wall Or floor / CP25WB+ / 2, 3 and 4 Hour Rating.
  7. CAJ 8013: 3 inch Copper, 2 1/2 inch Steel, 1 inch PVC; 3/4 inch AB/PVC; 45 Square Inches 9 inch Maximum Through A Concrete Wall Or Floor / FS-195+, CP25WB+ / 3 Hour Rating.
  8. CAJ 3030: 1000 KCmil, 2/0 AWG, 150 Pair, Fiber Optic: 8 inch Steel, 6 inch PVC Sleeve Optional Through A Concrete Wall Or Floor / CP25WB+ / 1 1/2, 2 and 3 Hour Rating.
  9. CBJ 1020: Nominal 12" diameter (or smaller) Schedule 10 (or heavier) steel pipe, nominal 6" diameter steel conduit (or smaller), nominal 4" diameter (or smaller) EMT, nominal 3" diameter (or smaller) Type L (or heavier) copper tubing. Rigidly supported on both sides of wall or floor assembly. Maximum area of opening 1500 sq. inches, with maximum dimension of 50 inches through a 5 1/2 inch thick Concrete Wall/Floor

or any UL classified concrete block wall, 4 hr rating.

10. FWD 1003: Construction Joints, 4 inches Wide, 25 Percent Compression/Extension through A Concrete Wall or Floor / FB-2000 or FB-2003 / 2 Hour Rating.
11. WWD 1004: Construction Joints, 4 inches Wide, 25 Percent Compression/Extension through A Concrete Wall / FB-2000 / 2 Hour Rating.

### 3.8 THROUGH PENETRATION FIRESTOP SYSTEM FOR ELECTRICAL PENETRATIONS

- A. 3M Fire Barrier Pass Through Devices: One-Piece device for firestopping of cable penetrations through rated walls and floors.
  1. Fire Resistance: For use in 2 hour fire rated systems.
- B. 3M Fire Barrier Cast-in-Place Devices: Firestopping device for use prior to a concrete pour. Adjustable height with pull tabs, straight edge design for close placement to walls and adjacent devices.
  1. Fire Resistance: For use in 3 hour fire rated systems.
- C. 3M Fire Barrier CP25WB+ Caulk: Intumescent water-based latex caulk. No-sag, fast drying, paintable.
  1. Fire Resistance: For use in 2 hour fire rated systems.
- D. 3M Fire Barrier IC 15WB+ Sealant: Intumescent latex based sealant. No-sag, fast drying, paintable.
  1. Fire Resistance: For use in 2 hour fire rated systems.
- E. 3M FireDam 150+ Acrylic Latex Sealant: Single part, water based, acrylic latex sealant. Endothermic, no-sag, low-shrinkage, low VOC.
- F. 3M Fire Barrier Watertight Silicone 3000 WT Sealant: Water-tight intumescent silicone sealant for filling voids in concrete gypsum, metal, plastic, wood and insulation.
  1. Fire Resistance: For use in 2 hour fire rated systems.
- G. 3M Fire Barrier 1000 NS Silicone Sealant: Non-slump firestopping sealant for floor and wall openings.
  1. Hardness (ASTM C 661): 1000 NS: 20 - 25.
  2. Service Temperature (ASTM C 1299): -60 - 300 degrees F (-51 - 149 degrees C).
  3. Fire Resistance: For use in 2 hour fire rated systems.
- H. 3M Fire Barrier 1003 SL Silicone Sealant: Self-leveling firestopping sealant for floor openings.
  1. Hardness (ASTM C 661): 1003 SL: 10 - 15.
  2. Service Temperature (ASTM C 1299): -60 - 300 degrees F (-51 - 149 degrees C).
  3. Fire Resistance: For use in 2 hour fire rated systems.
- I. 3M Fire Barrier Moldable Putty+: One-part, 100 percent solids intumescent firestop. Remains pliable, flexible and easily re-enterable. Non-toxic synthetic elastomer formula.
  1. Type: Stick.



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2. Type: Pad.
3. Fire Resistance: For use in 2 hour fire rated systems.
- J. 3M Fire Barrier 2001 Silicone RTV Foam: Two-part, liquid-silicone elastomer, foams in place when mixed. For use sealing large or complex openings such as cable bundles, cable trays and conduit banks.
  1. Fire Resistance: For use in 2 hour fire rated systems.
- K. 3M Fire Barrier Mortar: Intumescent firestop mortar. For sealing openings in concrete and masonry walls and floors. Self Leveling, non-sag, low VOC.
- L. 3M Fire Barrier Self-Locking Pillow: Self-contained, highly intumescent firestop pillow with interlocking strips. Meets fire rating without the use of wire mesh.
  1. Fire Resistance: For use in 2 hour fire rated systems.
- M. 3M Fire Barrier Pillow: Self-contained, highly intumescent firestop product. Meets fire rating without the use of wire mesh.
  1. Fire Resistance: For use in 2 hour fire rated systems.
- N. 3M Fire Barrier CS-195+ Composite Sheet: Organic/inorganic intumescent elastomeric sheet, bonded on one side to a layer of 28 gauge galvanized steel. Other side reinforced with steel-wire mesh and covered with aluminum foil. Re-enterable.
  1. Thickness: Nominal 0.3 inch (7.6 mm).
  2. Thermal Expansion: 8 - 10 times original size.
  3. Tensile Strength (ASTM D412): 93.6 psi (645 kPa)/489 percent.
  4. Fire Resistance: For use in 2 hour fire rated systems.
- O. 3M Interam Ultra GS Tape: Graphite based, flexible, largely inorganic, Intumescent and endothermic mat. For use firestopping around DWV piping or closed pipe systems.
  1. Free Expansion: 25 times.
  2. Fire Resistance: For use in 2 hour fire rated systems.
- P. 3M Fire Barrier FS-195+ Wrap/Strip: One-part, organic/inorganic intumescent elastomeric strip with foil on one side. May be cut to fit irregular shapes.
  1. Length: 24 inch (610 mm).
  2. Width: 1 inch (25.4 mm).
  3. Width: 2 inches (51 mm).
  4. Fire Resistance: For use in 2 hour fire rated systems.

### 3.9 FIRESTOPPING FOR CONSTRUCTION GAPS

- A. 3M FireDam 150+ Acrylic Latex Sealant: Single part, water based, acrylic latex sealant. Endothermic, no-sag, low-shrinkage, low VOC.

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B. 3M FireDam Spray 200: Water based, spray applied firestopping for use at head-of-wall, wall-to-wall, floor-to-floor and perimeter joints. Paintable, low VOC.

1. Compression/Extension Recovery: +/- 25 percent of joint width.

2. Fire Resistance: For use in 2 hour fire rated systems.

### 3.10 PROTECTION

A. Protect installed products until completion and project closeout.

B. Touch-up, repair or replace damaged products before Substantial Completion.

### 3.11 CLEAN-UP

A. Prior to project closeout, remove all related rubbish, excess material, scaffolding, tools and equipment from the site. Dispose of waste material in a manner approved by applicable jurisdictions.

END OF SECTION 07840

## 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 sealants for interior applications.
- B. Preparing substrate surfaces and providing sealant and joint backing.
- C. Work at partitions, ceiling trim, door frames, wall penetrations and other joints as indicated.

#### 1.3 RELATED SECTIONS

- A. Division 9 Section "Construction Painting".
- B. Division 22: Sealants for plumbing work is specified in Division 22.
- C. Division 23: Sealants for mechanical work is specified in Division 23.
- D. Divisions 26: Sealants for electrical work is specified in Division 26.

#### 1.4 REFERENCES

- A. American Aluminum Manufacturers Association (AAMA): AAMA 808.3.
- B. American Society for Testing and Materials (ASTM):
  - 1. ASTM C510 - Standard Test Method for Staining and Color Change of Single and Multi-component Joint Sealants.
  - 2. ASTM C639 - Standard Test Method for Rheological (Flow) Properties of Elastomeric Sealants.
  - 3. ASTM C661 - Standard Test Method for Indentation Hardness of Elastomeric Type Sealants by Means of a Durometer.
  - 4. ASTM C679 - Standard Test Method for Tack-Free Time of Elastomeric Sealants.
  - 5. ASTM C719 - Standard Test Method for Adhesion and Cohesion of Elastomeric Joint Sealants Under Cyclic Movement (Hockman Cycle).
  - 6. ASTM C794 - Standard Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants.
  - 7. ASTM C920 - Elastomeric Joint Sealants.
  - 8. ASTM C1135 - Standard Test Method for Determining Tensile Adhesion Properties of Structural Sealants.

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9. ASTM C1193 - Standard Guide for Use of Joint Sealants.
10. ASTM C1248 - Standard Test Method for Staining Porous Substrate by Joint Sealants.
11. ASTM C1330 - Cylindrical Sealant Backing for Use with Cold Liquid Applied Sealants.
12. ASTM D412 - Standard Test Method for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers - Tension.
13. ASTM D624 - Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers.
14. ASTM D2202 - Standard Test Method for Slump of Sealants.
15. ASTM D2240 - Rubber Property Durometer Hardness.
16. ASTM E119 (UL 263) - Standard Test Method for Fire Tests of Building Construction and Materials.

C. National Sanitation Foundation (NSF): NSF Standard 51 and 61.

#### 1.5 SUBMITTALS

- A. Products Data: Submit data indicating sealant chemical characteristics, performance criteria, substrate preparation, limitations, and color availability.
- B. Manufacturer's Installation Instructions: Indicate special procedures, surface preparation, and perimeter conditions requiring special attention.

#### 1.6 QUALITY ASSURANCE

- A. Perform work in accordance with sealant manufacturer's published requirements for preparation of surfaces and material installation instructions and in accordance with the Manufacturer's Representative pre-installation meeting:
- B. Instructions and recommendations.
- C. Provide sample of work on each substrate for approval by Architect and Engineer. Approved work to be used as standard of quality.

#### 1.7 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum five years (5) documented experience.
- B. Applicator: Company specializing in performing Work of this Section with minimum five years (5) documented experience. Trained and certified by the sealant manufacturer.
- C. On-Site Supervisor: Full-time employee of the Contractor. Experienced in the Work of this Section. Trained and certified by the manufacturer.

#### 1.8 ENVIRONMENTAL REQUIREMENTS

- A. Maintain temperature and humidity recommended by sealant manufacturer during and after installation.

## 1.9 COORDINATION

- A. Coordinate Work with all other work requiring sealant.

## 1.10 WARRANTY

- A. Special Installer's Warranty: Written warranty in which Installer agrees to repair or replace joint sealants that do not meet requirements specified in this Section or fail in adhesion within specified warranty period [2] two years from date of Substantial Completion.
- B. Special Manufacturer's Warranty: Manufacturer's standard form in which manufacturer agrees to furnish joint sealants to repair or replace those that do not comply with requirements specified in this Section within [5] five years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 SEALANTS

- A. Acrylic Terpolymer (Type A): ASTM C834, Single component, solvent based, thermoplastic, non-staining, non-bleeding, non-sagging; color as selected by Architect; manufactured by Pecora Corp., Bostik, Tremco or approved equal.
  - 1. Elongation Capability  $\pm 10$  percent
  - 2. Service Temperature Range 2 to 160° F
  - 3. Shore A Hardness Range 15 to 40
  - 4. Solids 95% Acrylic
- B. Polyurethane Elastomeric Sealant (Type C): ASTM C920, Type S, Grade NS, Class 25, Use NT, M, A, G, O; Gun Grade single component, non-sagging, non-staining, non-bleeding, color to match substrate; manufactured by Sonneborn (Degussa), Pecora, Bostik, or Sika Corp., or approved equal.
  - 1. Movement Capability  $\pm 25$  percent
  - 2. Service Temperature Range -40 to 180° F
  - 3. Shore A Hardness Range 25 to 30
- C. Silicone Sealant (Type D): ASTM C920, Type S, Grade NS, Class 25, Use NT, G, A, M, O; single component, neutral curing, high performance, non-sagging, non-staining, non-bleeding, specifically designed for mildew resistant applications; color as selected by Architect; manufactured by Dow Corning, General Electric, Pecora or approved equal.
  - 1. Elongation Capability  $\pm 50$  percent
  - 2. Service Temperature Range -60 to 180° F
  - 3. Shore A Hardness Range 20 to 30
- D. Fire-Rated Sealant (Type F): ASTM E814, UL 1479; single component, non-flammable, high performance, non-sagging, non-staining, non-bleeding, specifically designed for fire-rated penetrations; manufactured by Dow Corning, General Electric, Pecora, 3M, Hilti, Flame-Safe or approved equal.

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1. Elongation Capability  $\pm$  50 percent
2. Service Temperature Range -60 to 180° F
3. Shore A Hardness Range 20 to 30

## 2.2 ACCESSORIES

- A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.
- B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.
- C. Joint Backing: ASTM D1056 round, closed cell polyethylene foam rod; oversized 30 to 50 percent larger than joint width.
- D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Verify that substrate surfaces and joint openings are ready to receive work.
- B. Verify joint backing and release tapes are compatible with sealant.

### 3.2 PREPARATION

- A. Remove loose materials and foreign matter which might impair adhesion of sealant.
- B. Clean and prime joints in accordance with manufacturer's instructions and pre-installation demonstration.
- C. Perform preparation in accordance with Manufacturer's Representative's instructions.
- D. Protect elements surrounding the Work of this Section from damage or disfiguration.

### 3.3 INSTALLATION

- A. Install sealant in accordance with manufacturer's instructions and pre-installation demonstration.
- B. Measure joint dimensions and size materials to achieve required width/depth ratios below or as recommended by manufacturer.
  1. Width/depth ratio of 2:1.
  2. Surface bond area on each side not less than 75 percent of joint width.
- C. Install joint backing to achieve a neck dimension no greater than 1/3 of the joint width.
- D. Install bond breaker where joint backing is not used.
- E. Install sealant free of moisture air pockets, foreign embedded matter, ridges, and sags.
- F. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.

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- G. Tool joints concave unless detailed differently using manufacturer's recommended joint tools, finger tooling shall not be allowed.

### 3.4 CLEANING

- A. Clean work under provisions of Section 01700.
- B. Clean adjacent soiled surfaces.

### 3.5 PROTECTION OF INSTALLED CONSTRUCTION

- A. Protect finished installation under provisions of Division One.
- B. Protect sealants until cured.

### 3.6 SCHEDULE

- A. The following sealant schedule is a listing of typical uses and is not all inclusive. Refer to individual specification sections and contract drawings:

	Location	Type	Color
1.	Door/Window frame	A or C	Match substrate
2.	Masonry Expansion Joints	C	Match CMU [vert]or mortar [horiz]
3.	Interior Partitions	A or C	Match Substrate
4.	Expansion Joints	C	Match Substrate
5.	Penetrations (non-rated)	A or C	Match Substrate
6.	Penetrations (rated)	F	Match Substrate
7.	Metal Trim, Exposed	A or C	Match Existing/Adjacent

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## SECTION 090190 REPAINTING

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Section includes maintenance repainting as follows:
  - 1. Patching substrates.
  - 2. Repainting.

#### 1.3 ALLOWANCES

- A. Allowances for maintenance repainting are specified in Section 012100 "Allowances."

#### 1.4 UNIT PRICES

- A. Work of this Section is affected by unit prices specified in Section 012100 "Allowances."
  - 1. Unit prices apply to authorized work covered by quantity allowances.
  - 2. Unit prices apply to authorized additions to and deletions from Work as authorized by Change Orders.

#### 1.5 DEFINITIONS

- A. Gloss Level 1: Not more than 5 units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.
- B. Gloss Level 2: Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
- C. Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
- D. Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.
- E. Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.

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- F. Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.
- G. Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

#### 1.6 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

#### 1.7 SEQUENCING AND SCHEDULING

- A. Perform maintenance repainting in the following sequence, which includes work specified in this and other Sections:
  - 1. Dismantle existing surface-mounted objects and hardware except items indicated to remain in place. Tag items with location identification and protect.
  - 2. Verify that temporary protections have been installed.
  - 3. Examine condition of surfaces to be painted.
  - 4. Remove existing paint to the degree required for each substrate and surface condition of existing paint.
  - 5. Apply paint system.
  - 6. Reinstall dismantled surface-mounted objects and hardware unless otherwise indicated.

#### 1.8 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Include recommendations for product application and use.
  - 2. Include test data substantiating that products comply with requirements.
- B. Product List: For each paint product indicated, include the following:
  - 1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
  - 2. Printout of current "MPI Approved Products List" for each MPI-product category specified in paint systems, with the proposed product highlighted.
  - 3. VOC content.

#### 1.9 INFORMATIONAL SUBMITTALS

- A. Color Matching Certificate: For computer-matched colors.

#### 1.10 QUALITY ASSURANCE

- A. Color Matching: Custom computer-match paint colors to existing colors.

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#### 1.11 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F (7 deg C).
  - 1. Maintain containers in clean condition, free of foreign materials and residue.
  - 2. Remove rags and waste daily.

#### 1.12 FIELD CONDITIONS

- A. Weather Limitations: Proceed with maintenance repainting only when existing and forecasted weather conditions are within the environmental limits set by each manufacturer's written instructions and specified requirements.
- B. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F (10 and 35 deg C).
- C. Do not apply paint in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.
  - 1. Painting may continue during inclement weather if surfaces and areas to be painted are enclosed and heated within temperature limits specified by manufacturer for surface preparation and during paint application and drying periods.

### PART 2 - PRODUCTS

#### 2.1 PAINT, GENERAL

- A. Material Compatibility:
  - 1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
  - 2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.
- B. Colors: Color match to existing colors.

#### 2.2 PAINT MATERIALS, GENERAL

- A. MPI Standards: Provide products that comply with MPI standards indicated and that are listed in its "MPI Approved Products List."
- B. Volatile Organic Compounds (VOCs) Regulatory Requirements: Chapter III of Title 6 of the official compilation of Codes, Rules and Regulations of the State of New York (Title 6

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NYCRR), Part 205 Architectural Surface Coatings. VOC (EPA Method 24: <50 g/L; 042 Lb/gal.

1. Certificate of Compliance: List of each paint product to be delivered and installed. List shall include written certification stating that each paint product listed complies with the VOC regulatory requirements in effect at the time of job site delivery and installation.

- C. Low-Emitting Materials: Interior paints and coatings shall comply with the testing and product requirements of the California Department of Public Health's (formerly, the California Department of Health Services') "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

## 2.3 PAINT MATERIAL MANUFACTURERS

- A. Sherwin-Williams Co. (Basis of Design) Cleveland, OH 44101, (800) 321-8194.
- B. Benjamin Moore and Co., 51 Chestnut Ridge Rd., Montvale, NJ 07645, (201) 573-9600.
- C. ICI Dulux Paints, 4000 Dupont Cr., Louisville, KY 40207, (800) 984-5444.

## 2.4 PAINT MATERIALS

- A. Interior Finish Paint Types:
- B. Interior Acrylic Latex, Flat (Ceiling paint).
  - a. Solids by Weight: 50.0 percent.
  - b. Solids by Volume: 32.0 percent.
  - c. Weight Per Gallon: 10.9 lbs.
  - d. Wet Film Thickness: 3.8 mils.
  - e. Dry Film Thickness: 1.3 mils.
  - f. VOC: Zero
  - g. Manufacturers: Sherwin-Williams–Promar 200 (Basis of Design), or approved equal from Benjamin Moore, ICI Dulux.
- C. Interior Acrylic Latex, Semi Gloss
  - a. Solids by Weight: 44.0 percent.
  - b. Solids by Volume: 35.0 percent.
  - c. Weight Per Gallon: 9.5 lbs.
  - d. Wet Film Thickness: 6 mils.
  - e. Dry Film Thickness: 2.5 mils.
  - f. VOC: Unreduced <50g/L
  - g. Manufacturers: Sherwin-Williams –Pro Industrial Acrylic (Basis of Design), or approved equal from Benjamin Moore, ICI Dulux.
- D. Interior Acrylic Latex, Flat Eggshell
  - a. Solids by Weight: 50.0 percent.
  - b. Solids by Volume: 32.0 percent.
  - c. Weight Per Gallon: 10.9 lbs.

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- d. Wet Film Thickness: 3.8 mils.
- e. Dry Film Thickness: 1.3 mils.
- f. VOC: Zero
- g. Manufacturers: Sherwin-Williams –Promar 200 (Basis of Design), or approved equal from Benjamin Moore, ICI Dulux.

## 2.5 PATCHING MATERIALS

- A. Wood-Patching Compound: Two-part, epoxy-resin, wood-patching compound; knife-grade formulation as recommended in writing by manufacturer for type of wood repair indicated, tooling time required for the detail of work, and site conditions. Compound shall be designed for filling voids in damaged wood materials that have deteriorated from weathering and decay. Compound shall be capable of filling deep holes and spreading to feather edge.
- B. Cementitious Patching Compounds: Cementitious patching compounds and repair materials specifically manufactured for filling cementitious substrates and for sanding or tooling prior to repainting; formulation as recommended in writing by manufacturer for type of cementitious substrate indicated, exposure to weather and traffic, the detail of work, and site conditions.
- C. Gypsum-Plaster Patching Compound: Finish coat plaster and bonding compound according to ASTM C 842 and manufacturer's written instructions.

## PART 3 - EXECUTION

### 3.1 PROTECTION

- A. Comply with each manufacturer's written instructions for protecting building and other surfaces against damage from exposure to its products. Prevent chemical solutions from coming into contact with people, motor vehicles, landscaping, buildings, and other surfaces that could be harmed by such contact.
  - 1. Cover adjacent surfaces with materials that are proven to resist chemical solutions being used unless the solutions will not damage adjacent surfaces. Use protective materials that are UV resistant and waterproof. Apply masking agents to comply with manufacturer's written instructions. Do not apply liquid masking agent to painted or porous surfaces. When no longer needed, promptly remove masking to prevent adhesive staining.

### 3.2 REPAINTING, GENERAL

- A. Maintenance Repainting Appearance Standard: Completed work is to have a uniform appearance as viewed by Architect from building interior at 5 feet (1.5 m) away from painted surface.
- B. Execution of the Work: In repainting surfaces, disturb them as minimally as possible and as follows:

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1. Verify that substrate surface conditions are suitable for repainting.
  2. Allow other trades to repair items in place before repainting.
- C. Mechanical Abrasion: Where mechanical abrasion is needed for the work, use gentle methods, such as scraping and lightly hand sanding, that will not abrade softer substrates, reducing clarity of detail.
- D. Heat Processes: Do not use torches, heat guns, or heat plates.

### 3.3 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of painting work. Comply with paint manufacturer's written instructions for inspection.
- B. Maximum Moisture Content of Substrates: Do not begin application of coatings unless moisture content of exposed surface is below the maximum value recommended in writing by paint manufacturer.
- C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
1. If existing surfaces cannot be prepared to an acceptable condition for proper finishing by using specified surface-preparation methods, notify Architect in writing.
- D. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.
1. Beginning coating application constitutes Contractor's acceptance of substrates and conditions.

### 3.4 SUBSTRATE REPAIR

- A. General: Repair substrate surface defects that are inconsistent with the surface appearance of adjacent materials and finishes.
- B. Cementitious Material Substrate:
1. General: Repair defects including dents and chips more than 1/4 inch (6 mm) in size and all holes and cracks by filling with cementitious patching compound and sanding smooth. Remove protruding fasteners.
  2. New and Bare Plaster: Neutralize surface of plaster with mild acid solution as recommended in writing by paint manufacturer. In lieu of acid neutralization, follow manufacturer's written instruction for primer or transition coat over alkaline plaster surfaces.

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3. Concrete, Cement Plaster, and Other Cementitious Products: Remove efflorescence, chalk, dust, dirt, grease, oils, and release agents. If surfaces are too alkaline to paint, correct this condition before painting.

C. Gypsum-Plaster and Gypsum-Board Substrates:

1. Repair defects including dents and chips more than 1/8 inch (3 mm) in size and all holes and cracks by filling with gypsum-plaster patching compound and sanding smooth. Remove protruding fasteners.
2. Rout out surface cracks to remove loose, unsound material; fill with patching compound and sand smooth.

### 3.5 PAINT APPLICATION, GENERAL

- A. Comply with manufacturers' written instructions for application methods unless otherwise indicated in this Section.
- B. Blending Painted Surfaces: When painting new substrates patched into existing surfaces or touching up missing or damaged finishes, apply coating system specified for the specific substrate. Apply final finish coat over entire surface from edge to edge and corner to corner.

### 3.6 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

END OF SECTION 090190



## SECTION 095100 - ACOUSTICAL CEILINGS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Section includes metal suspension systems, acoustical panels and exposed suspension systems for ceilings.
- B. Products furnished, but not installed under this Section, include anchors, clips, and other ceiling attachment devices to be cast in concrete.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each exposed product and for each color and texture specified, 6 inches (150 mm) in size.
- C. Samples for Initial Selection: For components with factory-applied color finishes.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
  - 1. Suspended ceiling components.
  - 2. Structural members to which suspension systems will be attached.
  - 3. Size and location of initial access modules for acoustical panels.
  - 4. Items penetrating finished ceiling including the following:
    - a. Lighting fixtures.
    - b. Air outlets and inlets.
    - c. Speakers.
  - 5. Perimeter moldings.

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## 1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For finishes to include in maintenance manuals.

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver acoustical panels, suspension-system components, and accessories to Project site in original, unopened packages and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.
- B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.
- C. Handle acoustical panels carefully to avoid chipping edges or damaging units in any way.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Seismic Standard: Acoustical ceiling shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

### 2.2 CEILING SYSTEMS

- A. Source Limitations:

- 1. Acoustical Ceiling Panel: Obtain each type from single source from single manufacturer.
  - 2. Suspension System: Obtain each type from single source from single manufacturer.

- B. Suspended Acoustical Ceiling System (SAC Type 1)

- 1. Basis-of-Design Product: Armstrong World Industries, Inc., Dune Tegular or a comparable product of one of the following:
    - a. CertainTeed Corp.
    - b. Chicago Metallic Corporation.
    - c. USG Interiors, Inc.; Subsidiary of USG Corporation.
  - 2. Classification: As follows, per ASTM E 1264:
    - a. Type and Form: Type III, Form 2.
    - b. Pattern: CE (perforated, small holes and lightly textured).
    - c. Light Reflectance (LR) Coefficient: Not less than 0.80
    - d. Noise Reduction Coefficient (NRC): Not less than 0.50
    - e. Ceiling Attenuation Class (CAC): Not less than 30.
    - f. Class A panels have a flame-spread index of 25 or less; Class B, 75 or less. Most products are Class A.

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- g. Surface-Burning Characteristics: Class A
  - 3. Color: White.
  - 4. Edge Detail: Armstrong 7808 (2"x2") Perimeter Angle molding
  - 5. Exposed Tee System: Interlude XL HRC 9/16
  - 6. Tile: Dune Tegal
    - a. Thickness: 5/8 inch (15 mm)
  - 7. Modular Size: 24 by 24 inches (610 by 610 mm)
- C. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated.
  - 1. Provide manufacturer's standard edge moldings that fit acoustical panel edge details and suspension systems indicated and that match width and configuration of exposed runners unless otherwise indicated.
  - 2. For lay-in panels with reveal edge details, provide edge molding that forms reveal of same depth and width as that formed between edge of panel and flange at exposed suspension member.
  - 3. For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.
  - 4. Provide manufacturers pre-fabricated, pre-finished end caps.
- D. Color and finish:
  - a. Face Design: Flat, flush
  - b. Face Finish: Painted white
- E. Attachment Devices: Sized for 5 times the design load indicated in ASTM C 635, Table 1, Direct Hung, unless otherwise indicated. Comply with seismic design requirements.
- F. Wire Hangers, Braces, and Ties: Zinc-coated carbon-steel wire; ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
  - 1. Size: Provide yield strength at least 3 times the hanger design load (ASTM C 635, Table 1, Direct Hung), but not less than 0.106-inch- (2.69-mm-) diameter wire.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.
- B. Examine acoustical panels before installation. Reject acoustical panels that are wet, moisture damaged, or mold damaged.

- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders, and comply with layout shown on reflected ceiling plans.

### 3.3 INSTALLATION

- A. Install acoustical ceilings to comply with ASTM C 636/C 636M and seismic design requirements indicated, according to manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."
- B. Suspend ceiling hangers from building's structural members and as follows:
  - 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
  - 2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension-system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
  - 3. Secure wire hangers to ceiling-suspension members and to supports above with a minimum of three tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
  - 4. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for both the structure to which hangers are attached and the type of hanger involved. Install hangers in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.
  - 5. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, postinstalled mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.
  - 6. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
  - 7. Do not attach hangers to steel deck tabs.
  - 8. Do not attach hangers to steel roof deck. Attach hangers to structural members.
  - 9. Space hangers not more than 48 inches (1200 mm) o.c. along each member supported directly from hangers unless otherwise indicated; provide hangers not more than 8 inches (200 mm) from ends of each member.
  - 10. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.
- C. Secure bracing wires to ceiling suspension members and to supports with a minimum of four tight turns. Suspend bracing from building's structural members as required for hangers, without

attaching to permanent metal forms, steel deck, or steel deck tabs. Fasten bracing wires into concrete with cast-in-place or postinstalled anchors.

- D. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.
  - 1. Screw attach moldings to substrate at intervals not more than 16 inches (400 mm) o.c. and not more than 3 inches (75 mm) from ends, leveling with ceiling suspension system to a tolerance of 1/8 inch in 12 feet (3.2 mm in 3.6 m). Miter corners accurately and connect securely.
  - 2. Do not use exposed fasteners, including pop rivets, on moldings and trim.
- E. Install suspension-system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
- F. Install acoustical panels with undamaged edges and fit accurately into suspension-system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide a neat, precise fit.
  - 1. Arrange directionally patterned acoustical panels as follows:
    - a. As indicated on reflected ceiling plans.
  - 2. For reveal-edged panels on suspension-system runners, install panels with bottom of reveal in firm contact with top surface of runner flanges.
  - 3. Paint cut edges of panel remaining exposed after installation; match color of exposed panel surfaces using coating recommended in writing for this purpose by acoustical panel manufacturer.
- G. Install acoustical panels with undamaged edges and fit accurately into suspension system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide a neat, precise fit.

### 3.4 CLEANING

- A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension-system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage

END OF SECTION 095100

## SECTION 096519 RESILIENT FLOORING AND ACCESSORIES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Section include the following:
  - 1. Resilient Vinyl Composite Tile
  - 2. Rubber Wall Base

#### 1.3 SUBMITTALS

- A. Product Data: Manufacturer's catalog sheets, specifications, and installation instructions for each material specified.
- B. Shop Drawings:
  - 1. Show locations of seams, edges, columns, doorways, enclosing partitions, built-in furniture, cabinets, and cutouts.
  - 2. Show details of special patterns.
- C. Samples:
  - 1. VCT: Manufacturer's standard size, but not less than 12 by 12 inches, each pattern and color required.
  - 2. Color Samples: Manufacturer's standard patterns, colors and textures for flooring and base.
- D. Quality Control Submittals:
  - 1. Certificates: Certificates required under Quality Assurance Article.
- E. Contract Closeout Submittals:
  - 1. Maintenance Data: Deliver 2 copies, covering the installed products, to Owner.
  - 2. Warranty Documents

#### 1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Installers shall be experienced in flooring installation, including the requirements of the flooring manufacturer, and shall have been regularly employed by a company engaged in installation of resilient flooring for a minimum of 5 years.
  - 1. Furnish the names and addresses of 5 similar projects which the installers have worked on during the past 3 years.
- B. Compatibility of Materials: Associated materials which are required for the installation of tile flooring shall be made by or recommended by the flooring manufacturer.
- C. Certifications: Furnish certification from flooring installer that the substrate surfaces have been examined and are acceptable for installation of the Work of this Section.
- D. Volatile Organic Compounds (VOCs) Regulatory Requirements: Chapter III of Title 6 of the official compilation of Codes, Rules and Regulations of the State of New York (Title 6 NYCRR), Part 205 Architectural Surface Coatings. VOC (EPA Method 24: <50 g/L; 042 Lb/gal).
  - 1. Certificate of Compliance: List of each paint product to be delivered and installed. List shall include written certification stating that each paint product listed complies with the VOC regulatory requirements in effect at the time of job site delivery and installation.

#### 1.5 PROJECT CONDITIONS

- A. Environmental Requirements: Make arrangements thru the Owners representative for having the temperature in the spaces to receive flooring maintained at 68 degrees F for 48 hours prior to flooring installation, during the installation, and for 48 hours after installation.
- B. Condition flooring materials by placing them in the spaces where they will be installed for at least 48 hours prior to installation.
- C. A mat bond test is required before any installation takes place. This will identify any potential bonding problems prior to installation. The tests should be conducted after all remediation and /or prep has been completed.

#### 1.6 EXTRA MATERIALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Floor Tile: Furnish 1 box for every 50 boxes or fraction thereof, of each type, color and pattern of floor tile installed.
  - 2. Wall Base: Furnish extra material, equal to 2 percent



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## 1.7 REGULATORY REQUIREMENTS

- A. Provide products with the following fire-test response characteristics as determined by testing identical products per test method indicated below by a testing and inspecting agency acceptable to authorities having jurisdiction.
  - 1. E648-19a.1 Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source.
- B. Fire-Test-Response Characteristics: For resilient tile flooring, as determined by testing identical products according to ASTM E 648-19a.1 or NFPA 253 by a qualified testing agency.
  - 1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

## 1.8 WARRANTY

- A. Manufacturer's Warranty: Submit manufacturer's standard warranty document.
  - 1. Warranty Period: Ten (10) year limited warranty commencing on Date of Substantial completion.

## PART 2 - PRODUCTS

### 2.1 ACCEPTABLE PRODUCTS

- A. Vinyl Composite Tile (VCT): Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to the following:
  - 1. Standard Excelon by Armstrong Industries (Basis of Design)
  - 2. Essentials by Mannington commercial
  - 3. Tarkett VCT

### 2.2 MATERIALS

- A. Vinyl Composite Tile (VCT): ASTM F1066 class 2 Through pattern ISO 10595 Type II.
  - 1. Type; VCT-1 Oakeside Basis of Design
    - a. Armstrong Standard Excelon Imperial
    - b. Nominal Floor Tile Size: 12x12 inches.
    - c. Patterns and Colors: Manufacturer's Standard as Selected by Architect
    - d. Thickness: 1/8 inch (3.2 mm).
  - 2. Type; VCT-2 Woodside Basis of Design
    - a. Armstrong Standard Excelon Imperial
    - b. Nominal Floor Tile Size: 12x12 inches.
    - c. Patterns and Colors: Manufacturer's Standard as Selected by Architect
    - d. Thickness: 1/8 inch (3.2 mm).

- B. Rubber Base: (RB) ASTM F386, Group I; Type TP; 4 inches high, 1/8 inch gage; with matching preformed external corner units. 100% vulcanized rubber, PVC Free and Phthalate free
  - 1. Style: Duracove TP, Cove wall base with Standard Toe
  - 2. Adhesive and Filler/Wall Patch: As recommended by the base manufacturer for the type of substrate indicated.
  - 3. Manufacturer: Tarkett Johnsonite
    - a. Color: (2) Two, From Manufactures Standard as Selected by Architect
- C. Primer for Porous or Dusty Concrete: Tile adhesive manufacturer's recommended primer for preparation of porous or dusty concrete.
- D. Adhesive: Water resistant, formulated for application on type of subfloor indicated, and recommended by the tile manufacturer.
- E. Trowelable Leveling and Patching Compounds: Latex-modified Portland cement based or blended hydraulic-cement-based formulation provided or approved by manufacturer for application on substrate surface and grade level..
- F. Flooring Adhesives and Joint Materials: Flooring manufacturer's recommended water resistant materials formulated for application on substrate surface and grade level.
- G. Low VOC Flooring Adhesive and Joint Materials: Flooring manufacturer's recommended water resistant materials formulated for low VOC (VOC Limit 50g/L less water) and for application on substrate surface and grade level.
- H. Floor Finish: Flooring manufacturer's recommended protective liquid floor finish.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Verification of Conditions:
  - 1. Examine substrate surfaces to receive the Work of this Section for moisture content and for defects that will adversely affect the execution and quality of the Work. Do not proceed until unsatisfactory conditions are corrected.
    - a. Concrete Subfloor Moisture Tests: Check concrete subfloors for moisture vapor emissions in accordance with the flooring manufacturer's printed instructions and ASTM F 1869. Ensure that moisture content in concrete substrate does not exceed manufacturer's recommendation.
    - b. Concrete Subfloor Bond Tests: Check for coatings on concrete subfloor by bond tests in accordance with the flooring manufacturer's printed instructions.
  - 2. Do not install the Work of this Section until after all other finishing operations, including painting, have been completed unless otherwise indicated or directed by the Owners representative.

### 3.2 PREPARATION

- A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of floor coverings.
- B. Remove dirt, grease, oil, paint, varnish, wax, sealers, and other contaminants which may impair the full bonding of the materials using mechanical methods recommended by manufacturer. Do not use solvents.
- C. Concrete Subfloor:
  - 1. Remove trowel marks and other projections by grinding or sanding.
  - 2. Level uneven surfaces with smooth trowelable leveling and patching compound. Fill cracks, grooves, holes and remove bumps and ridges to produce a uniform and smooth substrate. Follow underlayment manufacturer's application and curing instructions.
  - 3. Provide a substrate surface with not more than 1/8 inch in 10'-0" variation from level or required slope.
  - 4. Sweep and vacuum clean substrates to be covered by floor coverings immediately before installation.

### 3.3 INSTALLATION

- A. Install the Work of this Section in accordance with manufacturer's printed instructions.
- B. Floor Tile:
  - 1. Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so floor tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.
  - 2. Match floor tiles for color and pattern by selecting tiles from cartons in same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed floor tiles.
- C. Extend floor coverings into toe spaces, door reveals, closets, and similar openings unless noted otherwise.
- D. Adhere floor coverings to substrates with adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections. Install adhesives in accordance to floor tile manufacturers written specifications.
- E. Install resilient edge strips at unprotected edges of flooring and floor finish change unless otherwise indicated.
- F. Do not install resilient flooring over expansion joints.

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### 3.4 CLEANING

- A. Remove excess adhesive and other surface soiling from face of installed materials with cleaning agents recommended by the manufacturer of the material being cleaned.

### 3.5 PROTECTION

- A. Protect installed flooring from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

### 3.6 FINISHING

- A. Prior to the final inspection, when directed by the Owners representative, thoroughly clean flooring and accessories. Comply with the flooring manufacturer's printed instruction for cleaning and finishing.

END OF SECTION 096519

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DIVISION 22  
PLUMBING SPECIFICATIONS (PC)  
INDEX

SECTION	TITLE
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## SECTION 220010 - PLUMBING WORK GENERAL

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract including all General Conditions, Supplementary Conditions, Division 1 specification sections as well as Information to Bidders requirements that are included in the project documents, apply to the work of this Contract.

#### 1.2 ALLOWANCES, ALTERNATES AND UNIT PRICES

- A. Refer to Division 1 specifications for allowances, alternates and unit prices required as part of this Contract.

#### 1.3 INTENT

- A. The intent of the drawings and these specifications is to provide all systems complete and operative. Whether indicated on the drawings and/or included in the specification or not, provide all materials, equipment and labor usually furnished with such systems.

#### 1.4 DEFINITIONS

- A. Provide: Furnish, install and connect.
- B. Furnish: Supply material only.
- C. EXR: Existing to remain.

#### 1.5 SCOPE OF WORK

- A. Drawings and specifications are complementary and must be so interpreted to determine the full scope of work under this section. Wherever any material, article, operation or method is either specified or shown on the drawings, this Contractor is required to provide each item and perform each prescribed operation according to the designated quality, qualification or condition, furnishing all necessary labor equipment and incidentals.
- B. Specifically included, without limiting the generality of drawings and specifications are:
  - 1. Valves where indicated.
  - 2. Connections to and from site utilities at 5' out structure unless otherwise noted.
  - 3. Hot and cold water lines, recirculating lines.
  - 4. Water meter, backflow preventer.

5. Connection to existing water and sewer mains.
6. Thermal insulation on hot and cold water systems.
7. Pressure reducing valve on cold water service where indicated on drawings.
8. Tests: This contractor shall furnish materials, equipment and labor and shall perform all work of testing of the plumbing systems as outlined hereinafter. Testing procedure shall include installation tests and operating tests.

#### 1.6 TEMPORARY SERVICES

- A. Temporary Heat: In accordance with Architect's specifications and/or conditions, contractor shall have the permanent heating system capable of providing heat to the new work areas when required. The term heating system shall include all work or components necessary to operate heating system. For temporary usage, it is not required that this work be in a finished condition, i.e., covers in place, etc. Cost of fuel consumed for temporary heat from permanent systems only shall be paid by owner.
- B. The use of permanent system will be allowed only if the building is fully enclosed with no construction dust to clog heating/cooling coils, heat recovery components, fans, etc.
- C. At the completion of work, Contractor shall turn over to the Owner all equipment used for temporary heat in a new, as purchased condition. Contractor shall replace filters with new ones, clean all components which shall include: unit casings, ductwork, grilles, diffusers, etc., re-lubricate all moving parts, replace belts if required and perform any other work necessary (as determined by Architect and Engineer) to put equipment in a "new" condition.
- D. Contractor shall take all measures necessary to insure that dust, dirt, or debris does not enter air systems while in operation for temporary heat and shall change filters as often as necessary. Under no circumstances shall air handlers be allowed to operate with no filter in place.

#### 1.7 CONTINUITY OF UTILITY SERVICES

- A. It is of paramount importance that each utility service operate continuously and without interruption. Whenever this contractor plans to make changes or alterations to any existing utility service, such plans shall result in no or minimum service interruption or inconvenience to Owner. This contractor shall plan and schedule any change or alteration to an existing utility service with Architect and Owner. Such planning, timing, and/or scheduling shall be approved by both these parties.



## 1.8 CODES AND STANDARDS

- A. All materials, equipment, and installations by this contract shall be in accordance with the latest editions of the following applicable requirements:
1. 2020 International Building Code, including all applicable amendments supplements to the following:
    - a) 2020 International Building Code
    - b) 2020 International Existing Building Code
    - c) 2020 International Fire Code
    - d) 2020 International Plumbing Code
    - e) 2020 International Mechanical Code
    - f) 2020 International Fuel Gas Code
  2. 2020 Supplement to the New York State Energy Conservation Construction Code including all applicable amendments to the following:
    - a) 2015 International Energy Conservation Code
    - b) 2013 ASHRAE 90.1
  3. 2020 Uniform Code Supplement (May 12, 2020)
  4. Lead testing in school drinking water (10 CRRNY 67-4)
  5. Conform to requirements of NEMA.
  6. Liquefied Petroleum Gas Code - NFPA 58.
  7. Bear label of Underwriters Laboratories, Inc.
  8. National Electrical Code NFPA Article 70, latest edition.
  9. New York State Health Code.
  10. Local Utility Standards.
  11. Local Municipal and/or City Standards.
  12. Industrial Code Rule #4 and #14 (12NYCRR 4 and 14) (Standards for Boiler Installation).
  13. Conform with applicable requirements of ASTM - Regulations and Standards for Pipe and Pipe Fittings.
  14. Be in accordance with USAS - Code for Pressure Piping, latest edition.
  15. For external and internal pipe insulations, have flame spread rating of 25 or less and smoke developed rating of 50 or less when tested in accordance with ASTM Standard E84.

16. Sheetmetal and Air Conditioning Contractor's National Association, Inc. (SMACNA), latest editions.
17. Conform with applicable requirements of Standard for the Installation of Air Conditioning and Ventilating Systems, NFPA 90A, and Code for Safety to Life from Fire in Buildings and Structures, NFPA 101.
18. Be in accordance with design standards outlined in ASHRAE Handbooks, latest edition.
19. Conform to requirements of Owner's insurance carriers.

## 1.9 SUBMITTALS AND SUBMISSION REQUIREMENTS

- A. All submittals shall be in accordance with Division 1 requirements, the following requirements listed below, and also as indicated in each specification section. All submittals not complying with the listing above will be returned to the contractor without being reviewed. Rejection by Architect or Engineer of any items submitted shall require resubmittal of acceptable items.
  1. Within (30) days after receiving signed contract or notice to proceed, submit to Architect for review complete descriptive dimensional data and ratings for equipment and materials proposed to be furnished and installed. Submit (8) copies of data unless otherwise specified by the architect.
  2. All materials submitted shall clearly state the job name and specification section(s) that it applies to.
  3. Any package containing more than one piece of equipment or material shall also contain a schedule clearly listing all items in submittal. Schedule page(s) shall also indicate project name and building name.
  4. All submittals must be clearly marked using nomenclature used in this specification for proper item identification, schedule of usage's, model numbers, construction materials, performance, data, etc.
  5. Projects involving multiple buildings must have the submittals separated by building. Submittals in which buildings are combined will not be accepted. (Exception: When specifically approved by engineer, basic materials may be submitted once.)
  6. The contractor shall verify and insure that dimensions and elevations of equipment and structures to be used conform to the space allocated for the equipment on the drawings and complies with existing conditions.
  7. Submittals traced or copied from contract drawings are not acceptable and will be returned without review.

8. In the event material and/or equipment is installed prior to obtaining approval of shop drawings, and in the sole opinion of the Owner's Agent, this material and/or equipment does not meet the specifications, the Contractor shall be liable for the removal and the replacement at no additional cost to the contract.
- B. Samples: When requested by Engineer, provide samples of both specified equipment and proposed substitutions for review by the Owner's Agent. Such equipment shall be delivered to a location designated or erected at the job site as directed. When neither is physically possible, arrange for the Owner's Agent to visit an acceptable site where the proposed equipment can be inspected.
- C. Substitutions:
  1. Submittals for equipment or materials other than as specified shall be accepted for review by the Owner's agent.
  2. Approval of substitute equipment shall be based on functional, physical and aesthetic compatibility to the equipment specified as determined by the Owner's agent and approved by the engineer.
  3. Where substitute equipment is approved, the contractor shall be responsible for, and bear the cost of any necessary changes by his trade or other trades to make the system complete and operable.
  4. Contractor is fully responsible for providing coordination between all trades affected by equipment substitution.
  5. When requested, contractor shall submit layout drawings indicating new dimensions and arrangements of substituted equipment. Layout drawings shall indicate all revisions necessary for all services affected by substitution.

#### 1.10 CUTTING AND PATCHING

- A. This contractor shall bear the cost of all cutting and patching required by and for the installation of this work. This contractor shall perform all cutting and patching unless otherwise indicated on drawings or if directed by the Architect.
- B. Patching of fire rated floors, walls, partitions, etc. shall be made using new materials equal to the fire rating of the existing.
- C. Should changes, omissions or errors in this contract's work require cutting, patching or making alterations in any portion of new construction, such work will be performed by GC at this Contractor's expense.
- D. Cutting and patching of roof surfaces and structures shall only be performed by a qualified contractor, as approved by the Architect. The work of this contract shall bear the cost of above mentioned cutting and patching. This contractor shall insure that existing roof warranties remain in force.

- E. This contractor shall furnish lintels, sized to accommodate structure above opening, where cutting and patching is to be performed on load bearing walls. Contractor shall obtain written approval for all lintels prior to installation.
- F. Cutting shall be done in a manner which will not adversely affect the strength of the building. Holes and openings shall be neatly cut so as to provide a finished appearance and shall be patched around the edge where required for a finished appearance. Provide temporary bracing, shoring, etc. as required.
- G. Patching shall be structurally sound and match the existing materials and finish of adjacent materials. Patching is required in finished areas, wherever existing work is removed, at the sides of openings, etc.
- H. At the completion of the work, all evidence of alteration will be as inconspicuous as possible.

#### 1.11 FIELD INSPECTION

- A. As there are various conditions at the site which do not show on the accompanying drawings, or which are at variance with the conditions indicated on the drawings, it is important that each bidder visit the site and acquaint himself with existing conditions, and take these conditions into consideration when preparing his proposal. Each bidder shall obtain information or make any measurement desired. Lack of knowledge relative to existing conditions will not be allowed as a basis for extra compensation.
- B. This contractor and his subcontractors shall inspect existing equipment to remain prior to any of his new work in order to determine that all equipment is in good operating condition. If equipment is found to be lacking components, is inoperable, damaged, etc., contractor shall provide immediate written notice to the Owner. The Owner or his representative shall determine if any additional work is necessary and the method by which any work shall be performed.

#### 1.12 INSTRUCTION SERVICES AND MANUALS

- A. Instructions:
  - 1. Provide competent personnel to remain at the jobsite for necessary time to instruct the Owner's personnel in proper operation and maintenance of installation made by this contractor.
  - 2. This contractor shall be responsible for notifying and instructing Owner's personnel on all equipment operations, maintenance requirements, etc. Furnish operating training session(s) for equipment listed.
  - 3. The Owner shall be responsible for establishing an operating and maintenance program for all equipment listed.

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- B. Training Session: A training session shall be held for each system and/or item listed below:

Item	Description	Training Hours For Each Bldg
1.	Flush Valves	1/2
2.	Hot Water System	1/2
3.	Compressed Air	1/2
4.	Grease Interceptor	1
5.	Dilution Trap Maintenance	1/2
6.	Emergency Shower Operation and Testing	1/2
7.	Tempered Water Valve Operation	1/2

- C. The instruction shall include the following types of information:

1. System overview
2. Major component designation
3. System operation procedures
4. Maintenance scheduling and procedures
5. Provide a list of spare components each system would normally require

- D. Services: Provide services required, for all equipment specified under this contract, for a period of (1) year after written acceptance by the Owner.

- E. Manuals: Submit (3) sets of Operation and Maintenance manuals. Each set shall contain the manufacturers' data, operating instruction parts catalog and maintenance procedures for each piece of equipment. Include normal maintenance servicing schedule to be performed by the Owner.

1. For projects containing multiple buildings, manuals shall be submitted separately for each building.

#### 1.13 PERMITS, CERTIFICATES AND FEES

- A. This Contractor shall obtain and pay for permits, certificates, fees etc. listed below. Costs for permits, fees etc. shall be included in the Base Bid amount.

1. All required applications and permits to begin work
2. Certificate of inspection including Third Party Agent
3. All municipal connection charges
4. All local utility charges (gas etc.)
5. Fees and charges shall be obtained directly from the respective authority having jurisdiction

#### 1.14 REMOVAL, DISPOSAL AND HAZARDOUS MATERIALS

- A. All removed equipment shall be removed from the site and properly disposed of.

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- B. All hazardous materials must be disposed of in compliance with ENCON and all other regulatory agencies.
- C. The Owner may wish to keep certain equipment, therefore, check with Owner before removals to determine what may be salvageable.

#### 1.15 GUARANTEE

- A. Contractor shall guarantee all work furnished through this contract including work performed by sub-contractors, for a period of (1) year (unless otherwise noted), from the date of final acceptance. Contractor agrees to repair or replace any defective work or materials at no additional cost to the Owner. Contractor shall also pay for any damage to other work resulting from repairs to defects. Contractor shall furnish written guarantees to the Owner's agent in accordance with the general conditions.

#### 1.16 INSTALLATION

- A. This contractor shall coordinate scheduling and installation of work with other contractors, sub-contractors and other trades. The contractor is also required to coordinate all work with owner supplied materials, direct contracts, and normal building operations, if any.
- B. All finished work shall be neat and workmanlike. All work of a special nature shall be performed by skilled and qualified workmen who can present credentials showing experience in said trade. New systems shall be delivered to Owner complete in perfect working order, tested and balanced in full accordance with plans and specifications. Existing systems shall function in same manner as before this work was performed. Any malfunctions which arise in existing systems as a result of demolition or alteration of parts of such systems shall be corrected.
- C. Layout of equipment, accessories and piping systems in plan is generally diagrammatic unless specifically dimensioned or detailed. Check project drawings and existing site conditions before installing work for interference's as governed by structural or other conditions. Owner reserves the right to make reasonable changes in location of equipment, accessories or piping systems prior to "roughing-in" without involving additional expense. Exact dimensions shown upon plans will be subject to verification and confirmation of exact conditions at site at time of construction. "Plus or minus" dimensions are shown upon drawing as a guide only. Exact surrounding conditions are governed by final equipment selection and/or other like details.
- D. Furnish all new equipment and materials as described herein. Any material, operation, method or device mentioned, listed or noted within this specification, if not specifically mentioned as furnished or installed by others, shall be furnished and installed by this contractor.

#### 1.17 TESTING AND INSPECTION

- A. Inspections required for any ordinances, regulations, instructions, laws, rules, standards and practices that require any work to be inspected or tested shall be performed. Contractor shall give Owner, Architect and Engineer timely notice of readiness of work for inspection or testing and the date fixed for said inspection or testing.
- B. Third-Party Agency must inspect completed installation and present Owner with Certificate of Inspection showing approval.
- C. Required local or municipal inspection processed and present Owner with certificate indicating approval of such governing bodies.
- D. Contractor shall submit a written report to Architect, copy to Engineer, on results of each inspection or test on system or equipment supplied. Report shall contain all pertinent information, recommendations, approvals, additional work required, etc.
- E. Tests:
  - 1. After installations are completed and before insulation is applied, walls are closed, or trenches backfilled, all portions of the installation shall be tested in accordance with the procedures described herein.
  - 2. Provide hydrostatic pressure test for storm water sanitary and vent pipe with 10' or more developed length. Test pressure shall be a minimum of 10' water column at all points except the upper most portion of the roof vent or drain terminal. Piping shall be tested in sections with approved test plugs, duration of the test shall be one hour. In addition to the pressure test described above, Contractor shall provide a flow test for each section of the plumbing drainage systems to verify that there are no blockages. All pipes must be exposed during testing unless otherwise approved by Engineer.
  - 3. Interior domestic water piping shall be tested at 125 psi pressure. Contractor shall fill piping at the beginning of working day and maintain pressure for two hours with no pressure loss. If no leaks are found, the piping shall be allowed to remain under pressure overnight and then be inspected the next morning. No insulation shall be applied to the piping until the test is complete.

#### 1.18 RECORD DOCUMENTS

- A. When required by general conditions or other Division 1 Section this Contractor shall prepare and turn over to Owner's agent record As-built documents. As-built drawings will include actual equipment location layout, service connections, ductwork and piping layouts, valve locations, etc.



- B. In all projects, contractor shall provide record drawings of all underground equipment and service runs. As-built drawings for underground work will include dimensions to actual locations finish grade elevations, and actual invert to underground structures equipment and service runs.

#### 1.19 IDENTIFICATION AND NAMEPLATES

- A. Provide engraved plastic labels screwed to equipment furnished under this contract including control panels, starters, switches, panels, etc. Labels shall have black background, white letters; minimum letter height 3/8" high, self adhesive labels or punch tape type labels are not acceptable.

#### 1.20 PENETRATIONS THRU FIRE RATED CONSTRUCTION

- A. All penetrations by this contract through rated construction shall be sealed fire safe by a UL listed approved method.
- B. All piping penetrations through walls, floors, etc. shall be sleeved.
- C. All piping penetrations through fire rated partitions, walls, floors, etc. shall be installed as follows; penetration shall be oversized 1/2" to 3/4" maximum. This contractor shall pack with fireproofing insulation, type FS cerablanket. Outside of penetrations (exposed surfaces around pipes and ductwork) shall be caulked and sealed with flame stop V, as manufactured by Flame Stop, Inc.; or an approved equal. Flame stop sealant shall be troweled smooth for finishing as required.

#### 1.21 CONFINED SPACES

- A. All work in pipe tunnels, mechanical pits, well manholes, etc. shall be performed by skilled tradesman and laborers with current certification for working in confined space. Contractor shall bear all costs to provide all safety equipment, ventilation, etc. as required by State and Federal Regulations and shall obtain all necessary permits for such work.
- B. Contractor shall submit copy of current certifications and photo I.D. of all tradesman and laborers who will be working in confined spaces on this project.

#### 1.22 COORDINATION DRAWINGS

- A. Before construction work commences, Contractors for all trades shall submit Coordination Drawings at not less than 1/4" = 1'-0" scale. Coordination Drawings are required throughout all areas for all trades. These drawings shall identify and show resolutions of trade conflicts. Mechanical Equipment Rooms shall be drawn early in the Coordination Drawing process, simultaneous with all other congested areas. Prepare Coordination Drawings as follows:
  - 1. HVAC Contractor will prepare the base plan Coordination Drawings showing all ductwork and all pertinent piping and equipment. The drawings shall be coordinated with cable tray, lighting fixtures, sprinklers, air diffusers, other

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ceiling mounted items, ceiling heights, structural work, maintenance clearances, electric code clearance, reflected ceiling plans, and other contract requirements. Reposition proposed locations of work after coordination drawing review by the Owner and the Architect. Provide adjustments to exact size, location and offsets of ducts, pipes, conduit, etc., to achieve reasonable appearance objectives. Provide these adjustments as part of Base Bid Contracts. Minor revisions need not be redrawn.

2. HVAC Contractor will provide prints and CAD drawings and submit the base plan to all major trades' Contractors.
3. Electrical, Plumbing and Fire Protection Contractors will draft location of piping and equipment on the base plan, indicating areas of conflict and suggested resolutions.

END OF SECTION 220010

## SECTION 220523 - VALVES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to work of this section.

#### 1.2 SUBMITTALS

- A. All valves other than design equipment.
- B. Operating and Maintenance Instruction Manual and Parts List.

### PART 2 - PRODUCTS

#### 2.1 VALVES

- A. General: Valves shall have following requirements:
  - 1. Working pressure stamped or cast on bodies.
  - 2. Ball valves, stem packing, serviceable without removing valve from line.
  - 3. All valves must comply with ANSI 372 for lead free plumbing products.
- B. Make
  - 1. Gate, globe and check valves: Walworth, Stockham, Milwaukee, Nibco.
  - 2. Butterfly Valves: Nibco, Milwaukee, Stockham, Watts.
  - 3. Ball valves: Nibco, Apollo, Milwaukee, Jomar.
  - 4. Balancing valves: Same as ball valves but with memory stop.
  - 5. For convenience in designating type, design, etc., certain numbers are given hereinafter as "Design Equipment."
- C. Valve Types:
  - 1. Gate Valves: (Use only where indicated)
    - a) 2" and Smaller: bronze, renewable seat, plug type, disc, union bonnet, rising stem, Class 200, screwed ends, Stockham Model #B-62.
    - b) 2-1/2" and Larger: rising stem resilient wedge, OS&Y Class 150 flanged, 200 psi, non-shock water working pressure, epoxy coated body, Stockham Model #G610; Nibco Model #F-607-RW.
  - 2. Globe Valves: (Use only where indicated)
    - a) 2" and Smaller: Bronze, renewable seat teflon disc, union bonnet, rising stem, Class 150, screwed ends, Stockham Model #B22T.
    - b) 2-1/2" and Larger: Bronze renewable seat teflon disc, rising stem, union bonnet, solder ends, Class 150, Stockham #B24T.

3. Check Valves:
  - a) 2" and Smaller: Bronze body, TFE seat and disc., silent check, screwed ends, Class 125, Nibco Model #T-480-Y-LF, conforms to MSS SP-110, ANSI 372.
  - b) 2-1/2" and Larger: Wafer style, silent check, renewable seat and disc, spring activated, globe style, LB W.O.G., Nibco Model #W-910.
4. Ball Valves:
  - a) 2" and Smaller: Bronze body 2-piece full port with chrome plated bronze ball. TFE seats and seals, 600 psi WP, W.O.G. screwed ends; Nibco Model #T-685-80-LF, conforms to MSS SP-110, ANSI 372.
5. Valves for Gauges, Instruments, etc.:
  - a) 1/4" Size: Brass bar stock for 1000 psi and 300°F; Trierice #735 Needle Valve, or approved equal.

### PART 3 - EXECUTION

#### 3.1 GENERAL

- A. Provide valves of type called for and where shown and/or specified, and where required to service equipment whether or not shown.
- B. Provide at all major building or systems sections whether or not shown.
- C. Install all valves with stems at or above horizontal positions and all swing check valves in horizontal position only.
- D. Ball valves may be used in place of gate valves for water service through 2" size at contractor's option, unless otherwise noted.
- E. Provide new valves (size to match existing) for any existing non-operational valves which are required to allow for new installations to be made.

#### 3.2 PLUMBING SYSTEM

- A. Install valves on all branch lines leaving mains and serving two fixtures or more; to isolate each piece of equipment or fixture, for future connections and where indicated.
- B. Use balancing valves on domestic water re-circulation lines.

END OF SECTION 220523

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## SECTION 220553 - PIPE IDENTIFICATION & VALVE TAGS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract including the General and Supplementary Conditions, apply to the work of this section.

#### 1.2 IDENTIFICATION

- A. Pipe Identification Markers: Furnish and install pipe identification markers on all piping installed under this contract, to consist of self-adhesive labels of black letters imprinted on color coded background indicating pipe fill and direction of flow. Lettering shall be 2" high on pipes 3" in diameter and over and 3/4" high on pipes under 3". Markers shall be applied to pipe, or to insulation in case of insulated pipes, on 15' centers, at branch take-offs and at each valve, whichever is closer.
- B. Refer to schedule below for piping system, background color and lettering color.
- C. Pipe Identification Schedule

	<u>System I.D.</u>	<u>Background</u>	<u>Lettering</u>
1.	Domestic Cold Water	Green	White
2.	Domestic Hot Water	Yellow	Black
3.	Domestic Hot Water Recirculation	Yellow	Black
4.	Sanitary Sewer	Green	White
5.	Storm Water Sewer	Green	White
6.	Natural Gas	Yellow	Black
7.	Liquefied Petroleum Gas	Yellow	Black
8.	Compressed Air	Blue	White
9.	Acid Resistant Sewer	Yellow	Black
10.	Acid Resistant Vent	Yellow	Black
11.	Sanitary Sewer Vent	Green	White
12.	Condensate Drainage	Yellow	Black
13.	Fire Protection Water	Red	White
14.	Fire Sprinkler Water	Red	White
15.	De-Ionized Water	Green	White
16.	Fuel Oil Supply & Return	Yellow	Black
17.	Non-Potable Water	Yellow	Black

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- D. Equipment Nameplates and Valve Tags: Identify each valve, control entity or piece of equipment with stamped brass or engraved plastic nameplate permanently attached by riveting, wiring, etc. Set up complete identification system in accordance with Owner's Physical Plant Department. Each drain plug or valve shall be tagged "DRAIN". Embossed and/or pressure sensitive plastic tape labels shall not be acceptable. Furnish engraved 2" x 1" black rigid laminated plastic nameplate for each motor starter to EC for mounting. Furnish framed valve chart indicating valve number, location and usage for all valves installed under this contractor.

END OF SECTION 220553

## SECTION 220715 - INSULATION

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to work of this section.

#### 1.2 SUBMITTALS

- A. Manufacturer data for all materials used in Contract.
- B. Submit schedule of insulation applications.
- C. Samples, only when requested.

#### 1.3 QUALIFICATIONS

- A. Installation of thermal insulation shall be made by competent mechanics regularly employed by and under the direct supervision of a qualified, approved insulation subcontractor.
- B. All materials shall be installed per manufacturer's written recommendations and specifications.
- C. All insulation, jackets, adhesives, and coatings, unless specifically modified, shall comply with the following:
- D. Any treatment of jackets or facings for flame and smoke safety must be permanent. Water soluble treatments prohibited.
- E. Insulation, including finishes and adhesives on the exterior surfaces of ducts, pipes, and equipment, shall have a flame spread rating of 25 or less and a smoke developed rating of 50 or less as determined by an independent testing laboratory in accordance with American Society for Testing and Materials Standard E 84, NFPA 255 and UL 723. Also, same shall comply with NFPA 90A, when installed in air plenums.
- F. Work shall not commence until building is enclosed and roofs are watertight. Obtain approval from Architects before commencing work.

### PART 2 - PRODUCTS

#### 2.1 PIPE INSULATION (RIGID TYPE)

- A. Pre-formed rigid sectional pipe covering, with factory applied jacket. Material, jacket type and thickness as specified hereinafter.
- B. Insulation Material: Fiberglass.



- C. Conductivity: Maximum thermal conductivity (k), on a flat surface, shall be 0.25 Btu/sq. ft. hr. °F/inch mean temperature.
- D. Jackets: White Kraft outer surface bonded to aluminum foil and reinforced with fiberglass yarn permanently treated for fire and smoke safety and to prevent corrosion of the foil.

## 2.2 ACCEPTABLE MANUFACTURERS

- A. Fiberglass: Johns-Manville, CGS, (Certainteed), Owens-Corning, Knauf.
- B. Adhesives: Benjamin Foster or equivalent. Benjamin Foster (BF) numbers are used, unless otherwise noted, for convenience in designating quality of adhesive.

## PART 3 - EXECUTION

### 3.1 GENERAL REQUIREMENTS

- A. "Concealed" is generally intended to mean Work within or behind various construction elements, either fixed or removable, or in crawl spaces or trenches, which are not exposed to view when project is complete.
- B. "Exposed" is generally intended to mean anything exposed to view when project is complete; as opposed to "concealed."
- C. Provide Thermal Insulation:
  - 1. Insulation is required on all piping unless otherwise indicated on Contract Documents.
  - 2. Only on clean, dry surfaces and after piping ductwork and equipment have been tested and found to be tight.
  - 3. On cold surfaces with continuous unbroken vapor seal.
  - 4. All exposed surfaces shall be white.
  - 5. Pipes individually insulated.
  - 6. Domestic cold water, hot water and hot water return piping-hanger installed around piping insulation. Provide insulation shields.
  - 7. On Sanitary drains for fixtures accessible to the disabled.
  - 8. On all roof drain bodies and storm water piping.

D. Miscellaneous:

1. Install insulation on exposed hot and cold plumbing piping to within 18" of fixture or equipment connection.
2. Insulate hot and cold piping longer than 18" located inside sink cabinets, under counters, under tables, etc.

3.2 PIPE INSULATION (RIGID TYPE)

- A. Apply insulation on all systems piping including fittings, flanges, unions, strainers, and other miscellaneous attachments installed in piping system, whether exposed or concealed, except where omitted or specified to contrary.
- B. Any piping in exterior walls, spaces, overhangs, attics, or where subject to freezing: Insulate pipe with double the thickness specified. Where in wall chases: In addition to the above, pack chase with loose glass fiber insulation.
- C. Hanger Shields: Required on all piping.
- D. Joints in Section Pipe Covering Made as follows:
1. Standard: Longitudinal laps and butt joint sealing strips cemented with BF 85-20 or Armstrong 520. May be stapled with outward clinching staples where concealed or recovered. Factory applied pressure sensitive adhesive lap seal may be used at contractor's option. Adhesive shall be in two strips -- one, applied to the longitudinal jacket and the other on the opposing jacket surface.
  2. Vapor barrier: Provide for all cold services. Longitudinal laps and 4" vapor barrier strip at butt joints shall be sealed with white BF 85-20 or Armstrong 520. Seal ends of pipe insulation at valves, flanges, and fittings and at butt joint approximately every 21' with white BF 85-20.
- E. Fittings, Valves and Flanges:
1. Concealed & Exposed: Premolded fitting covers of the same material and thickness as the adjacent pipe insulation and finished with glass cloth applied and coated with BF 30-36 "Seal-Fas".
  2. Optional: In lieu of the standard method above, the Contractor has the option of using "Zeston" methods, or Ceel-Tite System provided:
    - a) Appearance and workmanship are acceptable to the Architects.
    - b) Insulation values at least as great as specified must be maintained.
    - c) Application details and manufacturer specifications shall be followed and are hereby made a part of the Contract Documents.

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### 3.3 PIPE INSULATION MATERIALS

A. Schedule of Piping Insulation:

<u>Service</u>	<u>Material</u>	<u>Insulation Thickness</u>
Domestic Cold-Water	Glass Fiber	All sizes-1"

B. Note: Jacket material, finish, fitting covers, etc. (for all piping) shall be as specified for "exposed" and/or "concealed" application. Color shall always be white unless specifically approved otherwise.

C. Insulation Covers for Piping and Pipe Fittings: Provide PVC (Zeston) type insulation covers for all exposed insulated pipe and pipe fittings, other than Mechanical Rooms. Cover shall be fastened with a vandal resistant system and as specified.

D. Cover system shall be installed from floor to ceilings, complete. In areas where a ceiling is not present cover system shall be provided from the floor to 10' 0" above finished floor.

END OF SECTION 220715

## SECTION 221116 - PIPING SYSTEMS & ACCESSORIES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to work of this section.

#### 1.2 SUBMITTALS

- A. All items specified in this section under Part 2 - Products.

### PART 2 - PRODUCTS

#### 2.1 GENERAL

- A. All pipe and fittings new and marked with manufacturer's name; comply with applicable ASTM and ANSI Standards.
- B. All water piping fittings must comply with ANSI 372 for lead free plumbing products.

#### 2.2 COPPER PIPE AND FITTINGS

- A. Pipe: Hard temper, ASTM B-88; Type K, L, M, or DWV, as called for. Soft temper only in specific cases. Plans show copper tube sizes.
  - 1. Copper is not allowed for urinal waste.
- B. Tees, Elbows, Reducers: Wrought copper or cast bronze; solder end connections; ASTM B-62, ANSI B16.22. mechanical fittings ASTM B-88
- C. Unions and Flanges: 2" and smaller use unions, solder type, cast bronze, ground joint, 150# swp; 2-1/2" and over use flanges, cast bronze, companion type, ASME drilled, solder connection, 150 swp. Bolts shall be same as for steel pipe.
- D. Press Fittings: Bronze or copper shall conform to the material requirements of ASME B16.18 or ASME B16.22, and the performance requirements of IAPMO PS117, and ICC LC1002. Press fittings 1/2-inch thru 4-inch for use with ASTM B88 copper tube type K, L, or M and 1/2-inch up to include 1-1/4-inch annealed copper tube. Press fittings shall have either an EPDM, FKM, or HNBR sealing element and integral detection feature intended to identify un-pressed fittings. 2-1/2-inch thru 4-inch shall have a 420 stainless steel grip ring, PBT separator ring, EPDM or FKM sealing element and integral detection feature. Sealing elements shall be factory installed and shall be verified for the intended use.
  - 1. Note: Only Press fittings with EPDM sealing element that conform to NSF 61-pw shall be installed in a potable water system.

2. Acceptable Manufacturers: Veiga ProPress, ApolloPRESS or Nibco.

## 2.3 SOIL PIPE AND FITTINGS

- A. All cast iron soil pipe and fittings shall be marked with the collective trademark of the Cast Iron Soil Pipe Institute (CISPI) and be listed by NSF International.
- B. Pipe: ASTM A-74 service weight cast iron, coated.
- C. Fittings: Service weight type with neoprene gasket of same manufacturer as piping, acceptable for piping buried only in earth.
- D. No-Hub (Above Grade Only):
  1. Pipe: ASTM C-564 no-hub cast iron, coated.
  2. Fittings: Cast iron no-hub pattern with heavy-duty rubber gasket and stainless-steel clamp assembly. Mission Rubber or equal. ASTM # 1540, ASTM C564.

## 2.4 DUCTILE IRON PIPE

- A. All ductile iron pipe shall meet the latest ANSI Specification A21.51-76 thickness Class 52.
- B. Pipe shall be full lengths of 18 ft. or longer with beveled and marked ends.
- C. The class or nominal thickness, manufacturer's mark, year pipe produced and the letters D1 or Ductile shall be cast or stamped on pipe. Cast marks to be near bell portion of pipe.
- D. Pipe shall have cement mortar lining in accordance with American-Standard Association Specification ASA A21.4-80 (AWWA-C10480). Pipe shall have a coating of coal tar pitch varnish on the outside.
- E. Joint shall be a mechanical type joint. There shall be two (2) bronze wedges supplied for each joint of pipe, gasket, lubricant, retainer gland and bolts.

## 2.5 SPECIAL FITTINGS

- A. Cast Iron to Lead Pipe:
  1. Red brass ferrules and wiped joints.
  2. Caulk ferrule into cast iron hub.

- B. Copper to Steel Piping
  - 1. Cast bronze copper to iron male or female adapter with shoulder.
  - 2. Use dielectric pipe fittings where required.
- C. Steel to Cast Iron: Cast iron soil pipe connector with spigot and IPS male thread end (Manhoff fittings).
- D. No-Hub or Cast Iron: Proper adapter to piping being connected.

## 2.6 DIELECTRIC PIPE FITTINGS

- A. Tensile strength, Federal Specification WW-U-531A, union or flange design, 250 psi pressure rating, threaded or solder joint, constructed to prevent gasket from squeezing into internal opening.
- B. Make: Epco or equivalent.

## 2.7 HANGERS, INSERTS AND SUPPORTS

- A. Hangers, Inserts, Clamps, Etc.: Carpenter & Patterson, Central Iron, Elcen, Fee & Mason, Grabler and Grinnell.
- B. Hangers: Adjustable, steel clevis type, cadmium plated or galvanized except where in contact with copper piping. Copper plated or PVC coated where in contact with copper piping.
- C. Hanger Shields: Required on all piping.
- D. Spacing Schedule:

Pipe Size	Steel (ft)	Copper (ft)	No-Hub Cast Iron *	Rod Size
3/4" to 1"	12	6	Each	3/8"
1-1/4" to 1-1/2"	12	6	Horizontal	3/8"
2" to 4"	12	10	Joint	1/2"
5" and Over	12	10	5 Feet	5/8"
8"	12	10	Maximum O.C.	3/4"

\*Cast iron "No-Hub" to be supported on all sides of fittings & Joints

- E. Piping systems with material not listed in above schedule shall be supported and protected in accordance with manufacturer's recommendations and as approved.
- F. Inserts: Equal to Grinnell Fig. #281, maximum loading 1000 lbs., galvanized finish, and Fig. #285, maximum loading 400 lbs. Use approved beam clamps if possible.

G. Supports:

1. For Weights Under 1000 lbs.: Support all Contract Work with approved type "Drill-In" inserts equal to "red Head," "unistrut," beam clamps or other structurally approved support. The factor of safety shall be at least four (4). Follow manufacturer's recommendations.
2. For Weights Above 1000 lbs.: Drill through floor slabs and provide flat flush plate bolted to top of rod or provide additional "Drill-In" inserts and hangers to reduce load per hanger below 1000 lbs.
3. For Metal Decks: Drill hole through for hanger rods and imbed a bolted plate in concrete or use Phillips "Red Head" devices designed for this application. All cases must have safety factor of four (4).

H. Trapeze Hangers:

1. Use for plumbing systems only.
2. Hangers shall be supported with rod size per above schedule.
3. May be "Kindorf" or Unistrut" manufactured type or suitable angle iron or channel.
4. Securely fasten to trapeze with "U" bolt or straps, dissimilar metals shall not touch, otherwise use isolation gaskets.

2.8 PIPING ACCESSORIES

- A. Escutcheon Plates: Steel or cast iron polished chrome, split hinge type with setscrew, when used at ceiling and floor locations. Special high plates where required for extended sleeves. Chrome plated in vicinity of all fixtures. Provide escutcheons at all pipe penetrations thru ceilings, floors and walls exposed to view.

2.9 SLEEVES

- A. Standard Type: Schedule 40 black steel pipe sleeves, two pipe sizes larger than the pipe, required for all structural surfaces.
- B. Sheet metal sleeves permitted only for nonstructural surfaces and existing construction. Sheet metal sleeves shall be 18 gauge minimum and shall be properly braced to prevent collapsing.

2.10 SEALING ELEMENTS

- A. Waterproof Type: Synthetic rubber material with zinc plated bolts equal to "Link-Seal" Series 200, 300 or 400.



## 2.11 PIPING MATERIALS (PLUMBING)

### A. Water Service Piping:

1. Sizes  $\frac{1}{2}$ ,  $\frac{3}{4}$ , 1", 1  $\frac{1}{4}$ ", 1  $\frac{1}{2}$ " & 2", shall be Copper Tubing Type K, ASTN B 75, NSF 61 Listed, 160psi working pressure.
2. Sizes 3", 4", 6", & 8", shall be Ductile iron water pipe cement lined with mechanical joints. AWWA C151/AZ1.51. All pipe shall be encased in 8 mils polyethylene conforming with AWWA C105.

### B. Water Distribution Piping:

1. Copper tubing Type "L" ASTM B75, ASTM B88, ASTM B251, ASTM B 447. Lead-free soldered joints or mechanical joints.
2. Galvanized steel piping, ASTM A53, threaded joints. Provide DIE electric fittings at connections to dissimilar materials.
3. Chlorinated polyvinyl chloride (CPVC) plastic pipe and tubing. ASTM D2846, ASTM F441, ASTM F442.
4. Cross-linked polyethylene plastic tubing (PEX) ASTM F876, ASTM F877. To be used only where noted.

## PART 3 - EXECUTION

### 3.1 EQUIPMENT AND SYSTEMS

- A. All equipment and systems as shown on the drawings or specified herein shall be installed in accordance with the provisions of each applicable section of these Specifications and all local and state codes and regulations having jurisdiction.
- B. All work shall be installed in a workmanlike manner as determined by Architects.
- C. Accurately establish grade and elevation of all piping before setting sleeves. Install piping without springing or forcing (except where specifically called for), making proper allowance for expansion and anchoring. Arrange piping at equipment with necessary offsets, unions, flanges, valves, to allow for easy part removal and maintenance, as approved.
- D. Offset piping and change elevation as required to coordinate with all other trades.
- E. Avoid contact with any part of other mechanical or electrical systems.
- F. Provide adequate means of draining and venting all units, risers, circuits and systems.

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- G. Conceal all piping unless otherwise specified.
- H. Install piping and connections approximately as indicated or directed, straight, plumb, direct, parallel and close to building walls, partitions, ceiling, in general, with groups of pipes parallel to each other and close to structural members allowing for insulation and access for servicing valves, etc. Horizontal piping to be installed as high as possible without sags.
- I. Coordination with other trades: Check Contract Drawings with all others, anticipate and avoid interference with other installations. Obtain decision or approval from Architect for proposed group installation and before proceeding, and for clearances in structure and finish.
- J. Fixture branches exposed only as required for final connections.
- K. Over Electrical Equipment: Prohibited. Special cases may be permitted with approval of Architect, protecting copper drip pan.
- L. Ream pipes after cutting and clean before installing. Cap or plug equipment and pipe openings during construction. Install piping parallel with lines of building, properly spaced to provide clearance for insulation. Make all changes in direction and branch connections with approved fittings. All cleanout plugs, bushings and nipples, required for gauge and instrument installation shall be brass. Do not install valves, unions and flanges in inaccessible locations.
- M. Materials used within a system and between systems shall be consistent. If this is not possible, install approved dielectric fittings.

### 3.2 HANGERS, INSERTS AND SUPPORTS

- A. No piping shall be supported by wires, band iron, chains, or from other piping, nor by vertical expansion bolts. Support piping with individual hangers from concrete inserts, approved welded supports, or beam clamps of proper configuration and loading design requirements for each location; replace if not suitable. Follow manufacturer's safe loading recommendations. Always obtain approval.
- B. Suspend with rods of sufficient length for swing and of size as previously scheduled, using four (4) nuts per rod. Use rods and nuts having electroplated zinc or cadmium (0.005" minimum) finish.
- C. Provide additional approved structural steel members, having one coat rustproof paint, where required for proper support.
- D. Provide oversized hangers where insulation/supports must pass between pipe and hanger.
- E. Hangers, when attached to joists, shall only be placed at the top or bottom chord panel point. Only concentric type hangers are permissible; "C" type not permitted.

- F. Riser Clamps: Provide riser clamps for each riser at each floor. Allow for escutcheon plates.

### 3.3 PIPE CONNECTIONS

- A. Solder Connections: Use only 95/5 nonacid flux and clean off excess flux. Also remove excess solder from piping.
- B. Threaded Connections: For steel pipe and brass pipe. Clean out tapering threads, made up with pipe dope; screwed until tight connection. Pipe dope must be approved for application.
- C. Dielectric Pipe Fittings: Protect fittings from excessive heat.

### 3.4 SLEEVES

- A. All underground pipes and conduits, regardless of their contents, shall be provided with sleeves at the foundation wall and shall be sealed at the section of entry into the building with a material that will form a gas-proof barrier.
- B. Provide for all pipes passing through floors, walls or ceilings.
  - 1. Standard type: Provide for all piping, except as specified above.
- C. Extend 1/8" above floor in all finished areas except those with floor drains or in Penthouse; use steel pipe sleeves 2" above floor in excepted areas. Use steel pipe sleeves in all bearing walls, structural slabs, beams and all other structural surfaces, and where specifically called for.
- D. Sleeves, where installed in walls of shafts, shall be as small as practical, consistent with insulation, etc., so as to preserve fire rating of shaft walls.
- E. Fill abandoned sleeves with concrete.
- F. Where floors are membrane waterproofed, use flashing clamp device on sleeves equivalent to Josam Series 1880 "Riser Sleeve".

### 3.5 ESCUTCHEON PLATES

- A. Provide polished chrome escutcheon plates for all exposed piping passing through floors, walls or ceilings, in all rooms except Mechanical Rooms.
- B. Cut plates if necessary to fit conditions.

### 3.6 SLEEVE PACKING

- A. Tightly seal void space at all sleeves throughout building as follows:
1. Interior locations: Firmly pack with fiberglass, the space between sleeve and pipe, then neatly caulk with caulking gun and approved material.
  2. Exterior walls above grade: Use sealing element.
  3. Exterior walls below grade: Use sealing element.
  4. Cored holes: Method shall be approved or use sealing element.
  5. Fire rated, partitions and floor slabs: Use fire rated sealing elements, materials and methods.
  6. Waterproofed floors without membrane: Use Architects' approved sealing element, device or compound.
  7. Waterproofed floors with membrane: Use Architects' approved sealing element, device or compound.

### 3.7 TESTS

- A. Refer to Section 220010 for testing of plumbing systems.

### 3.8 PIPE LINE SIZING

- A. Pipe sizes indicated on Contract Documents are to be maintained. Pipe size changes made only as approved by Engineer or required by State or local codes.
- B. Where discrepancy in size occurs, the larger size shall prevail, unless otherwise directed by the Architects.

### 3.9 TRAPEZE HANGERS

- A. Use where groups of piping can be installed easily. Hangers are to be sized in accordance with loads imposed.

END OF SECTION 221116

## SECTION 221127 - WATER SUPPLY

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUBMITTALS

- A. All items specified under Part 2 - Products of this Section, including pipe and fittings.

### PART 2 - PRODUCTS

#### 2.1 WATER PIPING

- A. Refer to Section 221116 - Piping Systems and Accessories; for acceptable materials.

#### 2.2 WATER METER

- A. Water Meter manufacturer and model shall be as required by local jurisdiction. Meter shall be furnished by and installed by this Contractor.
  - 1. Meters 2" and under shall be a Disc Type.
  - 2. Meters 3" and larger shall be a Compound Type.
- B. Provide strainer on inlet side of meter equal to meter size.
- C. Provide remote reader unless otherwise directed by local jurisdiction.
- D. Provide pressure gauge upstream side of cold-water meter and on outlet side of backflow assembly and/or pressure reducing valve.

#### 2.3 DISINFECTION

- A. The Contractor shall disinfect the entire hot and cold-water system. This shall include all hot water circulation piping and connecting supply mains. Renovations to existing piping systems shall be isolated with new valves by Contractor for testing of new system only.
- B. Use the purging and disinfecting procedure proscribed by the authority having jurisdiction or, in case a method is not prescribed by that authority, the procedure described in either AWWA C651, or AWWA C652, or as described below.

- C. A chlorine solution shall be injected into and circulated through the entire hot and cold-water system. Operate all hot and cold-water faucets, flush valves, mixing valves and metering valves. Duct tape all metering valves to hold in on position. Continue flow of water from system until a determined uniform chlorine count of 50 ppm is reached. Then shut off all flow and let systems stand full.
- D. Tube test samples of hot and cold water in each fixture area every 8 hours to determine chlorine residual content.
- E. If the chlorine residual content drop is more than 10% in any 24-hour period, system must be injected with additional chlorine and Step A repeated. This shall continue until a 95% chlorine residual level remains over 24 hours.
- F. After the system test has been accepted by the Architect or Engineer, the entire system shall be drained and refilled. It is important that if the building has a septic system all water must be drained on to paved areas of parking lots. The Contractor shall install all necessary valves at low points and furnish any pumps and drain piping to accomplish this.
- G. Prior to final test, the system should be flushed through plumbing fixtures until any concentrated chlorine odor is undetectable.
- H. A final test of both hot and cold water shall be taken at the furthest point of the system by a certified testing agency. Full bacteria and metals test shall be performed to verify the water meets all potable drinking water standards.

## 2.4 BACKFLOW PROTECTION

- A. BFP-1 Double Check Valve Assembly:
  - 1. Approved for use by New York State Department of Health.
  - 2. All bronze body construction (over 4" cast iron body), stainless steel bolts and stainless-steel internal parts.
  - 3. Easily removed from line for service.
  - 4. Test cocks, strainer and isolation valves.
  - 5. Similar to Watts Series 709, Lawler RZ.
  - 6. Contractor shall be responsible for all permits and tests as required by the Department of Health.

## PART 3 - EXECUTION

### 3.1 WATER SERVICE

- A. Primary shut-off for water service entrance shall be:
  - 1. Service size 2" and under shall be a full-port ball valve.
  - 2. Service size 3" and over shall be a gate valve.

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3. Butterfly valves shall not be used on the domestic water service.

### 3.2 WATER METER

- A. Provide adequate straight run of pipe upstream of meter. Refer to manufacturer's written installation requirements.

### 3.3 BACKFLOW PREVENTER

- A. Mount above floor in accessible location. Minimum clearance above floor shall be 18".

### 3.4 PIPING

- A. Run slightly off level to low points; provide drain valves.
- B. Provide shock arrestors where shown or specified.
- C. Branch headers serving flush valves; full size as shown.
- D. Provide dielectric pipe fittings when connecting to piping system of dissimilar metals.
- E. Supply piping to all fixtures, faucets and flush valves shall be anchored to prevent movement.
- F. Provide and install necessary wood or metal backing material to secure piping, flush valves, faucets, etc.
- G. Piping shall be run to avoid all electrical panels and equipment.

END OF SECTION 221127



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## SECTION 221130 - EQUIPMENT

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUBMITTALS

- A. All items specified in this Section under Part 2 - Products.

### PART 2 - PRODUCTS

#### 2.1 HOSE BIBBS

- A. Provide Watt's # HB-1 with built in vacuum breaker.

#### 2.2 SHOCK ARRESTORS

- A. Provide where shown on drawings and of size indicated.
- B. Must meet or exceed requirements of the Plumbing and Drainage Institute Standard - PDI-WH 201.
- C. Make: Watt's LF 15 MZ, male I.P.S. inlet.

#### 2.3 THERMOMETERS

- A. Provide where shown on drawings or called for in specifications. See Specification Section 220519 - Meters and Gauges, for requirements.

#### 2.4 PRESSURE GAUGES

- A. Provide where shown on drawings or called for in specifications, and where water service enters building. See Specification Section 220519 - Meters and Gauges, for requirements.

### PART 3 - EXECUTION

#### 3.1 SHOCK ARRESTORS

- A. Install in vertical position and at accessible locations for maintenance.

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### 3.2 CLEANOUTS

- A. Install cleanouts out of traffic patterns; provide offset from unnecessary stress on basin at these points.
- B. Do not locate under doors or under equipment, or behind cabinets.

END OF SECTION 221130

## SECTION 221217 - SWIMMING POOL FILTRATION, RECIRCULATION, CONTROL & CHEMICAL EQUIPMENT

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to work of this section.

#### 1.2 SUBMITTALS

- A. Provide detailed shop drawings of the items of equipment being provided, indicating the dimensions, material of the filter tanks, exterior face piping, internal manifolds and laterals and filter media.
- B. Provide a complete set of operating instructions, embracing the operational functions and recurring maintenance processes involved in connection with the complete filtration system.

#### 1.3 DESCRIPTION OF WORK

- A. Provide all swimming pool equipment, and necessary work to completely install the specified equipment as indicated on the drawings and specified herein, including:
  - 1. Chlorine and pH feed system.
  - 2. Specialty start-up chemicals.
  - 3. Start-up service.
  - 4. Warranties.

#### 1.4 RELATED SECTIONS

- A. Division 23 - Plumbing
- B. Division 26 - Electrical

#### 1.5 QUALITY ASSURANCE

- A. Due to the specialized nature of the specified work and products, all Contractors shall be required to have a minimum of (5) years of operating history. The equipment described herein shall be products of a manufacturer regularly engaged in the fabrication of filtration and recirculating systems for at least (15) years and shall be a professional engineering corporation.
- B. As assurance that each item of apparatus is properly sized to perform in conjunction with each other, the owner requires bidders to use the filter manufacturer as a single source of supply for the items of equipment as listed and described herewith.

## 1.6 GUARANTEE

- A. The equipment supplier shall guarantee that the equipment to be furnished is of the correct capacity, that the various parts are designed to operate correctly and in conjunction with each other, that if the installation is made in accordance with the project drawings and operated in accordance with the suppliers instructions, the system will perform the prescribed functions correctly, the water entering the pool will be clear, bright, free from suspended matter visible to the unaided eye, and will be sanitary to the satisfaction of all authorities having jurisdiction.

## PART 2 - PRODUCTS

### 2.1 AUTOMATIC CHEMICAL CONTROLLER

- A. CCU-1: Siemens Impact # 4 Chemical Controller. Per owner's request, this is the preferred system due to local service representation.

### 2.2 SODIUM HYPER CHLORIDE DRY FEED SYSTEM

- A. CHS-1: Pulsar III system. Supply with (2) 50lb pails for start up purposes.

### 2.3 PH CONTROL

- A. MAS-1: LMI Muriatic Acid Feed Pump with 50 Gallon Polyethylene, Double Walled storage tank

### 2.4 TEST KIT

- A. Provide (1) Taylor No. 1765-2 tester for measuring FAC chlorine residuals and pH. Include sufficient reagents for one year's testing. Furnish in carrying case with separate slides for pH and chlorine. Also provide WB test with extra reagents and a Dalite slide mount for viewing.

### 2.5 SPECIALTY START-UP CHEMICALS

- A. The contractor is responsible to supply and dose the pool with all necessary chemicals to balance the water to the following levels:
  - 1. Ph 7.5 - 7.6
  - 2. Total Alkalinity 80 - 120 ppm
  - 3. Calcium Hardness 250 - 350 ppm
- B. All chemicals shall be USP listed and mineral free.
- C. Initial shock treatment shall be performed with a non-chlorine oxidant and shall be administered prior to balancing.

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- D. Chemicals necessary to prevent staining and discoloration (sequestering agents) shall be introduced prior to shock treatment.
- E. All chemical tests must meet owner satisfaction and filter manufacturers standards. Contractor shall obtain owner approval prior to any chemical dosage.

### PART 3 - EXECUTION

#### 3.1 PIPING AND VALVES

- A. All chemical feed equipment, tubing, piping and chemical control sample streams shall be installed in strict accordance to the manufacturers installation instructions.

#### 3.2 SYSTEM OPERATION INSTRUCTION AND ENGINEERING SERVICES

- A. An authorized representative of the equipment supplier shall provide the supervisory services of an installation engineer for at least one day to fully instruct designated personnel in the operation, care and maintenance of the entire purifying, sterilizing and recirculating system.
- B. All system components shall be operational prior to scheduling operator training.

END OF SECTION 221217

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DIVISION 23  
HVAC SPECIFICATIONS (HC)  
INDEX

SECTION	TITLE
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230523	PIPING SYSTEM VALVES
230593	TESTING, ADJUSTING AND BALANCING
230713	DUCTWORK INSULATION
230719	PIPING INSULATION
230993	TEMPERATURE CONTROLS
232100	WATER SYSTEM SPECIALTIES & EQUIPMENT
232110	STEAM SYSTEM SPECIALTIES & EQUIPMENT
232113	PIPING SYSTEMS & ACCESSORIES
232115	INITIAL FILL & CLEANING (ALL HYDRONIC SYSTEMS)
233300	DUCTWORK ACCESSORIES
233310	DUCTWORK HANGERS AND SUPPORTS
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## SECTION 230005 - HVAC WORK GENERAL

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract including all General Conditions, Supplementary Conditions, Division 1 specification sections as well as Information to Bidders requirements that are included in the project documents, apply to the work of this Contract.

#### 1.2 ALLOWANCES, ALTERNATES AND UNIT PRICES

- A. Refer to Division 1 specifications for allowances, alternates and unit prices required as part of this Contract.

#### 1.3 INTENT

- A. The intent of the drawings and these specifications is to provide all systems complete and operative. Whether indicated on the drawings and/or included in the specification or not, provide all materials, equipment and labor usually furnished with such systems.

#### 1.4 DEFINITIONS

- A. Provide: Furnish, install and connect.
- B. Furnish: Supply material only.
- C. EXR: Existing to remain.
- D. MC: Mechanical Contractor-note MC and HC (Heating Contractor) shall be interchangeable for all drawings and specifications.

#### 1.5 SCOPE OF WORK

- A. This Contractor shall do all work, furnish all labor, tools and equipment necessary for all the HVAC work all as indicated on the drawings and specified herein.
  - 1. Removal of existing equipment as indicated on drawings.
  - 2. All cutting and patching.
  - 3. Air cooled condenser units; steel frames for units provided by steel fabricator.
  - 4. Unit ventilators.
  - 5. Self contained unit vents.
  - 6. Exhaust fans, complete with accessories, curbs, etc., flashing by GC.



7. Crawl space dehumidifiers, complete with piping and accessories and supports.
8. Pipe fittings, hangers, supports, valves and piping specialties as required to make complete heating system.
9. Refrigeration piping, fittings, valves, etc.
10. All diffusers, registers and grilles complete with accessories.
11. All louvers provided by Contractor.
12. Galvanized ductwork (or specialty ductwork where noted) to serve supply, relief and exhaust systems complete with control devices and accessories, unless otherwise noted.
13. Insulation both thermal and acoustical to serve piping, ductwork systems, equipment, housings and accessories.
14. Temperature control system complete to serve all HVAC equipment and systems complete with accessories.
15. Testing and balancing of all heating, ventilating and air conditioning installations to include sheetmetal ductwork, air conditioning supply and exhaust systems, heating and cooling systems and temperature control system. Balancing shall include NC ratings as described herein.
16. Special testing and balancing requirements for existing HVAC equipment to include repair of existing equipment as required to obtain air flow as indicated on drawings.
17. Servicing of heating, ventilating and air conditioning facilities are required for guarantee period. Provide competent factory trained men at site for purpose of instructing Owner's personnel in proper operation and maintenance of all new HVAC facilities.
18. Concrete pads, 4" high unless otherwise noted on drawings, to provide housekeeping elevation for boilers, pumps and such other equipment as shown on drawings that require a pad. Coordinate installation of pads with GC to insure secure bonding of pads to floor structure. This contractor shall be responsible for installation of pads.
19. Temporary heat as required by Architect's Special Conditions.

#### 1.6 TEMPORARY SERVICES

- A. Temporary Heat: In accordance with Architect's specifications and/or conditions, contractor shall have the permanent heating system capable of providing heat to the new work areas when required. The term heating system shall include all work or components necessary to operate heating system. For temporary usage, it is not required that this work be in a finished condition, i.e., covers in place, etc. Cost of fuel consumed for temporary heat from permanent systems only shall be paid by owner.

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- B. The use of permanent system will be allowed only if the building is fully enclosed with no construction dust to clog heating/cooling coils, heat recovery components, fans, etc.
- C. At the completion of work, Contractor shall turn over to the Owner all equipment used for temporary heat in a new, as purchased condition. Contractor shall replace filters with new ones, clean all components which shall include: unit casings, ductwork, grilles, diffusers, etc., re-lubricate all moving parts, replace belts if required and perform any other work necessary (as determined by Architect and Engineer) to put equipment in a "new" condition.
- D. Contractor shall take all measures necessary to insure that dust, dirt, or debris does not enter air systems while in operation for temporary heat and shall change filters as often as necessary. Under no circumstances shall air handlers be allowed to operate with no filter in place. All duct in the work area shall be sealed so no dust or debris will enter duct.

#### 1.7 CONTINUITY OF UTILITY SERVICES

- A. It is of paramount importance that each utility service operate continuously and without interruption. Whenever this contractor plans to make changes or alterations to any existing utility service, such plans shall result in no or minimum service interruption or inconvenience to Owner. This contractor shall plan and schedule any change or alteration to an existing utility service with Architect and Owner. Such planning, timing, and/or scheduling shall be approved by both these parties.

#### 1.8 CODES AND STANDARDS

- A. All materials, equipment, and installations by this contract shall be in accordance with the latest editions of the following applicable requirements:
  - 1. 2020 New York State Building Code, including all applicable amendments supplements to the following:
    - a) 2020 International Building Code
    - b) 2020 International Existing Building Code
    - c) 2020 International Fire Code
    - d) 2020 International Plumbing Code
    - e) 2020 International Mechanical Code
    - f) 2020 International Fuel Gas Code
  - 2. 2020 Supplement to the New York State Energy Conservation Construction Code including all applicable amendments to the following:
    - a) 2020 International Energy Conservation Code
    - b) 2013 ASHRAE 90.1
  - 3. 2020 Uniform Code Supplement (May 12, 2020)
  - 4. New York State Department of Environmental Conservation.
  - 5. Conform to requirements of NEMA.
  - 6. Bear label of Underwriters Laboratories, Inc.

7. National Electrical Code NFPA Article 70, latest edition.
8. New York State Health Code.
9. Local Utility Standards.
10. Local Municipal and/or city standards.
11. ASHRAE Standard 15.
12. Conform with applicable requirements of ASTM - Regulations and Standards for Pipe and Pipe Fittings.
13. Be in accordance with USAS - Code for Pressure Piping, latest edition.
14. For external and internal duct insulations, have flame spread rating of 25 or less and smoke developed rating of 50 or less when tested in accordance with ASTM Standard E84.
15. Sheetmetal and Air Conditioning Contractor's National Association, Inc. (SMACNA), latest editions.
16. Conform with applicable requirements of Standard for the Installation of Air Conditioning and Ventilating Systems, NFPA 90A, and Code for Safety to Life from Fire in Buildings and Structures, NFPA 101.
17. Conform to requirements of ASHRAE 90.1, latest edition.
18. Be in accordance with design standards outlined in ASHRAE Handbooks, latest edition.
19. Conform to requirements of Owner's insurance carriers.

#### 1.9 SUBMITTALS & SUBMISSION REQUIREMENTS

- A. All submittals shall be in accordance with Division 1 requirements, the following requirements listed below, and also as indicated in each specification section. All submittals not complying with the listing above will be returned to the contractor without being reviewed. Rejection by Architect or Engineer of any items submitted shall require resubmittal of acceptable items.
  1. Within (20) days after receiving notice to proceed, submit to Architect for review complete descriptive dimensional data and ratings for equipment and materials proposed to be furnished and installed.
  2. All materials submitted shall clearly state the job name and specification section(s) that it applies to.

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3. Any package containing more than one piece of equipment or material shall also contain a schedule clearly listing all items in submittal. Schedule page (s) shall also indicate project name and building name.
  4. All submittals must be clearly marked using nomenclature used in this specification for proper item identification, schedule of usages, model numbers, construction materials, performance, data, etc.
  5. Projects involving multiple buildings must have the submittals separated by building. Submittals in which buildings are combined will not be accepted. (Exception: When specifically approved by engineer, basic materials may be submitted once.)
  6. The contractor shall insure that dimensions of equipment to be used conform to the space allocated for the equipment on the drawings.
  7. Submittals traced or copied from contract drawings are not acceptable and will be returned without review.
  8. In the event material and/or equipment is installed prior to obtaining approval of shop drawings, and in the sole opinion of the Owner's Agent, this material and/or equipment does not meet the specifications, the Contractor shall be liable for the removal and the replacement at no additional cost to the contract.
- B. Samples: When requested by Engineer, provide samples of both specified equipment and proposed substitutions for review by the Owner's Agent. Such equipment shall be delivered to a location designated, or erected at the job site as directed. When neither is physically possible, arrange for the Owner's Agent to visit an acceptable site where the proposed equipment can be inspected.
- C. Substitutions:
1. Submittals for equipment or materials other than as specified shall be accepted for review by the Owner's agent.
  2. Approval of substitute equipment shall be based on functional, physical and aesthetic compatibility to the equipment specified as determined by the Owner's agent and approved by the engineer.
  3. Where substitute equipment is approved, the contractor shall be responsible for, and bear the cost of any necessary changes by his trade or other trades to make the system complete and operable, including but not limited to any design fees and structural or steel changes required to implement a substituted unit.
  4. Contractor is fully responsible for providing coordination between all trades affected by equipment substitution.

5. When requested, contractor shall submit layout drawings indicating new dimensions and arrangements of substituted equipment. Layout drawings shall indicate all revisions necessary for all services affected by substitution.

#### 1.10 CUTTING AND PATCHING

- A. This contractor shall bear the cost of all cutting and patching required by and for the installation of this work. This contractor shall perform all cutting and patching unless otherwise indicated on drawings or if directed by the Architect.
- B. Patching of fire rated floors, walls, partitions, etc. shall be made using new materials equal to the fire rating of the existing.
- C. Should changes, omissions or errors in this contractor's work require cutting, patching or making alterations in any portion of new construction, such work will be performed by GC at contractor's expense.
- D. Cutting and patching of roof surfaces and structures shall only be performed by a qualified contractor, as approved by the Architect. The work of this contract shall bear the cost of above mentioned cutting and patching. This contractor shall insure that existing roof warranties remain in force.
- E. This contractor shall furnish lintels, sized to accommodate structure above opening, where cutting and patching is to be performed on load bearing walls. Contractor shall obtain written approval for all lintels prior to installation.
- F. Cutting shall be done in a manner which will not adversely affect the strength of the building. Holes and openings shall be neatly cut so as to provide a finished appearance and shall be patched around the edge where required for a finished appearance. Provide temporary bracing, shoring, etc. as required.
- G. Patching shall be structurally sound and match the existing materials and finish of adjacent materials. Patching is required in finished areas, wherever existing work is removed, at the sides of openings, etc.
- H. At the completion of the work, all evidence of alteration will be as inconspicuous as possible.

#### 1.11 FIELD INSPECTION

- A. As there are various conditions at the site which do not show on the accompanying drawings, or which are at variance with the conditions indicated on the drawings, it is important that each bidder visit the site and acquaint himself with existing conditions, and take these conditions into consideration when preparing his proposal. Each bidder shall obtain information or make any measurement desired. Lack of knowledge relative to existing conditions will not be allowed as a basis for extra compensation.

- B. This contractor and his subcontractors shall inspect existing equipment to remain prior to any of his new work in order to determine that all equipment is in good operating condition. If equipment is found to be lacking components, is inoperable, damaged, etc., contractor shall provide immediate written notice to the Owner. The Owner or his representative shall determine if any additional work is necessary and the method by which any work shall be performed.

#### 1.12 INSTRUCTION SERVICES AND MANUALS

A. Instructions:

1. Provide competent personnel to remain at the jobsite for necessary time to instruct the Owner's personnel in proper operation and maintenance of installation made by this contractor.
2. This contractor shall be responsible for notifying and instructing Owner's personnel on all equipment operations, maintenance requirements, etc. Furnish operating training session(s) for equipment listed.
3. The Owner shall be responsible for establishing an operating and maintenance program for all equipment listed.

- B. Training Session: A training session shall be held for each system and/or item listed below: (Note: For Temperature Controls refer to Temperature Control Sections for training requirements.)

Item	Description	Training Hours For Each Bldg
1.	Self contained unit vents	
2.	Dehumidifier	

C. The instruction shall include the following types of information:

1. System overview
2. Major component designation
3. System operation procedures
4. Maintenance scheduling and procedures
5. Provide a list of spare components each system would normally require

- D. Services: Provide services required, for all equipment specified under this contract, for a period of (1) year after written acceptance by the Owner.

- E. Manuals: Submit (3) sets of Operation and Maintenance manuals. Each set shall contain the manufacturers' data, operating instruction parts catalog and maintenance procedures for each piece of equipment. Include normal maintenance servicing schedule to be performed by the Owner.

1. For projects containing multiple buildings, manuals shall be submitted separately for each building.

#### 1.13 PERMITS, CERTIFICATES AND FEES

- A. This Contractor shall obtain and pay for permits, certificates, fees etc. listed below and as required. Costs for permits, fees etc. shall be included in the base bid amount.
  - 1. All required applications and permits to begin work
  - 2. Certificate of inspection including Third-Party Agency.
  - 3. All municipal connection charges
  - 4. All local utility charges (power, telephone, cable, etc.)
  - 5. Fees and charges shall be obtained directly from the respective authority having jurisdiction
  - 6. Fees and charges for hazardous waste hauling as required by DOT, DEC, etc.

#### 1.14 REMOVAL, DISPOSAL AND HAZARDOUS MATERIALS

- A. All removed equipment shall be removed from the site and properly disposed of.
- B. All hazardous materials must be disposed of in compliance with ENCON and all other regulatory agencies. The contractor shall provide the owner with written chain of custody reports and final destination of disposal.
- C. The Owner may wish to keep certain equipment, therefore, check with Owner before removals to determine what may be salvageable.
- D. Unless otherwise noted, all equipment to be removed shall have all accessories and supports removed with it, whether indicated or not. In addition, any refrigeration containing equipment that is shown for removal shall have all refrigerant evacuated from the system and properly disposed of and all refrigerant piping removed from the site.

#### 1.15 GUARANTEE

- A. Contractor shall guarantee all work furnished through this contract including work performed by sub-contractors, for a period of (1) year (unless otherwise noted), from the date of final acceptance. Contractor agrees to repair or replace any defective work or materials at no additional cost to the Owner. Contractor shall also pay for any damage to other work resulting from repairs to defects. Contractor shall furnish written guarantees to the Owner's agent in accordance with the general conditions.

#### 1.16 INSTALLATION

- A. This contractor shall coordinate scheduling and installation of work with other contractors, sub-contractors and other trades. The contractor is also required to coordinate all work with owner supplied materials, direct contracts, and normal building operations, if any.
- B. All finished work shall be neat and workmanlike. All work of a special nature shall be performed by skilled and qualified workmen who can present credentials showing experience in said trade. New systems shall be delivered to Owner complete in perfect working order, tested and balanced in full accordance with plans and specifications. Existing systems shall function in same manner as before this work was performed. Any malfunctions which arise in existing systems as a result of demolition or alteration of parts of such systems shall be corrected.



- C. Layout of equipment, accessories and piping systems in plan is generally diagrammatic unless specifically dimensioned or detailed. Check project drawings and existing site conditions before installing work for interference's as governed by structural or other conditions. Owner reserves the right to make reasonable changes in location of equipment, accessories or piping systems prior to "roughing-in" without involving additional expense. Exact dimensions shown upon plans will be subject to verification and confirmation of exact conditions at site at time of construction. "Plus or minus" dimensions are shown upon drawing as a guide only. Exact surrounding conditions are governed by final equipment selection and/or other like details.
- D. Furnish all new equipment and materials as described herein. Any material, operation, method or device mentioned, listed or noted within this specification, if not specifically mentioned as furnished or installed by others, shall be furnished and installed by this contractor.

#### 1.17 STORAGE OF MATERIALS

- A. For all ductwork, piping and insulation brought to the jobsite, it shall be protected from all environmental elements. This shall include, but not limited to, water, dust, chemicals and other hazardous materials. It shall be stored within a protected area in the building.
- B. All ductwork onsite shall have a wrap on it to prevent the duct from having any dust, debris or other hazardous materials from becoming adhered to the interior of the duct. No duct may be stored where it could be rained on. Also refer to section 233330, low velocity ductwork, for additional information.
- C. All insulation on the jobsite will be stored in an area that will protect it from weather damage.

#### 1.18 START UP

- A. A start up shall be performed for all new HVAC equipment (HVAC equipment shall be defined as any HVAC unit that requires power or a temperature controls connection). The manufacturers representative will be onsite and unit operation will be verified, including but not limited to air flow, heating and cooling setpoints are attained and unit functions within manufacturers parameters. A written report shall be furnished to the architect.

#### 1.19 TESTING AND INSPECTION

- A. Inspections required for any ordinances, regulations, instructions, laws, rules, standards and practices that require any work to be inspected or tested shall be performed. Contractor shall give Owner, Architect and Engineer timely notice of readiness of work for inspection or testing and the date fixed for said inspection or testing.
- B. Third-Party Agency must inspect completed installation and present Owner with Certificate of Inspection showing approval.
- C. Required local or municipal inspection processed and present Owner with certificate indicating approval of such governing bodies.

- D. Contractor shall submit a written report to Architect, copy to Engineer, on results of each inspection or test on system or equipment supplied. Report shall contain all pertinent information, recommendations, approvals, additional work required, etc.

#### 1.20 RECORD DOCUMENTS

- A. When required by general conditions or other Division 1 Section, this Contractor shall prepare and turn over to Owner's agent record As-built documents. As-built drawings will include actual equipment location layout, service connections, ductwork and piping layouts, valve locations, etc.
- B. In all projects, contractor shall provide record drawings of all underground equipment and service runs. As-built drawings for underground work will include dimensions to actual locations finish grade elevations, and actual invert to underground structures equipment and service runs.

#### 1.21 IDENTIFICATION AND NAMEPLATES

- A. Provide engraved plastic labels screwed to all HVAC equipment furnished under this contract including but not limited to: pumps, air handling units, rooftop units, exhaust fans, condensing units, control panels, starters, switches, panels, etc. Labels shall have black background, white letters; minimum letter height 3/8" high, self adhesive labels or punch tape type labels are not acceptable.

#### 1.22 PENETRATIONS THRU FIRE RATED CONSTRUCTION

- A. All penetrations by this contract through rated construction shall be sealed fire safe by a UL listed approved method.
- B. All piping penetrations through walls, floors, etc. shall be sleeved.
- C. All ductwork penetrations shall be furnished with trim frames.
- D. All piping and ductwork penetrations through fire rated partitions, walls, floors, etc. shall be installed as follows; penetration shall be oversized 1/2" to 3/4" maximum. This contractor shall pack with fireproofing insulation, type FS cerablanket. Outside of penetrations (exposed surfaces around pipes and ductwork) shall be caulked and sealed with flame stop V, as manufactured by Flame Stop, Inc.; or an approved equal. Flame stop sealant shall be troweled smooth for finishing as required.

#### 1.23 CONFINED SPACES

- A. All work in pipe tunnels, mechanical pits, well manholes, etc. shall be performed by skilled tradesman and laborers with current certification for working in confined space. Contractor shall bear all costs to provide all safety equipment, ventilation, etc. as required by State and Federal Regulations and shall obtain all necessary permits for such work.
- B. Contractor shall submit copy of current certifications and photo I.D. of all tradesman and laborers who will be working in confined spaces on this project.

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#### 1.24 COORDINATION

- A. Layouts of duct and piping systems shown on contract drawings are diagrammatic. Actual duct and piping layouts shall be coordinated in the field by contractor. Ductwork shop drawings shall be submitted for approval (see next section for coordination drawings). Coordinate with other trades and with existing conditions, as required for proper installation of all systems. Contractor shall verify that ductwork and piping layouts are coordinated with all other construction trades which might cause a conflict. Any changes due to systems not being properly coordinated shall be the contractor's responsibility.

END OF SECTION 230005

## SECTION 230523 - PIPING SYSTEM VALVES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUBMITTALS

- A. Schedule of valves and service.
- B. Product data for all valves.

#### 1.3 REFERENCE STANDARDS AND CODES

- A. All installations and materials shall conform to applicable 2016 New York State Building Code, and local building and plumbing codes.
- B. All installations shall conform to requirements of Owner's Insurance carriers.
- C. Refer to the latest edition and applicable sections of the following:
  - 1. Underwriters Laboratories (UL)
  - 2. American Society of Testing and Materials (ASTM)
  - 3. American National Standards Institute (ANSI)
  - 4. American Society of Mechanical Engineering (ASME)
  - 5. Code for Pressure Piping B31.9 - Building Services Piping
  - 6. American Welding Society (AWS)
  - 7. National Fire Protection Association (NFPA)
  - 8. Manufacturer's Standardization Society of the Valve and Fitting Industry (MSS)

#### 1.4 GENERAL REQUIREMENTS

- A. Ensure valves are dry and internally protected against rust and corrosion. Store valves indoors. Maintain valve temperature higher than the ambient dew point temperature. If outdoor storage is necessary, support valves off the ground or pavement in watertight enclosures.
- B. Protect valve ends against damage to threads, flange faces and weld-end preps.
- C. Do not use hand-wheels and stems as lifting or rigging points.
- D. All valves shall be same size as upstream piping, unless otherwise indicated.
- E. Furnish valves with pressure and temperature ratings as specified and required to suit system pressures and temperatures.
- F. Furnish valves with either threaded, flanged or solder-joint end connections as specified.

- G. Furnish chain wheel operators for valves 6" and larger when valve is to be mounted 8' or higher above finished floor elevations.

## PART 2 - PRODUCTS

### 2.1 VALVE SCHEDULE

- A. Note: Specialty valves specified in other sections.

	<u>Pipe Fill</u>	<u>Pipe Size</u>	<u>Valve Type</u>
1.	Heating Hot Water	Up to 2"	BV-1
2.	Heating Hot Water	2-1/2" & Over	WV-1
3.	Heating Hot Water	Up to 2"	CBV-1
4.	Heating Hot Water	2-1/2" & Over	CBV-2
5.	Heating Hot Water	Up to 2"	CKV-1
6.	Heating Hot Water	2-1/2" & Over	CKV-2
7.	Steam (below 30 psig)	Up to 2"	GV-1
8.	Steam (below 30 psig)	2-1/2" & Over	GV-2
9.	Steam Condensate	Up to 2"	BV-1
10.	Steam Condensate	2-1/2" & Over	WV-2

- B. Valve Types

- BV-1: Ball valve, size as required, sweat or threaded ends, forged bronze body, hard chrome plated ball, glass reinforced durafill seats, PTFE stem packing, 600 psi WOG non-shock, 150psi WSP for 1/4"-2", 450°F (@50psi) maximum temperature. Brass body is not acceptable and will be rejected. Series #B6000, B6001, Watts Regulator Co.; or equal.
- CBV-1: Circuit balancing valve, size as required for nominal 2 ft WG pressure drop. Y-pattern Style design and all metal parts of nonferrous, pressure die cast, nonporous Ametal copper alloy and high strength resin hand-wheel and sleeve. Provides a positive shut-off. Provision for connecting a portable differential pressure meter. Each meter connection shall have pressure/ temperature readout ports. Rubber O-ring disc to ensure positive shut-off. Valve shall provide multi-turn, 360° adjustment, digital handwheel with hidden memory feature to set the valve with precision tamper-proof setting. Model STAD, rated at 300 psig, 250°F, TA Hydronics; or equal.
- CBV-2: Circuit balancing valve, size as required for nominal 2 ft WG pressure drop. Flanged, Y-pattern Style design with ductile iron body and other metal parts of nonferrous copper alloy and high strength resin hand-wheel and sleeve. Provides a positive shut-off. Provision for connecting a portable differential pressure meter. Each meter connection shall have pressure/ temperature readout ports. Rubber O-ring disc to ensure positive shut-off. Valve shall provide multi-turn, 360° adjustment, digital handwheel with hidden memory feature to set the valve with precision tamper-proof setting. Model STAF, rated at 250 psig, 250°F, TA Hydronics; or equal.

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4. CKV-1: Check valve, bronze body, bronze disc. rated at 200 psi, non-shock for 2" and smaller. Nibco Model #T-413; or equal.
5. CKV-2: Check valve, iron body, bronze disc. rated at 200 psi, non-shock, flanged connections for 2-1/2" and larger. Nibco Model #F-918; or equal.
6. GV-1: Gate valve, size as required, Class 125, bronze body, solid wedge, traveling stem threaded ends, rated for steam, rated at 200 psig and 353 F, T-113, Nibco; or equal.
7. GV-2: Gate valve, size as required, Class 125, iron body, OS & Y, flanged ends, bronze trim, rising stem, rated for steam service, Figure #F-617, Nibco; or equal.
8. WV-1: Butterfly valve (HW) 2" – 12" size as required,. One piece cast iron **LUG** style body ANSI class 125/150, extended neck, Stainless Steel disc with polished edges, one piece stainless steel stem, triple function molded-in EPDM seat, upper and lower stem bearings, NBR (Buna) upper stem seal, bubble-tight shutoff, temperature range of -20o F to 250o F, pressure rating of 250 psi bi-directional. Keystone Figure 222; or equal.
  - a) Grooved end valve: 300 psi CWP suitable for bidirectional and dead-end service at full rated pressure. Body shall be grooved end black enamel coated ductile iron conforming to ASTM A536. Disc shall be electroless nickel plated ductile iron with blowout proof 416 stainless steel stem. Disc shall be offset from the stem centerline to allow full 360 degree seating. Seat shall be pressure responsive EPDM. Valve shall be complete with ISO flange for actuation mounting. Valve operators shall be lever handle or gear operator, available with memory stop feature, locking device, chainwheel, or supplied bare. Basis of Deign: Victaulic S/761

### PART 3 - EXECUTION

#### 3.1 GENERAL

- A. Install all valves per manufacturers recommendations.

END OF SECTION 230523

## SECTION 230593 - TESTING, ADJUSTING AND BALANCING

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General and Supplementary conditions and Division 1 Specification Sections, apply to work of this section.

#### 1.2 SUBMITTALS:

- A. Description of intended testing procedures.
- B. Blank data forms indicating all intended test data points.
- C. Written statement of coordination with sheetmetal contractor.
- D. Written statement of coordination with piping contractor.
- E. Written statement of acceptance of location and quantity of air and water balancing devices.
- F. Pre-balance information from existing systems, where required.

#### 1.3 QUALIFICATIONS

- A. Acceptable Subcontractors are:
  - 1. Member contractors of "Associated Air Balance Council".
  - 2. Member contractors of "National Environmental Balancing Bureau".
- B. Procedures and Methods: Follow written procedures published, one or more of following:
  - 1. Associated Air Balance Council (AABC).
  - 2. National Environmental Balancing Bureau (NEBB).

#### 1.4 SCOPE OF WORK

- A. Contractor shall perform testing, balancing and adjusting work on all new and existing equipment shown on plans, listed in this section and as required by applicable sections of the specification. Note: All existing equipment used in new or renovated systems is required to be tested adjusted and balanced.
- B. Note: Air side systems shall be balanced prior to water balance.
- C. Testing, adjusting and balancing is required for all of the following:
  - 1. Air Side Equipment:
    - a) Air Handling Units
    - b) Supply, Return, Exhaust and Relief Duct Systems
    - c) Terminal Equipment
    - d) Diffusers, Registers and Grilles



- 2. Hydronic Equipment:
  - a) Pumps
  - b) Air Handling Unit Coils
  - c) Terminal Equipment Coils
  - d) Piping Distribution Systems
  - e) Terminal Radiation Units

## 1.5 GENERAL REQUIREMENTS

- A. It shall be responsibility of the Contractor to place all systems in satisfactory operating condition, including providing services of approved adjusting and balancing subcontractor regularly engaged in this type of work.
- B. Furnish set of Bid Documents to subcontractor within ten (10) days after award of contract.
- C. Adjusting and balancing shall be accomplished as soon as possible after systems are complete and before Owner takes possession.
- D. All systems must conform with the following noise criteria:
  - 1. Areas shall have NC30 to 35.
- E. Initial adjustment and balancing to quantities indicated on design drawings and thereafter as required to satisfy job conditions to satisfaction of the Architects.
- F. Adjusting and balancing shall be accomplished under appropriate outdoor temperature conditions.
- G. Immediately prior to subcontractor's arrival on project:
  - 1. Adjust all balancing cocks and dampers open.
  - 2. Place all equipment in operating condition.
  - 3. Clean all strainers.
  - 4. Remove all temporary air filters and install design filters.
- H. During course of the adjusting and balancing work:
- I. Maintain qualified personnel at project at all times for system operation, trouble shooting, assistance, etc.
- J. Change pulleys and belts as required to meet system performance requirements. Adjustable sheaves shall not be operated at extreme end of adjustment. Replace adjustable sheaves with proper size to operate approximately in mid-range.
- K. Perform necessary mechanical adjustments in conjunction with balancing procedure.
- L. Replace all flow balancers in new and existing systems that cannot be manipulated to satisfy balancing requirements.

## 1.6 JOB VISIT

- A. Balancing subcontractor shall visit job prior to concealment of work and advise location of dampers, test connections, etc.; advise Architects by letter.
- B. Make any changes or additions of types, locations, etc. of balancing facilities.

## 1.7 FINAL REPORT

- A. Upon completion, all information shall be inserted in report form listing all items required by specifications. Entire report shall be typewritten and shall be submitted to Architect and Engineer for approval. Results shall be guaranteed. Provide (3) hard copies and electronically submit to architect.
- B. Complete balancing analysis on all individual equipment and systems as specified shall be included in report.
- C. Contractor shall be subject to recall to site to verify report information before approval of report by Architects.
- D. Record action taken to adjust all systems to meet design specifications.
- E. Report on condition of installations (i.e. - complete/inoperative etc.)
- F. Final reports which do not contain all data required by this section will be rejected. Contractor will be required to retest and resubmit for all applicable systems with missing information.

## PART 2 - PRODUCTS

### 2.1 GENERAL REQUIREMENTS

- A. Provide all tools, ladders, recording meters, gauges, thermometers, velometers, anemometers, Pitot tubes, inclined gauge manometers, magnehelic gauges, amprobes, voltmeters, psychrometers, tachometers, etc. required to execute the work. Instruments used shall be accurately calibrated.

- 1. **NOTE: IF VFD IS PROVIDED, CONTRACTOR SHALL USE VFD FOR BALANCING OF AIR OR HYDRONIC EQUIPMENT. SYSTEM TO BE BALANCED WITH TDV COMPLETELY OPEN.**

## PART 3 - EXECUTION

### 3.1 AIR AND HYDRONIC SYSTEMS

- A. Preparation:
  - 1. Examine bid documents and notify Architects of any questions regarding balancing, within 30 days after receipt of bid.

2. The balancing subcontractor shall review sheetmetal shop drawings and mark the location of all required balancing dampers before duct fabrication.
3. Written notice of coordination between Contractor and balancing contractor to be submitted to Architect and Engineer.

B. Requirements for Air-Side Testing, Adjusting & Balancing:

1. Air Handling Equipment:
  - a) Record all drive information (i.e. - sheave type, belt size, motor data).
  - b) Test and adjust fan rpm to design requirements.
  - c) Record RPM and final sheave position.
  - d) Test and record motor no load, and full load amperes, and determine operating brake horsepower.
  - e) Test and record inlet and discharge static pressures.
  - f) Test, adjust and record SA, RA, OA and relief air flows for design recirculated air cfm.
  - g) Test, adjust and record SA, RA, OA and relief air flows for full design outside air cfm. Make special effort to test and record total relief cfm air.
  - h) Test and record entering and leaving air temperatures. (D.B. heating and cooling)
  - i) Test and record equipment sound levels in closest occupied space.
2. Ductwork & Air Distribution Systems:
  - a) Adjust all main supply, exhaust and return air ducts to proper design cfm, supply, exhaust, return and relief.
  - b) Test and adjust each diffuser, grille, and register to within 10% of design requirements.
  - c) After grilles, diffusers and registers are set at final CFM, check and record sound levels at occupant level at all locations.
  - d) Each grille, diffuser, and register shall be identified as to location and area.
  - e) Size, type and manufacturer of diffusers, grilles and registers, and all tested equipment shall be identified and listed; manufacturer's ratings on all equipment shall be used to make required calculations.

- f) Readings and tests of diffusers, grilles and registers shall include required fpm velocity and test resultant velocity, required cfm and test resultant cfm after adjustments.

3. Terminal Units:

- a) Adjust terminal units to cfm.

4. Fans (Supply & Exhaust):

- a) Record all drive information (i.e. - sheave type, belts, size, motor data).
- b) Test and adjust fan rpm to design requirements.
- c) Record cfm, rpm and final sheave position.
- d) Test and record motor no load and full load amperes and determine operating brake horsepower.
- e) Test and record inlet and discharge static pressures.
- f) In cooperation with control manufacturer's representative, make mechanical adjustments of automatically operated dampers to operate as specified, indicated, and/or noted; subcontractor shall check these damper control operations for proper calibrations and list those requiring adjustment by control installers.
- g) All diffusers, grilles and registers shall have air patterns adjusted to minimize drafts in all areas.
- h) A record of all final settings shall be made, preferably at each piece of equipment by an appropriate approved mark or if necessary by description on the report schedule.
- i) Record all space temperatures. If space temperatures vary more than 2°F from thermostat setting readjust air flows to obtain proper temperature.

C. Requirements for Water Systems Testing, Adjusting & Balancing:

1. Initial Procedure:

- a) Examine bid documents and notify Architects of any questions regarding balancing, within 30 days after receipt of bids.
- b) Air systems shall be examined first.
- c) Open all manual valves to full open position; close coil bypass stop valves; set automatic control valves to full coil flow.
- d) Examine water in system and determine if water has been treated and cleaned.

- e) Check expansion tank and/or compression tanks to determine if they are not air bound or water logged and system is full of water and a proper minimum fill pressure.
  - f) Check all air vents at high points of water systems and determine if they are installed and operating freely.
  - g) Balance terminal units furthest from pumps, work towards pumps. Final balance pump flow control valve(s) last.
2. Piping Distribution System:
- a) Test and adjust all flow control devices.
  - b) Record final settings and distribution gpm.
  - c) Test and record pressure on non adjustable flow control valves. Verify pressure is within control range on valve.

### 3.2 STEAM SYSTEMS

#### A. Preparation:

- 1. Examine bid documents and notify Architects of any questions regarding balancing, within 30 days after receipt of bids.
- 2. Air systems shall be balanced first.

#### B. Initial Procedure:

- 1. Open all manual valves to full open position; close coil bypass stop valves; set automatic control valves to full coil flow. Examine steam in system and determine if desired flow is attainable.
- 2. Set all temperature controls so all coils are calling for full flow.
- 3. Check operation of any automatic bypass or diverting valves.
- 4. Check all steam traps and determine they are installed and operating freely.

#### C. Flow Adjustments:

- 1. Check steam temperatures at outlet side of heating coils; Note: drop of temperature from source.
- 2. Upon completion of readings and adjustment at coils, mark all settings and record data. Show on schematic sketch form wherever practical.
- 3. Fin radiation balancing valves shall be set by temperature drop across the fin. Drop shall be consistent with drop and heat output as specified herein.

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D. Final Check:

1. After procedure is complete, thoroughly clean all strainers, dirt pockets, traps, etc.

END OF SECTION 230593

## SECTION 230713 - DUCTWORK INSULATION

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

#### 1.2 WORK INCLUDED

- A. Insulate all ducts and as required by contract documents.

#### 1.3 REFERENCES

- A. Test standards and reports for evaluating and rating performance of fire rated shaft enclosures and zero inch clearance ratings for duct wrap systems for compliance to Code.
  - 1. ISO 6944-1985, 'Fire Resistive Tests - Ventilation Ducts'.
  - 2. ASTM E 2336, 'Standard Test Methods for Fire Resistive Grease Duct Enclosure Systems'.
  - 3. ASTM E 814 (UL1479), 'Fire Tests of Through-Penetration Fire Stops Standard'.
  - 4. ASTM E 84, 'Standard Test Method for Surface Burning Characteristics of Building Materials'.
  - 5. ASTM C 1338, 'Fungi Resistance of Insulation Materials and Facings Standard'.
  - 6. NFPA 96 'Standard for Ventilation Control & Fire Protection of Commercial Cooking Operations'.

#### 1.4 SUBMITTALS

- A. Manufacturer data for all materials used in contract. Submit schedule of insulation applications.



## PART 2 - PRODUCTS

### 2.1 DUCTWORK INSULATION

A. The following is a schedule for ductwork insulation:

**NOTE: IF A CONDITION IS NOT LISTED BELOW, IT SHALL BE INSULATED WITH 2" RB.**

	<u>Duct System &amp; Location</u>	<u>Type</u>	<u>Thickness</u>	<u>Notes</u>
1.	Outside Air, Relief Air, and Exhaust Air Ducts & Plenum Exposed to Air at Outside Ambient Temperatures (For All Air Handling and Energy Recovery Units), Energy Recovery Exhaust:			
	a) Concealed Spaces	FB	3"	(2)
	b) Exposed Spaces	RB	2"	(1)
2.	Supply & Return Duct:			
	a) Concealed Spaces	FB	2"	(2)(4)
	b) Exposed Spaces	RB	2"	(1)(4)
3.	Return Duct within a plenum ceiling	NONE		(9)
4.	Exhaust Fan Ductwork	NONE		(5)
	a) Between the backdraft or mechanical damper and the space (ductwork having room conditioned ductwork), no insulation is required. All other exhaust ductwork (or if there is no damper present) shall be insulated as outside air ductwork.			
5.	Crawlspace	FB	2"	(2)(3)

#### Schedule Notes:

- (1) Weld pins with tapered joints.
- (2) Stapled edge with mechanical fasteners on ducts over 24" wide.
- (3) Provide insulation whether duct is lined or not
- (4) Ducts with internal liner do not require additional insulation unless otherwise noted. This does not apply to special 14 gauge supply duct.
- (5) Exhaust duct exposed to air at ambient temperature must meet the requirements listed above.
- (6) Provide continuous, water tight jacketing over all exterior ductwork.
- (7) For ductwork over 24" wide, pitch insulation towards sides of duct.
- (8) Pitch insulation at equipment connections away from equipment to prevent pooling and intake of water.
- (9) Exterior insulation is not required on return ductwork contained within areas with a ceiling acting as a plenum return – provide exterior insulation per schedule on return ductwork when outside of areas of plenum return.

B. Duct insulating materials shall be as follows:

1. FB: Flexible fiberglass blanket type duct wrap with factory applied foil faced jacketing reinforced with fiberglass scrim laminated to UL rated kraft. Minimum thickness = 2in. Insulation shall be 1-lb/ft<sup>3</sup> with a thermal conductivity (k-value) of 0.25 Btu x in/(hr x ft<sup>2</sup> x °F) at 75°F mean temperature when compressed. Provide with 2" stapling tab. Provide Type #100, Johns Manville; or equal.
2. RB: Factory fabricated rigid fiberglass board with factory applied white kraft facing bonded to aluminum foil, reinforced with fiberglass yarn. Minimum thickness = 2in. Temperature limit 450°F unfaced side, 3.0 lb./cu. ft. density. Thermal conductivity (k-value) of 0.23 Btu x in/(hr x ft<sup>2</sup> x °F) at 75°F mean temperature. Insulation to have a R value of 4.3 per inch. Type #814, Johns Manville; or equal.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION OF DUCTWORK INSULATION

- A. All insulation, jacketing and accessories are to be installed in strict accordance with manufacturer's instructions.
- B. Flexible Blanket Insulation (FB): Insulation shall be tightly wrapped around ductwork with all circumferential joints butted and longitudinal joints overlapped minimum of 2".
  1. Adhere insulation to metal with 4" wide strips of insulation bonding adhesive at 8" on center and, on ductwork over 24" wide, additionally secure insulation to bottom with pins welded to duct 18" on center. On circumferential joints, secure 2" flange of facing using 9/16" flare door staples applied 6" on center and tape with 3" wide foil reinforced kraft tape. On longitudinal joints, secure overlap in the same manner. All pin penetrations or punctures in facing shall be similarly taped. If single blanket or sufficient thickness is not available, install two layers of equal thickness with vapor barrier facing on outer layer only.
- C. Rigid Board Insulation (RB): Impale insulation over pins welded to duct on 21" centers, cut to extend 1/8" beyond face of board and cover with vapor seal mastic and self-locking cap. Seal all edges and butt joints with 5" wide strips of self-sealing pressure sensitive tape matching surface and finish of duct insulation.

END OF SECTION 230713

## SECTION 230719 - PIPING INSULATION

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

#### 1.2 SUBMITTALS

- A. Schedule of all materials used.
- B. Product data for all materials.

#### 1.3 WORK INCLUDED

- A. Insulate all pipes as required by contract documents.

### PART 2 - PRODUCTS

#### 2.1 PIPING INSULATION

- A. The following is a schedule for pipe insulation:

System Type	Pipe Diameter		Type	Notes
	Up To 1-1/4"	1-1/2" & Larger Insulation		
	Min. Insulation Thickness			
1. Steam (Low Pressure)	2"	3"	A	(1)(2)(3)(6)
2. Condensate	2"	3"	A	(1)(2)(3)(6)
3. Heating Hot Water	1-1/2"	2"	A	(1)(2)(3)(5)(6)
4. Refrigerant Suction, Liquid Piping and Hot Gas Bypass	1-1/2"	1-1/2"	B	(4)(5)

#### Schedule Notes:

- (1) Pre-Molded PVC Fitting Covers: Zeston, Inc.; or equal.
- (2) Self-seal lap.
- (3) Staples-outward clinching.
- (4) Foamed plastic pipe insulation adhesive; Armstrong Co.; 520 adhesive; or equal.
- (5) Exterior insulation shall be covered with jacketing as specified hereinafter.
- (6) Furnish high impact strength PVC piping jacketing, as specified hereinafter, for all exposed piping in all finished spaces.

(NOTE: 1-1/2" Insulation is required per the 2015 IECC, substitutions for lesser values of refrigeration thicknesses will not be accepted).

B. Equipment Insulation:

1. All hot water and chilled water fittings, valves, water specialties, flanges, air separators and pumps shall be insulated per this section, NO EXCEPTIONS!
2. Note: Do not run any insulation through pitch pockets.
3. Note: All insulation requirements of this section shall apply to flexible expansion joints (EXP-1).

2.2 MATERIALS FOR PIPING INSULATION

A. Pipe insulating materials shall be as follows:

1. Type A: Fiberglass pipe insulation jacketed with a reinforced vapor retarder jacket and factory applied longitudinal acrylic adhesive closure system. Insulation shall have a maximum service temperature of 850°F with a thermal conductivity (k-value) of 0.23 Btu x in/(hr x ft<sup>2</sup> x °F) at 75°F mean temperature per ASTM C518 and UL rated for maximum flamespread of 25 and smoke developed of 50. Johns Manville. Micro-Lok; or equal.
2. Type B: Closed Cell Foam Pipe Insulation. Insulation shall have a maximum service temperature of 300°F with a thermal conductivity (k-value) of 0.28 Btu x in/(hr x ft<sup>2</sup> x °F) at 75°F mean temperature per ASTM C518 and UL rated for a maximum flamespread of 25 and smoke developed of 50.
  - a) Interior use: Pre-slit foamed plastic pipe insulation with slit positioned at side and vapor sealed with adhesive on all joints. AP Armaflex Tube Insulation; or equal.
  - b) Exterior use: Composite product comprised of multi-ply PVC/aluminum laminate jacketing that is factory adhered to a closed cell flexible elastomeric foam insulation, rated for maximum flame spread 25 and smoke developed 50, with slit positioned at side. Rivet manufacturers tape along longitudinal seams. Install per manufacturers instructions. K-flex Clad AL K-Flex USA Inc., or equal.

B. High Impact Strength Jacketing: Furnish PVC jacketing and fitting covers, conforming to ASTM E-84; flame spread 25, smoke developed 50, white high gloss finish, 0.02" minimum thickness.

C. Furnish pre-molded PVC jacketing and fitting covers, lo-smoke type, as manufactured by Proto Corp.; or an approved equal.

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## PART 3 - EXECUTION

### 3.1 PIPING INSULATION INSTALLATION

#### A. Type of Insulation Listed and Methods of Installation:

1. Fiberglass Pipe Insulation (A): Butt joints sealed with 3" wide strips of jacket material with factory applied pressure sensitive adhesive, laps and strips applied over clean dry surfaces and all longitudinal and circumferential seams rubbed hard with blunt steel edge. Cover valves, fittings, flanges, etc. with pre-formed fiberglass fittings and premolded PVC plastic jackets.
2. Closed Cell Foam Pipe Insulation (B): Insulate fittings, valves and flanges with mitered and fitted sections of foamed plastic pipe insulation positioned and fastened by adhesive on all joints.

#### B. Special Requirements:

1. Heating piping hangers shall be applied directly to piping. Cut-out insulation for hanger and cover with jacketing. Insulation shall be "butt-up" to hanger as tightly as possible.
2. Cooling/refrigeration piping insulation shall be continuous and have no breaks, insulation shield shall be applied between insulation and hanger.

END OF SECTION 230719

## SECTION 230993 – TEMPERATURE CONTROLS

### PART 1 – GENERAL

#### 1.1 RELATED SECTIONS

- A. The General Conditions of the Contract, Supplementary Conditions, and General Requirements are part of this specification and shall be used in conjunction with this section as part of the contract documents. Consult the above for further instructions pertaining to this work. The Contractor is bound by the provisions of Division 0 and Division 1.

#### 1.2 CONNECTION TO EXISTING CONTROL SYSTEM

- A. All new control equipment must integrate seamlessly with existing **Andover Continuum DDC** system. All new digital controllers are required to communicate fully with the existing temperature control network.
- B. All new controllers provided under this project must be connected to the existing BAS System. Extend network (including software) as required to provide a fully integrated control system.
- C. BAS System Contractor shall modify programming in host computer to accept all new equipment and I/O points.
- D. Contractor must visit site to inspect existing equipment required for operation of new systems. If existing miscellaneous equipment is not of sufficient size or is not functioning properly, contractor must include replacement or refurbishment in his bid.

#### 1.3 ACCEPTABLE MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. **Automated Control Logic**, 578 Commerce St, Thornwood, NY.
- B. If the Contractor is proposing to provide a product by a Manufacturer other than those listed above, the Contractor must, at least 10 days prior to bid opening, to obtain the approval of the Owner for the equal manufacturer, along with provided 5 references of sites where the company has performed projects to similar type.

#### 1.4 CONTROL SYSTEM DESCRIPTION

- A. Provide labor, controls materials, controls equipment and services as required for a complete BACnet **Building Automation System** (BAS), to perform the functions described in this Section. Controls System shall be Web-based and accessible either directly connected and/or through the owners IP LAN network.

- B. It is the BAS manufacturer's responsibility to provide all the design, engineering, and field coordination required to ensure all equipment sequence of operations are met as specified and the designated BAS operators have the capability of managing the building mechanical system.
- C. The BAS shall meet BACnet communication standards to ensure the system maintains "interoperability" to avoid proprietary arrangements that will make it difficult for the Owner to consider other BAS manufacturers in future projects. These open protocol communication standards are discussed in more detail later in this specification.
- D. BAS controllers shall be listed by BACnet Testing Laboratories (BTL) with appropriate classification.
- E. Direct Digital Control (DDC) technology shall be used to provide the functions necessary for control of mechanical systems and equipment on this project.
- F. The BAS shall accommodate simultaneous multiple user operation. Access to the control system data should be limited only by the security permissions of the operator role. Multiple users shall have access to all valid system data. An operator shall be able to log onto any workstation on the control system and have access to all appropriate data.
- G. The BAS manufacturer shall provide all hardware and software necessary to implement the functions and sequence of operations specified.

## 1.5 SUBMITTAL REQUIREMENTS

- A. BAS manufacturer shall provide shop drawings and manufacturers' standard specification data sheets on all hardware and software being provided for this project. No work may begin on any segment of this project until the Engineer has reviewed submittals for conformity with the plan and specifications. Five (5) copies are required. All shop drawings shall be provided to the Owner electronically once they have been approved and as-built drawings have been completed.
- B. Quantities of items submitted shall be reviewed by the Engineer. Such review shall not relieve the BAS manufacturer of furnishing quantities required based upon contract documents.
- C. Provide the Engineer with any additional information or data which is deemed necessary to determine compliance with the specifications or which is deemed valuable in documenting and understanding the system to be installed.
- D. Submit the following within 45 days of contract award:
  - 1. A complete bill of materials of equipment to be used indicating quantities, manufacturers and model numbers.
  - 2. A schedule of all control valves including the valve size, pressure drop, model number (including pattern and connections), flow, CV, body pressure rating, and location.



3. A schedule of all control dampers including damper size, pressure drop, manufacturer, and model number.
  4. Note: schedule of valves and dampers shall be submitted independently of other submittals; do not combine with other submittals.
  5. Provide all manufacturers' technical cut sheets for major system components. When technical cut sheets apply to a product series rather than a specific product, the data specifically applicable to the project shall be highlighted or clearly indicated by other means. Include:
    - a) Building Controllers
    - b) Custom Application Controllers
    - c) Application Specific Controllers
    - d) Operator Workstations
    - e) Portable Operator Terminals
    - f) Auxiliary Control Devices
  6. Room schedule including a separate line for each VAV box and/or terminal unit indicating location and address.
  7. Samples of graphic display screen types and associated menus.
  8. Provide proposed Building Automation System architectural diagram depicting various controller types, workstations, device locations, addresses, and communication cable requirements.
  9. Provide detailed termination drawings showing all required field and factory terminations, as well as terminal tie-ins to DDC controls provided by mechanical equipment manufacturers. Terminal numbers shall be clearly labeled.
  10. Provide points list showing all system objects and the proposed object names.
  11. Provide a sequence of operation for each controlled mechanical system and terminal end devices.
  12. Provide a BACnet Protocol Implementation Conformance Statement (PICS) for each BACnet system level device (i.e. Building Controller & Operator Workstations) type. This defines the points list for proper coordination of interoperability with other building systems if applicable for this project.
- E. Project Record Documents: Upon completion of installation, submit PDF of record (as-built) documents. The documents shall be submitted for approval prior to final completion and include:
1. Project Record Drawings - These shall be as-built versions of the submittal shop drawings. One set of electronic drawing files shall be provided.
  2. Testing and Commissioning Reports and Checklists signed off by trained factory (equipment manufacturers) and field (BAS) commissioning personnel.

3. Operating and Maintenance (O & M) Manuals - These shall be as-built versions of the submittal product data. In addition to the information required for the submittals, Operating & Maintenance manual shall include:
  - a) Names, address and 24-hour/7-day per week telephone numbers of Contractor personnel managing and installing equipment, along with service personnel responsible for supporting the ongoing warranty and services of the control system.
  - b) Procedures for operating the BAS including logging on/off, alarm management, generation of reports, trends, overrides of computer control, modification of setpoints, and other interactive system requirements.
  - c) Description of the programming language including syntax, statement descriptions, algorithms, calculations, point database creation and modification, program creation and modification, and operator use of the editor.
  - d) Explanation of how to design and install new points, new DDC controllers, and other BAS hardware.
  - e) Preventative Maintenance and calibration procedures; hardware troubleshooting; and hardware repair and/or replacement procedures.
  - f) Documentation of all software program logic created for Custom Programmable Controllers including the overall point database. Provide one set of magnetic media containing files of the software and point database.
  - g) One set of electronic media containing files of all operator color graphic screens for the project.
  - h) A list of recommended spare parts including pricing, manufacturer, supplier, and part numbers.
  - i) Documentation, installation, and maintenance information for all third party hardware/software products provided including personal computers, printers, hubs, sensors, valves, etc.
  - j) Original issue media for all software provided, including operating systems, programming language, operator workstation software, and graphics software.
  - k) Licenses, Guarantee, and Warranty documents for all equipment and systems.

## 1.6 PRODUCTS FURNISHED BUT NOT INSTALLED UNDER THIS SECTION

### A. Section 232113 – Hydronic Piping

#### 1. Control Valves

Hamlin Design Group  
 PRJ 201 Oakside Elementary  
 PRJ 202 Uriah Hill School  
 PRJ 203 Woodside School  
 PRJ 204 Middle School

The City School District of Peekskill  
 SED 66-15-00-01-0-005-020  
 SED 66-15-00-01-0-007-014  
 SED 66-15-00-01-0-008-017  
 SED 66-15-00-01-0-014-005

2. Temperature Sensor Wells and Sockets
3. Hydronic Pressure Taps
4. Hydronic Flow Meters

B. Section 233300 – Ductwork Accessories

1. Automatic Dampers
2. Airflow Stations

1.7 DEFINITIONS

<b>Term</b>	<b>Definition</b>
UCP	Unitary Controller
ACP	Air Handler Controller
BACnet/BACnet Standard	BACnet communication requirements as defined by the latest version of ASHRAE/ANSI 135 and approved addenda.
Control Systems Server	A computer(s) that maintain(s) the systems configuration and programming database.
Controller	Intelligent stand-alone control device. Controller is a generic reference to building controllers, custom application controllers, and application specific controllers.
Direct Digital Control	Microprocessor-based control including Analog/Digital conversion and program logic.
Gateway	Bi-directional protocol translator connecting control systems that use different communication protocols.
Local Area Network	Computer or control system communications network limited to local building or campus.
Master-Slave/Token Passing (MS/TP)	Data link protocol as defined by the BACnet standard.
Point-to-Point	Serial communication as defined in the BACnet standard.
Primary Controlling LAN	High speed, peer-to-peer controller LAN connecting BCs and optionally AACs and ASCs. Refer to System Architecture below.
Protocol Implementation Conformance Statement (PICS)	A written document that identifies the particular options specified by BACnet that are implemented in a device.
Router	A device that connects two or more networks at the network layer.
Wiring	Raceway, fittings, wire, boxes and related items.

## 1.8 CODES AND STANDARDS

- A. Codes and Standards: Meet requirements of all applicable standards and codes, except when more detailed or stringent requirements are indicated by the Contract Documents, including requirements of this Section.
1. Underwriters Laboratories: Products shall be UL-916-Energy Management Systems for BAS components & ancillary equipment
  2. Underwriters Laboratories: Products shall be UL-873 Temperature Indication & Regulating Equipment.
  3. Federal Communications Commission –Part 15- Subpart J.
  4. All products shall be labeled with the appropriate approval markings. System installation shall comply with NFPA, NEMA, Local and National Standards.
  5. ASHRAE/ANSI 135-2012 (BACnet) - (System Level Devices) - Building Controllers shall conform to the listed version of the BACnet specification in order to improve interoperability with various building system manufacturers' control systems and devices.
  6. ASHRAE/ANSI 135-2012 (BACnet) - (Unit Level Devices) - Unit Controllers shall conform to the listed version of the BACnet specification in order to improve interoperability with various building system manufacturers' control systems and devices.

## 1.9 QUALITY ASSURANCE

- A. BAS Manufacturer Qualifications
1. The BAS manufacturer shall have an established business office within 100 miles of the project site and must provide 24 hours/day, 7 days/week response in the event of a customer warranty or service call.
  2. The BAS Manufacturer shall have factory trained and certified personnel providing all engineering, service, startup, and commissioning field labor for the project from their local office location. BAS manufacturer shall be able to provide training certifications for all local office personnel upon request.
  3. The BAS shall be provided by a single manufacturer and this manufacturer's equipment must consist of operator workstation software, Web-based hardware/software, Open Standard Protocol hardware/software, Custom application Programming Language, Graphical Programming Language, Building Controllers, Custom Application Controllers, and Application Specific Controllers. All other products specified herein (i.e., sensors, valves, dampers, actuators, etc.) need not be manufactured by the BAS manufacturer listed in this specification.

## 1.10 SYSTEM PERFORMANCE

### A. Performance Standards. The BAS system shall conform to the following:

1. Graphic Display. The system shall display a graphic with a minimum of 20 dynamic points. All current data shall be displayed within 10 seconds of the operator's request.
2. Graphic Refresh. The system shall update all dynamic points with current data within 10 seconds.
3. Object Command. The maximum time between the command of a binary object by the operator and the reaction by the device shall be 5 seconds. Analog objects shall start to adjust within 5 seconds.
4. Object Scan. All changes of state and change of analog values shall be transmitted over the high-speed network such that any data used or displayed at a controller or workstation will be current within the prior 10 seconds.
5. Alarm Response Time. The maximum time from when an object goes into alarm to when it is annunciated at the workstation shall not exceed 10 seconds.
6. Program Execution Frequency. Custom and standard applications shall be capable of running as often as once every 5 seconds. The Contractor shall be responsible for selecting execution times consistent with the mechanical process under control.
7. Programmable Controllers shall be able to execute DDC PID control loops at a selectable frequency from at least once every 5 seconds. The controller shall scan and update the process value and output generated by this calculation at this same frequency.
8. Multiple Alarm Annunciations. All workstations on the network shall receive alarms within 5 seconds of each other.

9. Reporting Accuracy. Table 1 lists minimum acceptable reporting accuracies for all values reported by the specified system.  
 a) Table 1: Reporting Accuracy (*applicable to the project*)

Measured Variable	Reported Accuracy
Space Temperature	±1°F
Ducted Air	±2°F
Outside Air	±2°F
Water Temperature	±1°F
Delta –T	±0.25°F
Relative Humidity	±5% RH
Water Flow	±5% of full scale
Air Flow (terminal)	±10% of reading
Air Flow (measuring stations)	±5% of reading
Air Pressure (ducts)	±0.1 "W.G.
Air Pressure (space)	±0.01 "W.G.
Water Pressure	±2% of full scale *Note 1
Electrical Power	5% of reading *Note 2
Carbon Monoxide (CO)	± 50 PPM
Carbon Dioxide (CO2)	± 50 PPM

Note 1: for both absolute and differential pressure  
 Note 2: \* not including utility supplied meters

#### 1.11 WARRANTY REQUIREMENTS

##### A. Warranty all work as follows:

1. BAS system labor and materials shall be warranted free from defects for a period of twelve (12) months after final completion acceptance by the Owner. BAS failures during the warranty period shall be adjusted, repaired, or replaced at no charge to the Owner. The BAS manufacturer shall respond to the Owner's request for warranty service within 24 hours of the initiated call and will occur during normal business hours.
2. At the end of the final start-up/testing, if equipment and systems are operating satisfactorily to the Owner and Engineer, the Owner shall sign certificates certifying that the BAS is operational and has been tested and accepted in accordance with the terms of this specification. The date of Owner's acceptance shall be the start of the warranty period.
3. Operator workstation software, project specific software, graphics, database, and firmware updates shall be provided to the Owner at no charge during the warranty period. Written authorization by the Owner must be granted prior to the installation of these updates.

4. The BAS manufacturer shall provide a web-accessible Users Network for the proposed System and give the Owner free access to question/answer forum, user tips, upgrades, and training schedules for a one year period of time correlating with the warranty period.

#### 1.12 SYSTEM MAINTENANCE

- A. Perform Building Automation System preventative maintenance and support for a period of 1 year (beginning the date of substantial completion).
  1. Make a minimum of 2 complete Building Automation System inspections, in addition to normal warranty requirements. Inspections to include:
    - a) System Review – Review the BAS to correct programming errors, failed points, points in alarm, and points that have been overridden manually.
    - b) Seasonal Control Loop Tuning – Control loops are reviewed to reflect changing seasonal conditions and/or facility heating and cooling loads.
    - c) Sequence of operation verification – Systems all verified to be operating as designed and in automatic operation. Scheduling and setpoints are reviewed and modified.
    - d) Database back-up
    - e) Operator coaching
  2. Technician shall review critical alarm log and advise owner of additional services that may be required.
  3. Technician shall provide a written report to owner after each inspection.
- B. Do not assign or transfer maintenance service to agent or subcontractor without prior written consent of owner.

#### 1.13 OWNERSHIP OF PROPRIETARY MATERIAL

- A. Project specific software and documentation shall become the owner's property upon project completion.

#### 1.14 SEQUENCE OF OPERATION

- A. Unit Shut Down
  1. All units connected to FACP shall be shut down in the event of fire. (By EC via fire alarm system).
  2. All units with low limit controllers (freezestats) shall be shut down if supply air temperature drops below 35°F. Shut down includes closing OA dampers, shut down fan, open control valve (or face damper).



3. All low limit controls shall be hard wired to break fan controls. Wiring low limit through DDC is not permitted to break fan controls. Wiring from LC-1 to DDC system is for alarm purposes only.
  4. When low limit control is activated, send auxiliary alarm signal to DDC unit controller. DDC system shall annunciate alarm condition.
  5. **All temperature control valves and dampers will be spring return and shall fail to the "Safe" position for that system.**
  6. **Bypass valve application will be size for 50% of the pump capacity of that system.**
- B. Remote Monitoring:
1. Provide all software necessary to monitor all sensors, equipment status and alarm conditions at operate workstation and local second tier controllers.
  2. Provide all software necessary to recognize, process and record alarm conditions as required by Owner.
- C. Occupied/Unoccupied Cycle:
1. Each system with DDC controls shall function as an individual D/N zone with individual event times for start/stop.
  2. Stagger initial start times to prevent simultaneous occupied cycle activation for all equipment.
  3. In unoccupied cycle, when room sensor override button is pushed, start software timer (setpoint 2 hours) to provide Day (occupied) cycle for a software selectable period of time after which system reverts to Night (unoccupied) cycle.
  4. While software timer is operating ignore additional override switch signals. System shall ignore switch signals initiated when area is in occupied cycle.
- D. Morning Warm-Up: Provide software routine to initiate morning warm-up when outdoor conditions dictate, warm-up schedule shall be adaptive (i.e. optimize energy usage). During morning warm-up for classrooms and shop areas with motion detector, the detector is overridden until room occupied temperature setpoint is reached, duration (2) hours (adjustable).
- E. Refer to drawings for unit specific sequences.

## PART 2 – PRODUCTS

### 2.1 GENERAL DESCRIPTION

- A. The Building Automation System (BAS) shall use an open BACnet architecture and DDC controllers that are certified by BACnet Testing Laboratories (BTL) with the appropriate classifications. The BAS shall be capable to integrate third-party devices and applications. The system shall be for use on the Internet, or intranets using off the shelf, industry standard technology compatible with the owner provided network.

- B. The Building Automation System (BAS) shall consist of the following:
1. BACnet Testing Laboratories Certified Controllers
  2. Portable Operator Terminal(s)
  3. Networking processing, data storage, and communications equipment
  4. Other controls components required for a complete and working BAS
- C. The Building Automation System (BAS) shall be modular in nature, and shall permit expansion of both capacity and functionality through addition of sensors, controllers, actuators, and operator devices, while reusing existing controls equipment.

## 2.2 BAS ARCHITECTURE

A. Communication Network

1. This project shall be comprised of a high speed Ethernet network utilizing BACnet/IP communications between System Controllers and Workstations. Each System Controller shall function as a BACnet Router to each unit controller providing a unique BACnet Device ID for all controllers within the system. Communications between System Controllers and sub-networks of Custom Application Controllers and/or Application Specific Controllers shall be as defined below.
2. Each System Controller shall perform communications to a network of Custom Application and Application Specific Controllers using BACnet/Zigbee (802.15.4) as defined by the Zigbee Standard.
  - a) Each communication interface shall be Zigbee Building Automation Certified product as defined by the BACnet Standard and the Zigbee Alliance.
  - b) Each System Controller shall function as a BACnet Router to each unit controller providing a unique BACnet Device ID for all controllers within the system.
  - c) Wireless equipment controllers and auxiliary control devices shall conform to:
    - (1) IEEE 802.15.4 radios to minimize risk of interference and maximize battery life, reliability, and range.
    - (2) Communication between equipment controllers shall conform to ZigBee Building Automation (ZBA) standard as BACnet tunneling devices to ensure future integration of other ZBA certified devices.
    - (3) Operating range shall be a minimum of 200 feet (60 m); open range shall be 2,500 ft. (762 m) with less than 2% packet error rate.
    - (4) To maintain robust communication, mesh networking and two-way communications shall be used to optimize the wireless network health.
    - (5) Wireless communication shall be capable of many-to-one sensors per controller to support averaging, monitoring, and multiple zone applications.
    - (6) Certifications shall include FCC CFR47 - RADIO FREQUENCY DEVICES - Section 15.247 & Subpart E.

3. Each System Controller shall perform communications to a network of Custom Application and Application Specific Controllers using BACnet/MSTP (RS485) as defined by the BACnet standard.

B. Integrator Panel:

1. The BAS System shall include appropriate hardware equipment and software to allow bi-directional data communications between the BAS and the 3<sup>rd</sup> Party manufacturers' control panels. The BAS shall receive, react to, and return information from multiple building systems, including equipment manufacturers' integral packaged controls that do not have the BACnet protocol.
2. All data required by the application shall be mapped into the BAS database, and shall be transparent to the operator.
3. Point inputs and outputs from from the third-party controllers shall have real-time interoperability with the BAS such as: Control Software, Energy Management, Custom Process Programming, Alarm Management, Historical Data and Trend Analysis, and Local Area Network Communications.

BACNET Protocol Integration:

4. The neutral protocol used between systems will be BACnet and must comply with the ASHRAE BACnet standard 135.
  5. A complete Protocol Implementation Conformance Statement (PICS) shall be provided for all BACnet system devices.
  6. The ability to command, share point object data, change of state data, and schedules between the host and BACnet systems shall be provided.
- C. The Controls Contractor shall provide all communication media, connectors, repeaters and network switches routers necessary for the high speed Ethernet communications network.

2.3 OPERATOR USER INTERFACE

- A. Furnish 1 PC based operator interface as shown on the system drawings. Each operator web interface shall be able to access all information in the system. Operator interfaces shall reside on the same dedicated high-speed IP network as the System Controller(s).
1. Each operator interface PC shall include the following:
    - a) Hardware type
      - (1) PC or Laptop
    - b. Minimum Hardware
      - (1) Pentium Core 2 DUO or better
      - (2) 4 GB RAM
      - (3) 100 GB hard drive space
    - c. Internet Browser compatibility outlined in the following sections.

B. Operator web interface

1. The operator web interface shall be accessible via a web browser without requiring any “plug-ins” (i.e. JAVA Runtime Environment (JRE), Adobe Flash).
2. The operator web interface shall support the following Internet web browsers:
  - a) Internet Explorer 11.0+
  - b) Firefox 47.0+
  - c) Chrome 51.0+
3. System Security
  - a) Each operator shall be required to login to the system with a user name and password in order to view, edit, add, or delete data.
  - b) User Profiles shall restrict the user to only the objects, applications, and system functions as assigned by the system administrator.
  - c) Each operator shall be allowed to change their user password.
  - d) The System Administrator shall be able to manage the security for all other users.
  - e) The system shall include pre-defined “roles” that allow a system administrator to quickly assign permissions to a user.
  - f) User logon/logoff attempts shall be recorded.
  - g) The system shall protect itself from unauthorized use by automatically logging off following the last keystroke. The delay time shall be user definable.
  - h) All system security data shall be stored in an encrypted format.
  - i) The system shall support Active Directory for user set-up and management.
  - j) The system shall track and record all user log-in activity and all changes done at the enterprise level including who made the change, when, what was changed, previous value and new value.
4. Database
  - a) Database Save: A system operator with the proper password clearance shall be able to archive controller back-ups on the designated Enterprise operator web interface PC.
  - b) Database Restore: The system operator shall also be able to clear a panel database and manually initiate a download of a specified database to any panel in the system.

- c) Database Limits. The system operator shall have the ability to set limits on Alarm Log, Global Point Control Log, System Log, and User Change Log to manage database size.
- 5. On-line Help and Training
  - a) Provide a context sensitive, on line help system to assist the operator in operation and configuration of the system.
  - b) On-line help shall be available for all system functions and shall provide the relevant data for each particular screen.
- 6. System Diagnostics
  - a) The system shall automatically monitor the operation of all network connections, building management panels, and controllers
  - b) The failure of any device shall be annunciated to the operators.
- 7. Customizable Navigation Tree
  - a) The Enterprise operator web interface shall include a fully customizable navigation tree that shall allow an operator to do the following:
    - (1) Move and edit any of the nodes of the tree.
    - (2) Move entire groups to any area of the tree
    - (3) Change the name of any node in the tree
    - (4) Create custom nodes for any page in the web interface including graphics, data log views, schedules, and dashboards.
    - (5) Support navigation from multi-building to single building view.
    - (6) Provide the ability to assign graphics to any node in the tree.
    - (7) Ability to create folders and assign and change hierarchy of nodes of the tree.
- 8. Equipment & Application Pages
  - a) The Enterprise operator web interface shall include standard pages for all equipment and applications. These pages shall allow an operator to obtain information relevant to the operation of the equipment and/or application, including:
    - (1) Animated Equipment Graphics for each major piece of equipment and floor plan in the System.
    - (2) Alarms relevant to the equipment or application without requiring a user to navigate to an alarm page and perform a filter.
    - (3) Historical Data (As defined in Data Log section below) for the equipment or application without requiring a user to navigate to a Data Log page and perform a filter.
    - (4) View of all custom graphical programming for supported controllers in real time.
    - (5) View and management of all points for equipment and applications.
    - (6) Support documents that have been assigned for that equipment.
    - (7) Live data view for any selected points.
    - (8) Touch friendly design for all action buttons, navigation, and spacing.

9. System Graphics. Enterprise operator web interface shall be graphically based and shall include at least one graphic per piece of equipment or occupied zone, graphics for each chilled water and hot water system, and graphics that summarize conditions on each floor of each building included in this contract. Indicate thermal comfort on floor plan summary graphics using colors to represent zone temperature relative to zone set point.
  - a) Functionality. Graphics shall allow operator to monitor system status, to view a summary of the most important data for each controlled zone or piece of equipment, to use point and-click navigation between zones or equipment, and to edit set points and other specified parameters.
  - b) Graphic imagery – graphics shall use 3D images for all standard and custom graphics. The only allowable exceptions will be photo images, maps, schematic drawings, and selected floor plans.
  - c) Animation. Graphics shall be able to animate by displaying different Image lies for changed object status.
  - d) Alarm Indication. Indicate areas or equipment in an alarm condition using color or other visual indicator.
  - e) Format. Graphics shall be saved in an industry-standard format such as BMP, JPEG, PNG, or GIF. Web-based system graphics shall be viewable on browsers compatible with World Wide Web Consortium browser standards. Web graphic format shall require no plug-in (such as HTML and JavaScript) or shall only require widely available no-cost plug-ins (such as Active-X and Macromedia Flash).
10. Custom Graphics
  - a) The operator interface shall be capable of displaying custom graphics in order to convey the status of the facility to its operators.
  - b) Graphical Navigation. The Enterprise operator web interface shall provide dynamic color graphics of building areas, systems and equipment.
  - c) Graphical Data Visualization. The Enterprise operator web interface shall support dynamic points including analog and binary values, dynamic text, static text, and animation files.
  - d) Custom background images. Custom background images shall be created with the use of commonly available graphics packages such as Adobe Photoshop. The graphics generation package shall create and modify graphics that are saved in industry standard formats such as GIF and JPEG.
11. Graphics Library. Furnish a library of standard HVAC equipment such as chillers, air handlers, terminals, fan coils, unit ventilators, rooftop units, and VAV boxes, in 3-dimensional graphic depictions. The library shall be furnished in a file format compatible with the graphics generation package program.

12. Document Support. The Enterprise operator web interface shall support the ability to import support files into a support files library.
  - a) Imported support files can include the following types of document formats: pdf, docx, xlsx, pptx, jpeg, tif, bmp, png, jpg, gif.
  - b) All imported support files can be associated directly with equipment or family types that can then be accessed directly from standard pages.
13. Manual Control and Override
  - a) Point Control. Provide a method for a user to view, override, and edit if applicable, the status of any object and property in the system. The point status shall be available by menu, on graphics or through custom programs.
  - b) Temporary Overrides. The user shall be able to perform a temporary override wherever an override is allowed, automatically removing the override after a specified period of time.
  - c) Override Owners. The system shall convey to the user the owner of each override for all priorities that an override exists.
  - d) Provide a specific icon to show timed override or operator override, when a point, unit controller or application has been overridden manually.
  - e) Global Point Control. Provide a method for a user to view, override, and edit if applicable, the status of multiple object and properties in the system. The point status shall be available by menu, on graphics or through custom programs.
14. Engineering Units
  - a) Allow for selection of the desired engineering units (i.e. Inch pound or SI) in the system.
  - b) Unit selection shall be able to be customized by locality to select the desired units for each measurement.
15. Scheduling. A user shall be able to perform the following tasks utilizing the Enterprise operator web interface:
  - a) Create a new schedule, defining the default values, events and membership.
  - b) Create expectations to a schedule for any given day.
  - c) Apply an exception that spans a single day or multiple days.
  - d) View a schedule by day, week and month.
  - e) Exception schedules and holidays shall be shown clearly on the calendar.
  - f) Modify the schedule events, members and exceptions.
  - g) Create schedules and exceptions for multiple buildings.



- h) Apply emergency schedule to multiple buildings
  - i) Drag and drop scheduling editing
  - j) Global schedule and exceptions across multiple buildings
16. Time of day scheduling
- a) Individual time schedules shall be provided for all areas and as listed below. The schedules for each area shall operate independently and shall be configured to meet the requirements of the Owner. The start time of each area shall be configured with optimum start times software functions, stop times shall follow a simple off time schedule.

Areas	Approx. Occupied Time
Office Areas	06:30 - 17:00
Classroom	07:00 - 15:00
Library	07:00 - 15:00
Toilet Room Exhaust Fans	06:00 - 20:00
Gymnasium	09:00 - 15:00
Auditorium	09:00 - 15:00
Kitchen	06:00 - 1500
Open Area	07:00 - 17:00

Note: General equipment associated with a particular area shall follow the area start/stop time schedule (i.e. – classroom general exhaust fans shall stop @ 15:00).

17. Data Logs
- a) Data Logs Definition
    - (1) The Enterprise operator web interface shall allow a user with the appropriate security permissions to define a Data Log for any data in the system.
    - (2) The Enterprise operator web interface shall allow a user to define any Data Log options as described in the Application and Control Software section.
    - (3) Data Log viewing capabilities shall include the ability to show a minimum of 5 points on a chart.
    - (4) Each data point data line shall be displayed as a unique color.
    - (5) Data points can be hidden on the display view by clicking on the point.
    - (6) The operator shall be able to specify the duration of historical data to view by scrolling, zooming, or selecting from a pull down list.
    - (7) The system shall provide a graphical trace display of the associated time stamp and value for any selected point along the x-axis.
    - (8) Operator will have the ability to show alarms and overrides on any data log view.

- b) Export Data Logs
  - (1) The Enterprise operator web interface shall allow a user to export Data Log data in CSV, xlsx or text format for use by other industry standard word processing and spreadsheet packages.

C. Central Server – Components (Provide server as required)

- 1. The central physical or virtual server shall consist of the following (minimum):
- 2. System shall utilize a server class PC, tower or rack mounted.
- 3. Two 3.0 GHz, Quad Core
- 4. 8GB, DDR266 SDRAM memory
- 5. Hard Drive 73 GB
- 6. RAID 5 (recommended)
- 7. Microsoft Windows Server 2012/2014
- 8. Microsoft SQL Server 2008/2012
- 9. No Exception Taken Framework V3.5, 4.0
- 10. TCP/IP Interface

D. The central server shall provide the following applications within the system.

- 1. Trend Log Application
  - a) The system shall automatically harvest trend logs for defined key measurements for each controlled HVAC device and HVAC application.
  - b) The automatic trend logs shall monitor these parameters for a minimum of 30 days at 15 minute intervals. The automatic trend logs shall be user adjustable.
- 2. Site Management
  - a) The system must allow for grouping of the many sites in an enterprise in a logical manner.
  - b) The system shall provide a search function to allow users to search for sites or groups of sites by name or partial names.
  - c) The system must provide the necessary means to add, remove, and manage site.
- 3. Automatic System Database Save and Restore
  - a) The central server shall store on the hard disk backup tables of data including trends, alarms, custom settings and user profiles.
  - b) The data shall be backed up once a day.
  - c) This database shall be updated whenever a change is made in the system.
  - d) The storage of this data shall be automatic and not require operator intervention.
  - e) This capability is completed through SQL scheduled automated tasks for backup and only available in full SQL, and not SQL Express.
- 4. Manual Database Save and Restore. A system operator with the proper password clearance shall be able to archive the database manually at any time.

5. System Configuration. The central server shall serve web pages as the interface for configuring the operator-level functions of the system. A user with proper security shall be able to configure the system to allow for future changes or additions.
- E. Portable Operator's Terminal P.O.T (where indicated).: (Intended for portable field diagnostic tool.) Provide laptop computer with terminal emulation software to interface with DDC panels. Computer shall be Windows platform with latest stable windows operating system (Windows 8.1) integral pointing device. Furnish unit with all interface cards, cables, and software necessary to operate with DDC communications network, and to communicate directly with unit control panels. Furnish with (2) sets interface cables. Provide Windows 8.1 software. Schedule of laptop computer requirements:

Processing Chip	Pentium N3540, 2.5 GHz
RAM Memory	4 GB
Hard Drive	500 GB 5400 RPM
Two USB	USB 2.0 Ports and 3.0 Ports
Display	15" LED True Life HD
Video	HDMI Port
Sound	Maxx Audio
LAN Comm.	Ethernet Communications Board, 3COMM; or equal
Wireless Card	3-1 Memory Card Reader

- F. Furnish the following applications software for building and energy management. All software applications shall reside and run in the system controllers. Editing of applications shall occur at the building operator interface.
1. Scheduling. Provide the capability to schedule each object or group of objects in the system based off of the owner's request. Each of these schedules shall include the capability for start, stop, optimal start, optimal stop, and night economizer actions. Each schedule may consist of up to [10] events. When a group of objects are scheduled together, provide the capability to define advances and delays for each member. Each schedule shall consist of the following:
    - a) Weekly Schedule. Provide separate schedules for each day of the week.
    - b) Exception Schedules. Provide the ability for the operator to designate any day of the year as an exception schedule. This exception schedule shall override the standard schedule for that day. Exception schedules may be defined up to a year in advance. Once an exception schedule is executed it will be discarded and replaced by the standard schedule for that day of the week.
    - c) Holiday Schedules. Provide the capability for the operator to define up to 99 special or holiday schedules. These schedules may be placed on the scheduling calendar and will be repeated each year. The operator shall be able to define the length of each holiday period.
    - d) Optimal Start. The scheduling application outlined above shall support an optimal start algorithm. This shall calculate the thermal characteristics of a zone and start the equipment prior to occupancy to achieve the desired space temperature at the specified occupancy time. The algorithm shall calculate separate sets of heating and cooling rates for zones that have been

unoccupied for less than and greater than 24 hours. Provide the ability to modify the start algorithm based on outdoor air temperature. Provide an early start limit in minutes to prevent the system from starting before an operator determined time limit.

2. Trend Log Application
  - a) Trend log data shall be sampled and stored on the System Controller panel and shall be capable of being archived to a BACnet Workstation for longer term storage.
  - b) Trend logs shall include interval, start-time, and stop-time.
  - c) Trend log intervals shall be configurable as frequently as 1 minute and as infrequently as 1 year.
3. Trend Logs
  - a) The system controller shall create trend logs for defined key performance indicators for each controlled HVAC device and HVAC application.
  - b) The trend logs shall monitor these parameters for a minimum of 7 days at 15 minute intervals. The automatic trend logs shall be user adjustable.
4. Alarm/Event Log
  - a) Any object in the system shall be configurable to generate an alarm when transitioning in and out of a normal or fault state.
  - b) Any object in the system shall allow the alarm limits, warning limits, states, and reactions to be configured for each object in the system.
  - c) An alarm/event shall be capable of triggering any of the following actions:
    - (1) Route the alarm/event to one or more alarm log
    - (2) The alarm message shall include the name of the alarm location, the device that generated the alarm, and the alarm message itself.
    - (3) Route an e-mail message to an operator(s).
    - (4) Log a data point(s) for a period of time.
    - (5) Run a custom control program.
5. Point Control. User shall have the option to set the update interval, minimum on/off time, event notification, custom programming on change of events.
6. Timed Override. A standard application shall be utilized to enable/disable temperature control when a user selects on/cancel at the zone sensor, building operator interface, or the local operator display. The amount of time that the override takes precedence will be selectable from the building operator interface.
7. Anti-Short Cycling. All binary output points shall be protected from short cycling.
8. Alarm/Event Notification:
  - a) An operator shall be notified of new alarms/events as they occur while navigating through any part of the system via an alarm icon.
  - b) The operator will have the option of selecting an audible alarm notification for all alarm classes they subscribe to.

- c) The system operator will have the option of setting specific times and days that that they will receive alarm notifications.
- d) Provide software alarm points as listed below and as required by the Owner. Contractor shall meet with the Owner to include additional alarm point annunciation as requested by the Owner.

Point	Alarm Function
Hardware	Communication Failure Hardware Failure
Space Temperature	Out of Limits ( $\pm 5^{\circ}$ from setpoint)
Duct Air Temperature	Out of Limits ( $\pm 10^{\circ}$ from setpoint)
Water Flow Switch	Loss of Flow
Air Flow Switch	Loss of Flow
Water Temperature	Out of Limits ( $\pm 10^{\circ}$ from setpoint)
Freeze Stat	Report Freeze Condition
Current Flow Switch	Loss of Current (Fan/Pump)

- 9. User Change Log. The operator shall be able to view all logged user changes in the system from any Enterprise operator web interface.
  - a) An operator shall be able to group user changes by: date, affected, date & affected, user, date & user, transaction type, date & transaction type, or sort only.
  - b) The operator will have the option of additional filtering capability of: date, transaction, type, user, affected, and details that can be used individually or in conjunction with other filters.

## 2.4 BUILDING CONTROLLERS

- A. There shall be one or more independent, standalone microprocessor based System Controllers to manage the global strategies described in Application and Control Software section.
  - 1. The System Controller shall have sufficient memory to support its operating system, database, and programming requirements.
  - 2. The controller shall provide a USB communications port for connection to a PC.
  - 3. The operating system of the Controller shall manage the input and output communications signals to allow distributed controllers to share real and virtual point information and allow central monitoring and alarms.
  - 4. All System Controllers shall have a real time clock.
  - 5. Data shall be shared between networked System Controllers.
  - 6. The System Controller shall continually check the status of its processor and memory circuits. If an abnormal operation is detected, the controller shall.
    - a) Assume a predetermined failure mode.

- b) Generate an alarm notification.
  - c) Create a retrievable file of the state of all applicable memory locations at the time of the failure.
  - d) Automatically reset the System Controller to return to a normal operating mode.
- 7. Environment. Controller hardware shall be suitable for the anticipated ambient conditions. Controller used in conditioned ambient shall be mounted in an enclosure, and shall be rated for operation at -40° C to 50° C [-40° F to 122° F].
- 8. Clock Synchronization:
  - a) All System Controllers shall be able to synchronize with a NTP server for automatic time synchronization.
  - b) All System Controllers shall be able to accept a BACnet time synchronization command for automatic time synchronization.
  - c) All System Controllers shall automatically adjust for daylight savings time if applicable.
- 9. Serviceability
  - a) Provide diagnostic LEDs for power, communications, and processor.
  - b) The System Controller shall have a display on the main board that indicates the current operating mode of the controller.
  - c) All wiring connections shall be made to field removable, modular terminal connectors.
  - d) The System controller shall utilize standard DIN mounting methods for installation and replacement.
- 10. Memory. The System Controller shall maintain all BIOS and programming information indefinitely without power to the System controller.
- 11. Immunity to power and noise. Controller shall be able to operate at 90% to 110% of nominal voltage rating and shall perform an orderly shut-down below 80% nominal voltage.
- 12. BACnet Test Labs (BTL) Listing. Each System Controller shall be listed as a Building Controller (B-BC) by the BACnet Test Labs with a minimum BACnet Protocol Revision of 14.

## 2.5 ADVANCED APPLICATION CONTROLLERS

- A. Advance Application Controllers shall be used to control all equipment or applications of medium and high complexity, including but not limited to Air Handlers, Boiler Plants and Chiller Plants.
- B. For Stand-Alone Operation of Advanced Application Controllers:
  - 1. Shall operate a schedule in a standalone application using a Real Time Clock with a 7 day power backup.
    - a) The Controller shall have a built in schedule (assessable with or without a display).
    - b) Support will be for at least 3 schedules with up to 10 events for each day of the week.
    - c) Each of the 3 schedules can be Analog, Binary or Multi-State.
    - d) The controller shall support a minimum of 25 exceptions each with up to 10 events.
- C. For ease of troubleshooting, the Controller shall support data trend logging.
  - 1. 25,000 samples minimum
  - 2. Trends shall be capable of being collected at a minimum sample rate of once every second.
  - 3. Trends shall be capable of being scheduled or triggered.
- D. To meet the sequence of operation for each application, the Controller shall use library programs provided by the controller manufacturer that are either factory loaded or downloaded with service tool to the Controller.
- E. Environment. Controller hardware shall be suitable for the anticipated ambient conditions.
  - 1. Storage conditions:
    - a) Temperature: -67°F to 203°F (-55°C to 95°C).
    - b) Humidity: Between 5% to 100% RH (non-condensing).
  - 2. Operating conditions:
    - a) Temperature: -40°F to 158°F (-40°C to 70°C)
    - b) Humidity: Between 5% to 100% RH (non-condensing).
  - 3. Controllers used indoors shall be mounted in a NEMA 1 enclosure at a minimum.
  - 4. Controllers used outdoors and/or in wet ambient shall be mounted within NEMA 4 type waterproof enclosures, and shall be rated for operation at -40° F to 158° F [-40° C to 70° C].



- F. Input/Output: The Controller shall have on board or through expansion module all I/O capable of performing all functionality needed for the application. Controls provided by the equipment manufacture must supply the required I/O for the equipment. In addition other controls must meet the following requirements.
1. Shall support flexibility in valve type, the controllers shall be capable of supporting the following valve control types: 0-10VDC, 0-5VDC, 4-20mA, 24VAC - 2 position.
  2. Shall support flexibility in sensor type, the Controller shall be capable of reading sensor input ranges of 0 to 10V, 0 to 20mA, 50ms or longer pulses, 200 to 20Kohm and RTD input.
  3. Shall support flexibility in sensor type, all Analog Outputs shall have the additional capability of being programmed to operate as Universal Inputs or Pulse Width Modulation Outputs.
  4. Shall support flexibility in sensor type, the Controller and/or expansion modules shall support dry and wetted (24VAC) binary inputs.
  5. The controller shall support pulse accumulator for connecting devices like energy meters.
  6. In order to support a wide range of devices, the Controller's binary output shall be able to drive at least 10VA each.
  7. Any unused I/O that is not needed for the functionality of the equipment shall be available to be used by custom programs on the Controller and by any other controller on the network.
  8. The Controller shall provide 24VAC and 24VDC power terminals sensors and other devices required.
  9. The Controller shall provide a dedicated static pressure input.
- G. Input/Output Expandability – The Controller shall provide the following functionality in order to meet current and future application needs:
1. For the application flexibility, the Controller shall be capable of expanding to a total of at least 100 hardware I/O terminations.
  2. Expansion I/O can be mounted up to 650 ft. (200m) from control.
  3. Expansion I/O can be added in as small as 4 point increments.
  4. To keep BACnet network traffic to a minimum, expansion I/O must communicate via an internal controller communication bus.

- H. Serviceability – The Controller shall provide the following in order to improve serviceability of the Controller.
1. Diagnostic LEDs for power/normal operation/status, BACnet communications, sensor bus communications, and binary outputs. All wiring connections shall be clearly labeled and made to be field removable.
  2. Binary and analog inputs and outputs shall use removable connectors or be connected to terminal strip external to the control box.
  3. Software service tool connection through all of the following methods: direct cable connection to the Controller, connection through another controller on BACnet link and through the Controller's zone sensor.
  4. For safety purposes, the controller shall be capable of being powered by a portable computer's USB port for the purposes of configuration, programming and testing programs so that this work can be accomplished with the power off to the associated equipment.
  5. The Controller software tool service port shall utilize standard off-the-shelf USB printer cable.
  6. Capabilities to temporarily override the BACnet point values with built-in time expiration in the Controller.
  7. To aid in service replacement, the Controller shall easily attached to standard DIN rail mounting.
  8. For future expansion, the Controller shall be capable of adding sequence of operation programming utilizing service tools software with a graphical programming interface (editing or programming in line code is not permissible).
  9. To aid in service replacement, the Controller shall allow for setting its BACnet address via controller mounted rotary switches that correspond to the numerical value of the address. (DIP switch methodologies are not allowed). Setting of the address shall be accomplished without the need of a service tool or power applied to the controller.
  10. Controller data shall be maintained through a power failure.
- I. Software Retention: All Controller operating parameters, setpoints, BIOS, and sequence of operation code must be stored in non-volatile memory in order to maintain such information for months without power.
- J. Transformer for the Controller must be rated at minimum of 115% of ASC power consumption, and shall be fused or current limiting type. 24 VAC, +/- 15% nominal, 50-60 Hz, 24 VA plus binary output loads for a maximum of 12 VA for each binary output.

K. Controller must meet the following Agency Compliance:

1. UL916 PAZX, Open Energy Management Equipment
2. UL94-5V, Flammability
3. FCC Part 15, Subpart B, Class B Limit
4. BACnet Testing Laboratory (BTL) Listed.

L. A Local Operator Touch Sensitive Display shall be provided for Central Plant and Air Handler Controllers at building locations where specified in the sequence of operations or point list.

## 2.6 APPLICATION-SPECIFIC CONTROLLERS

A. Application Specific Controllers (ASC) shall be microprocessor-based DDC controllers which, through hardware or firmware design, control specified equipment. They are not user programmable, but are customized for operation within the confines of the equipment they are designed to serve.

1. Application Specific Controller are only allowed when both the following are met.
  - a) The equipment is compressor based or boiler based.
  - b) The controller is provided by the equipment manufacturer and warrantied as part of the equipment.

B. Zone Controllers are controllers that operate equipment that control the space temperature of single zone. Examples are controllers for VAV, Fan coil, Blower Coils, Unit Ventilators, Heat Pumps, and Water Source Heat Pumps.

1. Software
  - a) To meet the sequence of operation for each zone control, the controller shall use programs developed and tested by the controller manufacturer that are either factory loaded or downloaded with service tool to the controller.
  - b) Stand-Alone Operation: Each piece of equipment specified in section "A" shall be controlled by a single controller and provide stand-alone control in the event of communication failure. In case of communications failure stand-alone operation shall use default values or last values for remote sensors read over the network such as outdoor air temperature.
  - c) For controlling ancillary devices and for flexibility to change the sequence of operation in the future, the controller shall be capable running custom programs written in a graphical programming language.
2. Environment: Controller hardware shall be suitable for the anticipated ambient conditions.
  - a) Storage: -55° to 203° F and 5 to 95% Rh, non-condensing.
  - b) Operating: -40° to 158° F and 5 to 95% Rh, non-condensing.

- c) Controllers used indoors shall be mounted in a NEMA 1 enclosure at a minimum.
  - d) Controllers used outdoors and/or in wet ambient shall be mounted within NEMA 4 type waterproof enclosures, and shall be rated for operation at - 40° to 158° F.
3. Input/Output:
- a) For flexibility in selection and replacement of valves, the controllers shall be capable of supporting all of the following valve control types 0-10VDC, 0-5VDC, 4-20mA, 24VAC floating point, 24VAC - 2 position (Normally Open or Normally Closed).
  - b) For flexibility in selection and replacement of sensors, the controllers shall be capable of reading sensor input ranges of 0 to 10V, 0 to 20mA, pulse counts, and 200 to 20Kohm.
  - c) For flexibility in selection and replacement of binary devices, the controller shall support dry and wetted (24VAC) binary inputs.
  - d) For flexibility in selection and replacement devices, the controller's shall have binary output which are able to drive at least 12VA each.
  - e) For flexibility in selection and replacement of motors, the controller shall be capable of outputting 24VAC (binary output), DC voltage (0 to 10VDC minimum range) and PWM (in the 80 to 100 Hz range).
  - f) For future needs, any I/O that is unused by functionality of equipment control shall be available to be used by custom program on the controller and by another controller on the network.
  - g) For future expansion and flexibility, the controller shall have either on board or through expansion, 20 hardware input/output points. Expansion points must communicate with the controller via an internal communications bus. Expansion points must be capable of being mounted up to 650ft. (200 m) from the controller. Expansion points that require the BACnet network for communication with the controller are not allowed.
4. Serviceability – The controller shall provide the following in order to improve serviceability of the controller.
- a) Diagnostic LEDs shall indicate correct operation or failures/faults for all of the following: power, sensors, BACnet communications, and I/O communications bus.
  - b) All binary output shall have LED's indicating the output state.
  - c) All wiring connectors shall removable without the use of a tool.
  - d) Software service tool connection through all of the following methods: direct cable connection to the controller, connection through another controller on BACnet link and through the controller's zone sensor.

- e) For safety purposes, the controller shall be capable of being powered by a portable computer for the purposes of configuration, programming, and testing programs so that this work can be accomplished with the power off to the equipment.
  - f) Capabilities to temporarily override of BACnet point values with built-in time expiration in the controller.
  - g) BACnet MAC Address shall be set using decimal (0-9) based rotary switches.
  - h) Configuration change shall not be made in a programming environment, but rather by a configuration page utilizing dropdown list, check boxes, and numeric boxes.
  - i) BACnet trending objects resident on controller.
    - (1) Minimum of 20,000 trending points total on controller
    - (2) Shall be capable of trending all BACnet points used by controller
    - (3) Shall be capable of 1 second sample rates on all points
5. Software Retention: All Zone Controller operating parameters, setpoints, BIOS, and sequence of operation code must be stored in non-volatile memory in order to maintain such information for months without power.
6. Transformer for the controller must be rated at minimum of 115% of ASC power consumption and shall be fused or current limiting type. 24 VAC, +/- 15% nominal, 50-60 Hz, 24 VA plus binary output loads, for a maximum of 12 VA for each binary output.
7. Agency Approval: The controller shall have meet the Agency Compliance:
- a) UL916 PAZX, Open Energy Management Equipment
  - b) UL94-5V, Flammability
  - c) FCC Part 15, Subpart B, Class B Limit

## 2.7 INPUT / OUTPUT INTERFACE

- A. Hardwired inputs and outputs may tie into the system through building, custom application, or ASCs.
- B. All input points and output points shall be protected such that shorting of the point to itself, to another point, or to ground will cause no damage to the controller. All input and output points shall be protected from voltage up to 24V of any duration, such that contact with this voltage will cause no damage to the controller.
- C. Binary inputs shall allow the monitoring of on/off signals from remote devices. The binary inputs shall provide a wetting current of at least 12 mA to be compatible with commonly available control devices and shall be protected against the effects of contact bounce and noise. Binary inputs shall sense “dry contact” closure without external power (other than that provided by the controller) being applied.
- D. Pulse accumulation input objects. This type of object shall conform to all the requirements of binary input objects and also accept up to 10 pulses per second for pulse accumulation.

- E. Analog inputs shall allow the monitoring of low voltage (0 to 10 VDC), current (4 to 20 mA), or resistance signals (thermistor, RTD). Analog inputs shall be compatible with and field configurable to commonly available sensing devices.
- F. Binary outputs shall provide for on/off operation or a pulsed low-voltage signal for pulse width modulation control. Binary outputs on building and custom application controllers shall have status lights. Outputs shall be selectable for either normally open or normally closed operation.
- G. Analog outputs shall provide a modulating signal for the control of end devices. Outputs shall provide either a 0 to 10VDC or a 4 to 20 mA signal as required to provide proper control of the output device. Analog outputs shall not exhibit a drift of greater than 0.4% of range per year.
- H. Tri-State Outputs. Provide tri-state outputs (two coordinated binary outputs) for control of three-point floating type electronic actuators without feedback. Use of three-point floating devices shall be limited to zone control and terminal unit control applications (VAV terminal units, duct-mounted heating coils, zone dampers, radiation, etc.). Control algorithms shall run the zone actuator to one end of its stroke once every 24 hours for verification of operator tracking.
- I. System Object Capacity. The system size shall be expandable to at least twice the number of input/ output objects required for this project. Additional controllers (along with associated devices and wiring) shall be all that is necessary to achieve this capacity requirement. The operator interfaces installed for this project shall not require any hardware additions or software revisions in order to expand the system.

## 2.8 POWER SUPPLIES

- A. Control transformers shall be UL listed. Furnish Class 2 current-limiting type or furnish overcurrent protection in both primary and secondary circuits for Class 2 service in accordance with NEC requirements. Limit connected loads to 80% of rated capacity.
  - 1. DC power supply output shall match output current and voltage requirements. Unit shall be full-wave rectifier type with output ripple of 5.0 mV maximum peak-to-peak. Regulation shall be 1.0% line and load combined, with 100-microsecond response time for 50% load changes. Unit shall have built-in overvoltage and overcurrent protection and shall be able to withstand a 150% current overload for at least three seconds without trip-out or failure.
    - a) Line voltage units shall be UL recognized and CSA approved.

## 2.9 AUXILLARY CONTROL DEVICES

- A. Motorized dampers, unless otherwise specified elsewhere, shall be as follows:
  - 1. **(D-1)**: Opposed blade damper.
  - 2. **(D-2)**: Parallel blade damper.

3. Damper frames shall be 16 gauge galvanized sheet metal or 1/8" extruded aluminum with reinforced corner bracing.
4. Damper blades shall not exceed 8" in width or 48" in length. Blades are to be suitable for medium velocity performance (2,000 fpm). Blades shall be not less than 16 gauge.
5. Damper shaft bearings shall be as recommended by manufacturer for application.
6. All blade edges and top and bottom of the frame shall be provided with compressible seals. Side seals shall be compressible stainless steel. The blade seals shall provide for a maximum leakage rate of 10 CFM per square foot at 2.5" w.c. differential pressure.
7. All leakage testing and pressure ratings will be based on AMCA Publication 500.
8. Individual damper sections shall not be larger than 48" x 60". Provide a minimum of one damper actuator per section.
9. Control dampers shall be parallel or opposed blade types as scheduled on drawings.
10. Acceptable Manufacturer shall be Ruskin, Greenheck, or equal.

B. Electric damper/valve actuators (**ME-1, ME-2, ME-3**)

1. ME-1: Modulating range.
2. ME-2: Two Position.
3. ME-3: Modulating range, for unit ventilators.
4. The actuator shall have electronic overload or digital rotation sensing circuitry to prevent damage to the actuator throughout the rotation of the actuator.
5. Where shown, for power-failure/safety applications, an internal mechanical, spring return mechanism shall be built into the actuator housing.
6. Proportional actuators shall accept a 0-10 VDC or 0-20 ma control signal and provide a 2-10 VDC or 4-20 ma operating range.
7. Actuators shall be Underwriters Laboratories Standard 873 listed.
8. Acceptable Manufacturer shall be Belimo or equal.

C. Control Valves

1. Control valves shall be two-way or three-way type for two-position or modulating service as scheduled or shown.



2. Size control valves according to chart below: (Maximum DP of 3 psi):

VALVE SIZE CHART		
Max GPM	VALVE SIZE	CV
7.5	1/2"	4.4
13	3/4"	7.5
24	1"	14
35	1-1/4"	20
48	1-1/2"	28
69	2"	40
113	2-1/2"	65
156	3"	156
294	4"	294

3. Close-off (differential) Pressure Rating: Valve actuator and trim shall be furnished to provide the following minimum close-off pressure ratings:
- a) Water Valves:
    - (1) Two-way: 150% of total system (pump) head.
    - (2) Three-way: 300% of pressure differential between ports A and B at design flow or 100% of total system (pump) head.
  - b) Steam Valves: 150% of operating (inlet) pressure.
4. Water Valves
- a) Body and trim style and materials shall be in accordance with manufacturer's recommendations for design conditions and service shown, with equal percentage ports for modulating service.
  - b) Sizing Criteria.
    - (1) **(CVT)** Two-position service.
    - (2) Two-way modulating service: Pressure drop shall be equal to twice the pressure drop through heat exchanger (load), 50% of the pressure difference between supply and return mains, or 3 psi, whichever is greater.
    - (3) **(CVM, CVZM)** Three-way modulating service: Pressure drop equal to twice the pressure drop through the coil exchanger (load), 3 psi maximum.
    - (4) Valves (1/2 in.) through (2 in.) shall be bronze body or cast brass ANSI Class 250, spring-return, PTFE packing, quick opening for two-position service. Two-way valves to have replaceable composition disc or stainless steel ball, 23°F - 250°F.
    - (5) Valves (2 1/2 in.) and larger shall be cast iron ANSI Class 125 with guided plug and PTFE packing, globe valve.

(6) Never provide a controls valve that is less than half the size of the supply line serving that system.

c) Terminal Unit Zone valves shall be sized to meet the control application and they shall be spring return so in the event of a power failure, they will go to full open.

5. Acceptable Manufacturer shall be Belimo; or equal.

D. Binary Temperature Devices (**THL-1**)

1. Low-voltage space thermostat shall be 24 V, bimetal-operated, mercury-switch type, with either adjustable or fixed anticipation heater, concealed setpoint adjustment, 13°C to 30°C (55°F to 85°F) setpoint range, 1°C (2°F) maximum differential, and vented ABS plastic cover. Acceptable Manufacturer shall be Honeywell; or equal.
2. Line-voltage space thermostat shall be bimetal-actuated, open contact type, or bellows-actuated, enclosed, snap-switch type or equivalent solid-state type, with heat anticipator, UL listed for electrical rating, concealed setpoint adjustment, 13°C to 30°C (55°F to 85°F) setpoint range, 1°C (2°F) maximum differential, and vented ABS plastic cover. Acceptable Manufacturer shall be Honeywell; or equal.

E. Temperature Sensors (**TSB, TSR, TSD, TSDA**)

1. TSB: Flat plate thermistor room sensor. ACI R2; or equal.
2. TSR: Room sensor with LCD display and setpoint adjustability. ZS Pro-M, Automated Logic; or equal.
3. TSD/TSDA: duct mounted sensor.
4. Temperature sensors shall be RTD or thermistor.
  - a) Wireless space sensor component certifications shall include:
    - (1) UL 916 - Energy Management Equipment.
    - (2) UL 94 - The Standard for Flammability of Plastic Materials for Parts in Devices and Appliances.
    - (3) UL 873 - Temperature regulating and indicating equipment.
  - b) The wireless space sensor battery life shall provide at least 15 years life under normal operating conditions and must be readily available size AA, 1.5V.
5. Duct sensors shall be single point or averaging as shown. Averaging sensors shall be a minimum of 1.5 m (5 ft) in length per 1 m<sup>2</sup> (10 ft<sup>2</sup>) of duct cross section.
6. Immersion sensors shall be provided with a separable stainless steel well. Pressure rating of well is to be consistent with the system pressure in which it is to be installed. The well must withstand the flow velocities in the pipe.
7. Space sensors shall be equipped with setpoint adjustment, override, display, and/or communication port as shown on plans.

8. Provide matched temperature sensors for differential temperature measurement.
- F. Humidity Sensors (**HSTS-wall mount / HSP-duct mount**)
1. Space Humidity Sensors shall have a sensing range of 20% to 80% with accuracy of +/- 2% RH.
  2. Duct Sensors and Outdoor air humidity sensors shall have a sensing range of 20% to 95% RH with an accuracy of +/- 2% RH.
  3. Humidity sensor's drift shall not exceed 1% of full scale per year.
  4. Acceptable Manufacturer shall be Omega; or equal.
- G. End Switch (**ES-1**)
1. Proof of closure of damper. Kele; or equal.
- H. Pressure Sensors (**DPT-1**)
1. Air pressure of differential pressure measurements in the range of 0 to 10" water column shall be accurate to +/- 1% of range. Acceptable Manufacturer shall be Setra; or equal.
  2. Liquid pressure or differential liquid pressure measurements shall be accurate to +/- 0.25% of range. Unit shall be provided with isolation and bypass manifold for startup and maintenance operations. Acceptable Manufacturer shall be Setra; or equal.
- I. Low Limit Thermostats (**LC-1**)
1. Safety low limit thermostats shall be vapor pressure type with an element 6m [20 ft] minimum length. Element shall respond to the lowest temperature sensed by any one foot section. Acceptable Manufacturer shall be Honeywell; or equal.
  2. Low limit shall be manual reset only.
- J. Carbon Dioxide Sensors (**CDS-1**)
1. Carbon Dioxide sensors shall measure CO<sub>2</sub> in PPM in a range of 0-2000 ppm. Accuracy shall be +/- 3% of reading with stability within 5% over 5 years. Sensors shall be duct or space mounted as indicated in the sequence of operation.
  2. Acceptable Manufacturer shall be Dwyer; or equal.
- K. Flow Switches (**FS-1**)
1. Flow-proving switches shall be either paddle or differential pressure type.

2. Paddle type switches (water service only) shall be UL listed, SPDT snap-acting with pilot duty rating (125VA minimum) and shall have adjustable sensitivity with NEMA 1 enclosure unless otherwise specified. Manufacturer shall be Setra; or equal.
3. Differential pressure type switches (air or water service) shall be UL listed, SPDT snap-acting, pilot duty rated (125 VA minimum), NEMA 1 enclosure, with scale range and differential suitable for intended application or as specified. Acceptable Manufacturer shall be Setra; or equal.

L. Air Flow Probes (**AF-1**)

1. Provide an array of airflow traverse probes where indicated, capable of continuously monitoring the fan or duct capacities (CFM) they serve. Each airflow traverse probe shall contain multiple total and static pressure sensors located along the exterior surface of the cylindrical probe and internally connected to their respective averaging manifolds. The flow sensors shall not protrude beyond the surface of the probe(s), and shall be the offset type for static pressure and the chamfered impact type for total pressure measurement. The airflow sensing probe's measurement accuracy shall not be affected by directional flow having pitch and/or yaw angles up to 30°. Each airflow traverse probe shall be of extruded aluminum construction and furnished with mounting plate(s), gasket and signal fittings suitable for HVAC duct installation.
2. The airflow traverse probe shall not induce a pressure drop in excess of 0.03" w.c. at 2000 FPM, nor measurably contribute to sound levels within the duct. Total and static pressure sensors shall be located at the centers of equal areas (for rectangular duct) or at equal concentric area centers (for circular ducts) along the probe length. The airflow traverse probe shall be capable of producing steady, non-pulsating signals of total and static pressure without need for flow corrections or factors, with an accuracy of 2-3% of actual flow, over a velocity range of 400 to 4000 FPM.
3. Provide the minimum number of probes indicated: Duct height 8 – 12", 1 probe; 13 – 30", 2 probes; 31 – 54", 3 probes; 55 – 84", 4 probes; 85 – 120", 5 probes; 121 – 180", 6 probes.
4. The airflow traverse probe shall be the VOLU-probe as manufactured by Air Monitor Corporation, or equivalent.

M. Hydronic Flow Meters (**FM-3**)

1. Insertion-Type Turbine Meter
  - a) Insertion type, complete with hot-tap isolation valves to enable sensor removal without water supply system shutdown.
  - b) Liquide flow measurement devices shall be accurate to +/- 1% over a turn down ratio of 10:1.

- c) Each sensor shall be individually calibrated and tagged accordingly against the manufacturer's primary standards.
- d) All wetted metal parts shall be constructed of 316 stainless steel.
- e) Analog outputs shall consist of non-interactive zero and span adjustments, a DC linearity of 0.1% of span, voltage output of 0–10 Vdc, and current output of 4–20 mA.
- f) Acceptable Manufacturer shall be Onicon; or equal.

N. Relays (**CR-1**)

- 1. Control relays shall be UL listed plug-in type with dust cover and LED "energized" indicator. Contact rating, configuration, and coil voltage shall be suitable for application.
- 2. Time delay relays shall be UL listed solidstate plug-in type with adjustable time delay. Delay shall be adjustable  $\pm 200\%$  (minimum) from setpoint shown on plans. Contact rating, configuration, and coil voltage shall be suitable for application. Provide NEMA 1 enclosure when not installed in local control panel.
- 3. Acceptable Manufacturer shall be Functional Device Inc.; or equal.

O. Transformers and Power Supplies

- 1. Control transformers (**XT-1**) shall be UL listed, Class 2 current-limiting type, or shall be furnished with over-current protection in both primary and secondary circuits for Class 2 service.
- 2. Unit output shall match the required output current and voltage requirements. Current output shall allow for a 50% safety factor. Output ripple shall be 3.0 mV maximum Peak-to-Peak. Regulation shall be 0.10% line and load combined, with 50 microsecond response time for 50% load changes. Unit shall have built-in over-voltage protection.
- 3. Unit shall be UL recognized.
- 4. Acceptable Manufacturer shall be Functional Device Inc.; or equal.

P. Current Switches (**CFS-1**)

- 1. Current-operated switches shall be self-powered, solid state with adjustable trip current. The switches shall be selected to match the current of the application and output requirements of the DDC system.
- 2. Acceptable Manufacturer shall be Functional Device Inc.; or equal.

Q. Immersion Temperature Sensor (**ITS, ITS-1**)

1. Furnish with brass thermowell. Well insertion length to center of pipe. Glycol system require stainless steel well. ACI; or equal.

R. Motion Detector (**MDS-1**)

1. Ultra- sonic type omni directional transmitter, dual receivers, sensitivity gain control, 600 sq. ft. coverage, 24 Volt DC, Universal Energy Control Inc.; or approved equal.

S. Static Pressure Sensor (**SPS-1, SPNL-1**)

1. Model 264, pressure transmitter 4-20mA, 0-5VDC, 2.5VDC bidirectional output, 24VDC power by this Contractor, range 0-1.0" wg. or as applicable to individual systems needs. Setra; or approved equal.

T. Current transmitters

1. AC current transmitters shall be the self-powered, combination split-core current transformer type with built-in rectifier and high-gain servo amplifier with 4 to 20 mA two-wire output. Unit ranges shall be 10 A, 20 A, 50 A, 100 A, 150 A, and 200 A full scale, with internal zero and span adjustment and  $\pm 1\%$  full-scale accuracy at 500 ohm maximum burden.
2. Transmitter shall meet or exceed ANSI/ISA S50.1 requirements and shall be UL/CSA recognized.
3. Unit shall be split-core type for clamp-on installation on existing wiring.
4. Acceptable Manufacturer shall be Functional Device Inc. or equal.

U. Power Monitors

1. Selectable rate pulse output for kWh reading, 4–20 mA output for kW reading, N.O. alarm contact, and ability to operate with 5.0 amp current inputs or 0–0.33 volt inputs.
2. 1.0% full-scale true RMS power accuracy,  $\pm 0.5$  Hz, voltage input range 120–600V, and auto range select.
3. Under voltage/phase monitor circuitry.
4. NEMA 1 enclosure.
5. Current transformers having a 0.5% FS accuracy, 600 VAC isolation voltage with 0 - 0.33 V output. If 0–5 A current transformers are provided, a three-phase disconnect/ shorting switch assembly is required.

6. Acceptable Manufacturer shall be Allen-Bradley; or equal.

V. Push Button (**PB-1**)

1. Flush mount, stainless steel plate, mushroom head, contact block with red nameplate, white lettering to identify fan and purpose.

W. Thermal Energy Meters

1. Matched RTD or thermistor temperature sensors with a differential temperature accuracy of  $\pm 0.15^{\circ}\text{F}$ .
2. Flow meter that is accurate within  $\pm 1\%$  at calibrated typical flow rate and does not exceed  $\pm 2\%$  of actual reading over an extended 50:1 turndown range.
3. Unit accuracy of  $\pm 1\%$
4. NEMA 1 enclosure.
5. UL listed.
6. Isolated 4–20 ma signals for energy rate and supply and return temperatures and flow.
7. Acceptable Manufacturer shall be Onicon; or equal.

X. Carbon Monoxide Sensor (**CDS-1**)

1. Wall mounted Carbon Monoxide Sensor (CO) shall monitor CO over a range of 0-300 PPM.
2. The device shall have an accuracy of  $\pm 3\%$  and operate within the range of 32-110 deg F and 0-95% RH.
3. Acceptable Manufacturer shall be Honeywell; or equal.

Y. Local Control Panels (**TCP, TCP-1**)

1. All indoor control cabinets shall be fully enclosed NEMA 1 Type construction with hinged door, and removable sub-panels or electrical sub-assemblies.
2. Interconnections between internal and face-mounted devices shall be pre-wired with color-coded stranded conductors neatly installed in plastic troughs and/or tie-wrapped. Terminals for field connections shall be UL listed for 600-volt service, individually identified per control/interlock drawings, with adequate clearance for field wiring. Control terminations for field connection shall be individually identified per control drawings.



3. Provide on/off power switch with over-current protection for control power sources to each local panel.

## PART 3 – EXECUTION

### 3.1 EXAMINATION

- A. The Contract Documents shall be thoroughly examined for coordination of control devices, their installation, wiring, and commissioning. Coordinate and review mechanical equipment specifications, locations, and identify any discrepancies, conflicts, or omissions that shall be reported to the Architect/Engineer for resolution before rough-in work is started.
- B. The BAS manufacturer shall inspect the jobsite in order to verify that control equipment can be installed as required, and any discrepancies, conflicts, or omissions shall be reported to the Architect/Engineer for resolution before rough-in work is started.

### 3.2 PROTECTION

- A. The BAS installation contractor shall protect all work and material from damage by their work or personnel, and shall be liable for all damage thus caused.
- B. The BAS manufacturer shall be responsible for their work and equipment until final inspection, testing, and acceptance. The BAS installing contractor shall protect their work against theft or damage, and shall carefully store material and equipment received on site that is not immediately installed. The Contractor shall close all open ends of work with temporary covers or plugs during storage and construction to prevent entry of foreign objects.

### 3.3 COORDINATION

- A. Site
  1. Where the mechanical work will be installed in close proximity to, or will interfere with, work of other trades, the contractor shall assist in working out space conditions to make a satisfactory adjustment. If the contractor installs his/her work before coordinating with other trades, so as to cause any interference with work of other trades, the contractor shall make the necessary changes in his/her work to correct the condition without extra charge.
  2. Coordinate and schedule work with all other work in the same area, or with work that is dependent upon other work, to facilitate mutual progress.
- B. Submittals. Refer to the “Submittals,” section of this specification for requirements.
- C. Test and Balance
  1. The contractor shall furnish a single set of all tools necessary to interface to the control system for test and balance purposes.

2. The contractor shall provide training in the use of these tools. This training will be planned for a duration of 4 hours.
3. The tools used during the test and balance process shall be returned to the contractor at the completion of the testing and balancing.

D. Life Safety

1. Duct smoke detectors required for air handler shutdown shall be supplied under Divison 26 contract. The contractor shall interlock smoke detectors to air handlers for shutdown as described in the Sequences of Operation for this project.

E. Coordination with Controls Specified in Other Sections or Divisions. Other sections and/or divisions of this specification include controls and control devices that are to be part of or interfaced to the control system specified in this section. These controls shall be integrated into the system and coordinated by the contractor as follows:

1. All communication media and equipment shall be provided as specified in the "Communication" section of this specification.
2. Each supplier of a controls product is responsible for the configuration, programming, start-up, and testing of that product to meet the sequences of operation described in this section.
3. The Contractor shall coordinate and resolve any incompatibility issues that arise between the control products provided under this section and those provided under other sections or divisions of this specification.

F. Fire Alarm: Provide interface card to allow communications between temperature control network and fire alarm system. Coordinate exact requirements with Electrical Contractor. Provide all hardware and software necessary for full seamless interface. Show fire alarm failure on graphics.

3.4 GENERAL WORKMANSHIP

- A. Install equipment, piping, wiring/conduit, parallel to building lines (i.e. horizontal, vertical, and parallel to walls) wherever possible.
- B. Provide sufficient slack and flexible connections to allow for vibration of piping and equipment.
- C. Install all equipment in readily accessible locations as defined by National Electric Code (NEC). Control panels shall be attached to structural walls or properly supported in a free-standing configuration, unless mounted in equipment enclosure specifically designed for that purpose. Panels shall be mounted to allow for unobstructed access for service.
- D. Verify integrity of all control wiring to ensure continuity and freedom from shorts and grounds prior to commencing the startup and commissioning procedures.

- E. All control device installation and wiring shall comply with Contract Documents, acceptable industry specifications, and industry standards for performance, reliability, and compatibility. Installation and wiring shall be executed in strict adherence to local codes and standard practices referenced in Contract Documents.

### 3.5 FIELD QUALITY CONTROL

- A. All work, materials, and equipment shall comply with the rules and regulations of applicable local, state, and federal codes and ordinances as identified in Contract Documents.
- B. BAS manufacturer shall continually monitor the field installation for building code compliance and quality of workmanship. All visible piping and or wiring runs shall be installed parallel to building lines and properly supported.
- C. BAS installing Contractor(s) shall arrange for field inspections by local and/or state authorities having jurisdiction over the work.

### 3.6 WIRING

- A. All control and interlock wiring shall comply with the National, Local Electrical Codes, and Division 26 of these Contract Document specifications.
- B. All NEC Class 1 (line voltage) wiring shall be UL Listed in approved raceway according to NEC requirements.
- C. All wiring in plenum spaces shall be enclosed in conduit. Plenum rated cable can be used in accessible ceilings.
- D. Where Class 2 wires are in concealed and accessible locations; including ceiling return air plenums, approved cables outside of electrical raceway can be used provided that the following conditions are met:
  - 1. Circuits meet NEC Class 2 (current-limited) requirements. (Low-voltage power circuits shall be sub-fused when required to meet Class 2 current-limit.)
  - 2. All cables shall be UL listed for application (i.e., cables used in ceiling plenums shall be UL listed specifically for that purpose).
  - 3. Line Voltage Control Wiring:
    - a) For control relays or other low amperage circuits #14 AWG THHN.
    - b) For direct line voltage control of equipment minimum conductor size #12 AWG THHN.
    - c) Electronic Sensor Wiring: 18 AWG, stranded (16x30) copper conductors, twisted pair, 100% overall aluminum polyester shield, 20 AWG CU drain wire. Polyethylene insulation, PVC jacket, 300V, 60°C. Furnish Belden; or equal.

- d) Computer Communications Cable: 18 AWG, stranded (16x30) copper conductors, (2) twisted pair, 100% individual aluminum polyester shields each shield with 20 AWG CU drain wire. PVC insulated, PVC jacket, 300V. Furnish Belden; or equal. Note: Actual # of conductors may be increased as required for actual communication requirement.
- 4. Provide minimum (1) spare shielded twisted pair conductors in each communications wiring run. Wiring runs between operator work stations (if any) provide (2) spare shielded twisted pair conductors.
- E. Do not install Class 2 wiring in conduits containing Class 1 wiring. Boxes and panels containing high voltage may not be used for low voltage wiring except for the purpose of interfacing the two via control relays and transformers.
- F. Where Class 2 wiring is run exposed, wiring shall be conduit
- G. Maximum allowable voltage for control wiring shall be 120Vac. If only higher voltages are available for use, the BAS manufacturer shall provide step-down transformers to achieve the desired control voltages.
- H. All control wiring shall be installed as continuous lengths, where possible. Any required splices shall be made only within an approved junction box or other approved protective device.
- I. Install plenum wiring in sleeves where it passes through walls and floors. Maintain fire rating at all penetrations in accordance with Contract Documents and National and/or Local Codes.
- J. Conduit and wire sizing shall be determined by the BAS manufacturer in order to maintain manufacturer's recommendation and meet National and Local Codes.
- K. Conduit Routing and termination
  - 1. Conduits shall be installed so as to be concealed in all finished spaces at the conclusion of the project unless otherwise noted. Conduits may be exposed in mechanical and electrical rooms and unfinished storage, maintenance and production areas.
  - 2. Where it is impractical to conceal wiring or conduit in finished construction, cables shall be run in wiremold.
  - 3. Make neat runs parallel or perpendicular to structural elements (walls, ceilings, floors) of building with minimum number of couplings and bends. Install so that required conductors may be drawn without injury or excessive strain.
  - 4. Provide double locknuts and insulation bushings on the end of each conduit entering an enclosure. If smaller holes are used in knockouts provide listed devices which overlap largest knockouts as required to strengthen the termination.

5. Cap or plug open ends of conduits during construction.
6. Conduits shall be continuous from equipment controls to cabinets, junction or pull boxes and shall enter and be secured to all boxes in such a manner that each system shall be electrically continuous.
7. Change in Direction of Conduit:
  - a) Concealed locations - use standard radius bend.
  - b) Exposed locations or concealed locations where conduit will be accessible; use standard radius bends or conduit body.
8. Install conduits to allow proper drainage. Do not form pockets.
9. Securely attach all conduits to building structure utilizing approved methods and fastening devices for support.
10. Clear obstructions in raceways or replace raceways at no additional contract cost. Demonstrate to Architect that spare conduits are free of obstruction at substantial completion and leave a drag line (1/8" polypropylene monofilament utility rope) for future use.
- L. Follow manufacturer's installation recommendations for all communication and network bus cabling. Network or communication cabling shall be run separately from all control power wiring.
- M. Adhere to the Division 26 requirements for installation of electrical raceways.
- N. BAS manufacturer shall terminate all control and/or interlock wiring and shall maintain updated (as-built) wiring diagrams with terminations identified at the job site.
- O. Flexible metal conduits and liquid-tight flexible metal conduits shall not exceed 3' in length and shall be supported at each end. Flexible metal conduit less than 1/2" electrical trade size shall not be used. In areas exposed to moisture, including chiller and boiler rooms, liquid-tight, flexible metal conduits shall be used.
- P. Penetrations:
  1. Provide fire stopping for all penetrations used by dedicated BMS conduits and raceways. All other project fire stopping to be by other trade.
  2. All openings in the fire proofed or fire stopped components shall be closed by using approved fire resistive sealant.
  3. All wiring passing through penetrations, including walls, shall be in conduit or enclosed raceway.
  4. Penetrations of floor slabs shall be by core drilling. All penetrations shall be plumb, true and square.

5. No penetrations in structural elements shall be made before receipt of written approval from Engineer and/or Architect.

Q. BMS Raceway:

1. All wiring shall be installed in conduit or raceway except as noted elsewhere in this specification. Minimum control wiring conduit size 3/4".
2. Where it is not possible to conceal raceways in finished locations, surface raceway (wiremold) may be used as approved by the Engineer.
3. All conduits and raceways shall be installed level, plumb, at right angles to the building lines and shall follow the contours of the surface to which they are attached.
4. Flexible metal conduit shall be used for vibration isolation and shall be limited to 3' in length when terminating to vibrating equipment. Flexible metal conduit may be used within partition walls. Flexible metal conduit shall be UL listed.

### 3.7 COMMUNICATION WIRING

- A. All cabling shall be installed in a neat and workmanlike manner. Follow manufacturer's installation recommendations for all communication cabling.
- B. Do not install communication wiring in raceway and enclosures containing Class 1 or other Class 2 wiring.
- C. Maximum pulling, tension, and bend radius for cable installation, as specified by the cable manufacturer shall not be exceeded during installation.
- D. Contractor shall verify the integrity of the entire network following cable installation. Use appropriate test measures for each particular cable.
- E. When a cable enters or exits a building, a lighting arrestor must be installed between the line and ground.
- F. All runs of communication wiring shall be unspliced length when the length is commercially available.
- G. All communication wiring shall be labeled to indicate origin and destination.

### 3.8 FIBER OPTIC CABLE

- A. All cabling shall be installed in a neat and workmanlike manner. Minimum cable and unjacketed fiber bend radii as specified by cable manufacturer shall be maintained.
- B. Maximum pulling tensions as specified by the cable manufacturer shall not be exceeded during installation. Post installation residual cable tension shall be within cable manufacturer's specifications.

- C. Fiber optic cabinets, hardware, and cable entering the cabinet shall be installed in accordance with manufacturers' instructions. Minimum cable andunjacketed fiber bend radii as specified by cable manufacturer shall be maintained.

### 3.9 INSTALLATION OF SENSORS

- A. Sensors required for mechanical equipment operation shall be factory installed and wired as specified in mechanical equipment specifications. BAS manufacturer shall be responsible for coordinating these control devices and ensuring the sequence of operations will be met. Installation and wiring shall be in accordance with the BAS manufacturer's recommendations.
- B. Sensors that require field mounting shall meet the BAS manufacturer's recommendations and be coordinated with the mechanical equipment they will be associated.
- C. Mount sensors rigidly and adequately for the environment the sensor will operate.
- D. Room temperature sensors shall be installed on concealed junction boxes properly supported by the block wall framing. For installation in dry wall ceilings, the low voltage sensor wiring can be installed exposed and must meet applicable National and Local Electrical Codes.
- E. All wires attached to wall mounted sensors shall be sealed off to prevent air from transmitting in the associated conduit and affecting the room sensor readings.
- F. Install duct static pressure tap with tube end facing directly down-stream of air flow.
- G. Install space static pressure sensor with static sensing probe applicable for space installation where applicable.
- H. Sensors used in mixing plenums, and hot and cold decks shall be of the averaging type. Averaging sensors shall be installed in a serpentine manner horizontally across duct. Each bend shall be supported with a capillary clip.
- I. All pipe mounted temperature sensors shall be installed in matched thermowells. Install all liquid temperature sensors with heat conducting fluid in thermal wells for adequate thermal conductance.
- J. Wiring for space sensors shall be concealed in building drywall. EMT conduit is acceptable within mechanical equipment and service rooms.
- K. Install outdoor air temperature sensors on north wall complete with sun shield at manufacturer's recommended location and coordinated with Engineer.



### 3.10 IDENTIFICATION OF HARDWARE AND WIRING

- A. All field wiring and cabling, including that within factory mounted, and wired control panels and devices for mechanical equipment, shall be labeled at each end within 2" of termination with a cable identifier and other descriptive information for troubleshooting, maintenance, and service purposes. BAS manufacturer to coordinate this labeling requirement with mechanical equipment manufacturer as it relates to controls.
- B. Permanently label or code each point of field terminal strips to show the instrument or item served and correlate them to the BAS design drawings.
- C. Identify control panels with plastic nameplates.

### 3.11 CONTROL SYSTEM CHECKOUT AND TESTING

- A. Acceptance Check Sheet:
  - 1. The contractor shall prepare check commissioning sheets that include all points for all functions of each system as indicated on the temperature controls submittal documents.
  - 2. Submit the check sheets to the engineer for approval within the temperature controls submittal documents.
  - 3. Engineer will use the approved check sheets as the basis for acceptance of the BAS.
  - 4. The contractor is perform complete commissioning reports for this project. Prior to final payment, contractor must submit signed commissioning checklist, approved by both the owner and engineer. The contractor must also prepare commissioning reports for each piece of equipment that is being controlled.
- B. Start-up testing. All testing in this section shall be performed by the contractor and shall make up part of the necessary verification of an operating control system. This testing shall be completed before the owner's representative is notified of the system demonstration.
  - 1. The contractor shall furnish all labor and test apparatus required to calibrate and prepare for service all of the instruments, controls, and accessory equipment furnished under this specification.
  - 2. Verify that all control wiring is properly connected and free of all shorts and ground faults. Verify that terminations are tight.
  - 3. Enable the control systems and verify calibration of all input devices individually. Perform calibration procedures according to manufacturer's recommendations.
  - 4. Verify all binary output devices (relays, solenoid valves, two-position actuators and control valves, magnetic starter, etc.) operate properly and normal positions are correct.

5. Verify all analog output devices (I/Ps, actuators, etc) are functional, that start and span are correct, and that direction and normal positions are correct. The contractor shall check all control valves and automatic dampers to ensure proper action and closure. The contractor shall make any necessary adjustments to valve stem and damper blade travel.
  6. Verify the system operation adheres to the sequences of operation. Simulate and observe all modes of operation by overriding and varying inputs and schedules. Tune all DDC loops and optimal start/stop routines.
  7. Alarms and Interlocks
    - a) Check each alarm separately by including an appropriate signal at a value that will trip the alarm.
    - b) Interlocks shall be tripped using field contacts to check the logic, as well as to ensure that the fail-safe condition for all actuators is in the proper direction,
    - c) Interlock actions shall be tested by simulating alarm conditions to check the initiating value of the variable and interlock action.
- C. Start-up testing. All testing in this section shall be performed by the contractor and shall make up part of the necessary verification of an operating control system. This testing shall be completed before the owner's representative is notified of the system demonstration.

### 3.12 CONTROL SYSTEM DEMONSTRATION AND ACCEPTANCE

- A. Acceptance: The BAS will not be accepted as meeting the requirements of Completion until all tests described in this specification have been performed to the satisfaction of both the Engineer and Owner. Any tests that cannot be performed due to circumstances beyond the control of the Contractor may be exempt from the Completion requirements if stated as such in writing by the Owner's representative. Such tests shall then be performed as part of the warranty.

### 3.13 TRAINING

- A. Provide minimum of 2 classroom training sessions, and 4 hours for each session, throughout the contract period. The training will be provided for personnel designated by the Owner.
- B. Provide course outline and materials prior to schedule training session. The instructor(s) shall provide one copy of training material per student.
- C. The instructor(s) shall be factory-trained and experienced in teaching this technical material.

END OF SECTION 230993

Hamlin Design Group  
PRJ 201 Oakside Elementary  
PRJ 202 Uriah Hill School  
PRJ 203 Woodside School  
PRJ 204 Middle School

The City School District of Peekskill  
SED 66-15-00-01-0-005-020  
SED 66-15-00-01-0-007-014  
SED 66-15-00-01-0-008-017  
SED 66-15-00-01-0-014-005

## SECTION 232100 - WATER SYSTEM SPECIALTIES AND EQUIPMENT

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawing and General Provisions of contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

#### 1.2 SUBMITTALS

- A. Schedule of all materials used.
- B. Product data for all specialties.

#### 1.3 GENERAL REQUIREMENTS

- A. All equipment and accessories in this section shall be rated for a least 125 psi wwp, and 250°F minimum temperatures, unless otherwise specified.
- B. Manufacturer's written installation procedures shall become a part of these specifications.

### PART 2 - PRODUCTS

#### 2.1 WATER SYSTEM SPECIALTIES AND EQUIPMENT

- A. AF-1: High capacity air vent; float actuated non-modulating. Positive shut off up to 150 psig and a maximum temp. of 250°F. Cast Iron construction with internal components of Type 313 stainless steel, brass, Buna-N and silicone rubber. Bell & Gossett, Model #107; or equal.
- B. AV-1: Air bleed valve, at each high point or air pocket in water piping systems, 1/8" NPT size, brass body, key operated, extension tube if required. 150 working pressure and 225°F operating temperature. Bell & Gossett Model #4V; or equal.
- C. PG-1: Pressure gauge, 0-60 psig range 4-1/2" dial, bottom connection, cast aluminum case, slip ring, phosphor bronze bourdon tube, brass socket, bronze rotary movement, 1% accuracy. Albert A. Weiss & Sons, Inc., Cat. #4PGAN-1; or equal. Pressure gauge shall be installed with shut-off valve pressure pulsation snubber.
- D. RWCV-1: Radiation Control Valve. Self contained, wireless, modulating temperature control valves for hot water, with remote sensing bulb. 150 psi maximum and 250°F maximum union connections. Danfoss Model #RA-FN with remote sensor Model #RA2000; or equal.
- E. SS-1: Pipeline strainer, line size up to 2", screwed cast bronze body, 20 mesh stainless steel screen, for liquid or steam service. S.W.P. 125 lbs at 400°F. Series #777S, Watts Regulator Co.; or equal. Note: Provide ball valve BV-1 and hose connections for blow-down.

- F. SS-2: Pipeline strainer, line size 2-1/2" and up, flanged connections, cast iron body, 20 mesh stainless steel screen, W.P. 125 lbs, for liquid or steam service. Series 77-125, Watts Regulator Co.; or equal. Note: Provide ball valve BV-1 and hose connections for blow down.
- G. TH-1: Thermometer, cast aluminum case and adjustable joint, copper plated steel bulb chambers, separable brass socket, range 30°F to 240°F. Weiss Instruments, Inc. Vari-angle, Model #9VS6; or equal.

### PART 3 - EXECUTION

#### 3.1 GENERAL REQUIREMENTS

- A. All equipment and systems as shown on the drawings or specified herein shall be installed in accordance with the provisions of each applicable section of these specifications.
- B. Provide 4" high concrete housekeeping pads where required.
- C. Obtain detailed written or graphical instruction from each manufacturer for proper method of installing each piece of equipment.
- D. Provide reducers where required to adapt water system specialties to piping system.
- E. Provide all supporting steelwork, hangers, and suspension racks as required, and support as approved by Architects.

#### 3.2 SYSTEM FILLING

- A. After cleaning, fill each system from low point:
  - 1. With pumps off, vent all mains, risers, runouts, units, etc., working consecutively from low to high point in building. Obtain approximately 2 psi at highest point. Obtain proper air cushion in compression tanks. Vent all released air and gases at all vent points. Check high level in compression tanks; drain if necessary.

#### 3.3 AIR VENTING

- A. Provide vents at all points in piping system where air may collect. Provide one of the following:
  - 1. Manual vent assembly consisting of: 1-1/4" x 6" air collection chamber, 1/4" brass globe valve in accessible location, install hose connection to valve outlet.
  - 2. Automatic vent with air chamber.

Hamlin Design Group  
PRJ 201 Oakside Elementary  
PRJ 202 Uriah Hill School  
PRJ 203 Woodside School  
PRJ 204 Middle School

The City School District of Peekskill  
SED 66-15-00-01-0-005-020  
SED 66-15-00-01-0-007-014  
SED 66-15-00-01-0-008-017  
SED 66-15-00-01-0-014-005

### 3.4 EQUIPMENT VENTS

- A. When Equipment is Above Mains: Connect runouts or risers to upper quadrant or top of mains. Install vent assembly concealed within enclosure, consisting of 1" diameter by 4" to 6" long air collection chamber with 1/4" soft copper tube to manual valve. Mount securely near bottom of enclosure, but not fastened to enclosure. For individual units, provide screwdriver.
- B. When Equipment is Below Mains: Connect piping runouts or risers to bottom or lower quadrant of mains. Vent assembly not required in unit. Provide means of purging and draining each unit, if required. Use tees instead of elbows at low point of runouts.

### 3.5 STRAINERS

- A. Provide approved valved dirt blow-off connection for strainers, size 6" and larger. Equip with quick opening gate valve and brass plug. Valve located 6" to 12" below strainer or as approved, full size of tapping. Provide discharge piping if required for protection, when directed by Architects or shown on plans.
  - 1. Note: strainer to be mounted horizontally.

END OF SECTION 232100

## SECTION 232110 - STEAM SYSTEM SPECIALTIES & EQUIPMENT

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract including the General and Supplementary Conditions and Division 1 Specifications Sections, apply to the work of this section.

#### 1.2 SUBMITTALS

- A. All parts, equipment, and piping specialties listed and specified in this section.
- B. Submittals shall be marked to identify specified information.

#### 1.3 GENERAL REQUIREMENTS

- A. All equipment and accessories in this section shall be rated for at least 125 psi wwp, and 250°F minimum temperatures, unless otherwise specified.
- B. Manufacturer's written installation procedures shall become a part of these specifications.

### PART 2 - PRODUCTS

#### 2.1 EQUIPMENT

##### A. PG-2: STEAM PRESSURE GAUGES

1. Pressure gauges shall have a 4" diameter dial with units marked in psig, as appropriate. Pressure ranges 0-300. Gauges installed in steam systems shall be installed with ring type syphon tube and cock or a U type syphon tube and cock. Bourdon tube gauge constructed in accordance with DIN 16005. Spirax Sarco or approved equal.
2. Ring syphon shall be an ASTM A-106 Gr. A, seamless steel.
3. Gauges shall be stainless steel or mild steel. Dry gauges shall have special dampening agent, performing as a liquid-filled gauge. Pressure gauge accuracy is 1½%. Spirax Sarco or approved equal.
4. Gauges shall be located to minimize the effects of vibration, extreme ambient temperatures and moisture. Gauges shall not be moved between different applications without written approval from the Engineer or Designee. Refer to ASME B40.1.
5. To prevent live steam from entering the bourdon tube, a siphon filled with water shall be installed between the gauge and the process steam.

6. If freezing of the condensate in the loop of the siphon is a possibility, a diaphragm seal shall be used to isolate the gauge for the process steam. Heat tracing and insulation of the siphon is also an acceptable option with approval from the Engineer or Designee.
7. Pressure gauges have a standard vent plug and should be used in an indoor dry environment.
8. Pressure gauges shall be sized for full-scale pressure range such that the operating pressure occurs in the middle of half of the scale (12 o'clock position desirable). The maximum operating pressure shall not exceed 80% of the full pressure range of the gauge.

**B. SSS-1: Cast Iron Y Pattern Strainers.**

1. Body: ASTM A 126, Class B cast iron, with bolted cover, for 2½ inch (DN 65) and larger.
2. End Connections: Threaded ends for strainers 3 inch (DN 80) and smaller; flanged ends for strainers 2 inch (DN 50) and larger.
3. In "Strainer Screen" sub-paragraph below, the larger mesh numbers have larger passages, thus allowing larger objects to pass.
4. Strainer Screen: steam use: stainless steel, 60/100 mesh to suit application.
5. Strainer Screen: liquid: 3" and less: 20 mesh. 4" and above 1/8" perforation.
6. Tapped blow off plug.
7. Maximum allowable saturated steam pressure rating: 250 psig or flange rating whichever is less.
8. *Spirax Sarco model IT, CI-125, CI-250*

**C. VB-1: VACUUM BREAKERS**

1. Vacuum breakers shall have a Brass or Stainless Steel body, hardened ball check valve design with all working parts manufactured from stainless steel.
2. In open loop steam systems, vacuum breakers on modulating or on/off heat exchangers and coils shall be installed in the supply side between the control valve and equipment.
3. Vacuum breakers shall be mounted at the highest point of the circuit.
4. Large coils or equipment may require more than one vacuum breaker to be fitted.
5. Vacuum breakers shall be installed in a vertical position with cap at top.



6. On packaged heat transfer and condensate pump skids vacuum breaker should be installed as directed by skid manufacturer.

7. ***Spirax Sarco Model VB14, VB21***

## 2.2 STEAM TRAPS

### A. STF-1: Float and Thermostatic Traps

1. Float and thermostatic traps shall have cast iron bodies or SG ductile iron bodies and covers to 200 psig) operating pressures or cast steel bodies and covers to 465 psig operating pressures. Traps shall be line repairable without disturbing the connecting piping. All internals including float, main valve head and seat, and thermostatic air vent shall be stainless steel. Air vent shall be of a precision welded twin diaphragm design, which is completely encased in a protective capsule, and is self-adjusting over its entire operating range. Air vent capsule shall be a stainless steel balance pressure thermostatic air vent capable of withstanding 572°F superheat steam temperature and resisting water hammer without sustaining damage. Internals of the trap shall be completely serviceable without disturbing the piping.
2. Float and Thermostatic traps for drip and/or process applications (under 200 psig) shall be SG ductile or Cast Iron and have either parallel or inline threaded connections.
3. ***SPIRAX SARCO MODELS FTI, FT, FTB, IFT OR FT14***

### B. STT-1: Thermodynamic Traps

1. Thermodynamic traps shall have tight shut-off with no steam loss allowed either by bleed or “controlled leak” and shall have an integral seat design with hardened disc and seating surfaces.
2. Thermodynamic traps for low and medium pressure drip, tracer or process applications shall be of all stainless steel or carbon steel construction with threaded socket weld or flanged connections on a common center line, and will operate in any position, although horizontal is preferred. Traps to be capable of operating with up to 80% back pressure and shall be standard with insulating cover to reduce excessive heat loss resulting from low ambient temperatures, wind, rain, etc. on all TD52, TD42 and TD62 series models. When supplied with an integral strainer a hand wheel or wrench operated blow-down valve, to keep the operator clear of the blow-down stream, shall be available as an option on some models. ***SPIRAX SARCO MODELS TD52 or TD52L,***

Hamlin Design Group  
PRJ 201 Oakside Elementary  
PRJ 202 Uriah Hill School  
PRJ 203 Woodside School  
PRJ 204 Middle School

The City School District of Peekskill  
SED 66-15-00-01-0-005-020  
SED 66-15-00-01-0-007-014  
SED 66-15-00-01-0-008-017  
SED 66-15-00-01-0-014-005

**C. STBP-1: Balanced Pressure Thermostatic Traps**

1. Balanced Pressure Thermostatic Traps shall be self-adjusting over the full operating range of the trap. All elements shall be either multiple plate bellows or capsule enclosed diaphragm of precision welded stainless steel with hardened stainless steel valve head. Internals shall be renewable without disturbing the piping.
2. Radiator traps shall operate from 25" Hg vacuum to 125 psig. Brass body, stainless steel seat and element replaceable in line. Trap shall discharge at 23°F below saturation temperature. Angle pattern traps with standard inlet spud or extended spud to meet legacy trap dimensions.
3. ***SPIRAX SARCO MODEL RTA-125, RTH-125, RTV-125***

**PART 3 - EXECUTION**

**3.1 GENERAL**

- A. All equipment and systems as shown on the drawings or specified herein shall be installed in accordance with the provisions of each applicable section of these specifications.
- B. Obtain detailed written or graphical instruction from each manufacturer for proper method of installing each piece of equipment.
- C. Provide all supporting steelwork, hangers, and suspension racks for all equipment as required, and support as approved by Engineer.

END OF SECTION 232110

Hamlin Design Group  
PRJ 201 Oakside Elementary  
PRJ 202 Uriah Hill School  
PRJ 203 Woodside School  
PRJ 204 Middle School

The City School District of Peekskill  
SED 66-15-00-01-0-005-020  
SED 66-15-00-01-0-007-014  
SED 66-15-00-01-0-008-017  
SED 66-15-00-01-0-014-005

## SECTION 232113 - PIPING SYSTEMS AND ACCESSORIES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General and Supplementary conditions and Division 1 Specification Sections, apply to work of this section.

#### 1.2 SUBMITTALS

- A. Schedule of pipe and fittings.
- B. Product data for all materials.
- C. Test reports.

#### 1.3 REFERENCE STANDARDS AND CODES

- A. All installations and materials shall conform to applicable 2016 New York State Building code, and local building and plumbing codes.
- B. All piping shall be inspected and approved by Underwriters Laboratories and bear the UL label.
- C. All installations shall conform to requirements of Owner's Insurance carriers.
- D. Refer to the latest edition and applicable sections of the following:
  - 1. American Society of Testing and Materials (ASTM)
  - 2. American National Standards Institute (ANSI)
  - 3. American Society of Mechanical Engineering (ASME)
  - 4. Boiler and Pressure Vessel Code, Section IX, Welding and Brazing Qualifications.
  - 5. Boiler and Pressure Vessel Code, Section VIII, Division 1 - Pressure.
  - 6. Boiler and Pressure Vessel Code, Section IV, Heating Boilers.
  - 7. Code for Pressure Piping B31.9 - Building Services Piping.
  - 8. American Welding Society (AWS).
  - 9. National Fire Protection Association (NFPA)
  - 10. National Electrical Manufacturer's Association (NEMA)

11. "Maximum allowable natural gas pressure: gas pressures within boiler rooms shall not exceed a maximum of 2 psig; gas pressures within buildings (other than boiler rooms) shall not exceed a maximum of 0.5 psig."

#### 1.4 GENERAL REQUIREMENTS

- A. All materials furnished and all installations made under this specification shall conform with the applicable requirements of the codes and standards described herein.
- B. Layout of equipment, piping, etc. is diagrammatic, unless detailed. Check project drawings prior to making installations for interference's with other trades and services. Owner reserves the right to make reasonable changes prior to "rough-in" without added expense. All dimensions shown are subject to verification of exact site conditions.
- C. Have any required local or municipal inspection processed and present to Owner with certificate indicating approval of such governing body.
- D. Furnish and install all brackets, anchors, sleeves, seals and/or supports as required for the HVAC installations. Where detail is not shown, submit shop drawings of intended construction for approval.
- E. All work to be performed in cooperation with the Owner. Coordinate construction schedule with the Owner. Report delays in material receipt immediately to Owner indicating full circumstances concerning delay.
- F. Piping systems shall be presented to the Owner complete, in perfect working order, tested in full accordance with the Contract Documents. All work associated with the installations shall be guaranteed in complete accordance with the Contract Documents.
- G. Perform all testing as required and as specified herein.

### PART 2 - PRODUCTS

#### 2.1 PIPE

- A. Heating Hot Water (2" & Below):
  1. Type L, seamless hard drawn temper copper tube, ASTM B-88; wrought copper socket fittings, unions, ANSI B16.22; threaded valve connections, solder joints shall be 95-5 tin to antimony solder, conforming to ASTM B-32.
  2. Type L, seamless hard drawn temper copper tube, ASTM B-88; unions, ANSI B16.22. For use with mechanically joined fittings.

B. Heating Hot Water (2-1/2" & Larger):

1. Black steel pipe, seamless or ERW, Schedule 40 with beveled ends, ASTM A-53, GR.B; steel weld joints and fittings, ASTM A-234; standard weight steel flanged connections to valves and equipment, butt-weld ends, raised facings, 150 lb. rating, ANSI B16.5.
2. Black steel pipe, seamless or ERW, Schedule 40 with beveled ends, ASTM A-53, GR.B; ASTM A-234; standard weight steel flanged connections to valves and equipment, 150 lb. rating, ANSI B16.5. For use with mechanically joined fittings.

C. Low Pressure Steam up to 15 PSI (2" & Below): Black steel pipe, seamless or ERW, Schedule 40, ASTM A-53, GR.B; threaded malleable iron fittings, 150 lb. rating, ANSI B16.3; threaded joints, ANSI B1.20.1; union connections.

D. Low Pressure Steam up to 15 PSI (2-1/2" & Larger): Black steel pipe, seamless or ERW, Schedule 40 with beveled ends, ASTM A-53, GR.B; welded joints and steel fittings, ASTM A-234; standard weight steel flanged connections to valves and equipment, butt-weld ends, raised facings, 150 lb. rating, ANSI B16.5.

E. Steam Condensate (2" & Below): Black steel pipe, seamless, Schedule 80 (XS), ASTM A-53, GR.B; threaded malleable iron fittings, 300 lb. rating; ASTM B16.3; threaded joints, ANSI B1.20.1, union connections.

F. Steam Condensate (2-1/2" & Larger): Black steel pipe, seamless, Schedule 80 (XS), ASTM A-53, GR.B; welded joints, extra heavy (XS) steel weld fittings, 300 lb. rating, ASTM A-234; flanged connections to valves and equipment, butt-weld ends, raised facing, 300 lb. rating, ANSI B16.5.

G. Condensate Drain (1" & Below): Type M, hard drawn copper tube, ASTM B-88; wrought copper socket fittings, unions, ANSI B16.22; solder joints shall be 50/50 tin to lead solder, conforming to ASTM B-32.

H. Condensate Drain (1-1/4" & Larger): Type DWV, hard drawn copper tube, ASTM B-88; wrought copper socket fittings, unions, ANSI B16.22; solder joints shall be 50/50 tin to lead solder, conforming to ASTM B-32.

2.2 FITTINGS (FOR WATER ONLY)

A. 2" and Smaller – Copper Pipe Mechanically Joined Fittings:

1. Copper and copper alloy press fittings shall conform to material requirements of ASME B16.18 or ASME B16.22 and performance criteria of ASME B16.51 and IAPMO PS 117. Sealing elements shall be factory installed EPDM. Fittings shall be rated for an operating pressure of 200PSI and operating temperature range of 0°F to 250°F
2. Manufacturer shall warranty fittings to be free from failure caused by manufacturing defect for a period of 50 years from date of installation.

3. Fittings shall not be allowed for use in below grade/direct buried application, or exposed outside of building envelope.
  4. Fittings shall be Viega ProPress or equal.
- B. 2-1/2" and Larger - Steel Pipe Mechanically Joined Fittings:
1. Couplings shall be manufactured in two segments of cast ductile iron, conforming to ASTM A-536, Grade 65-45-12. Gaskets shall be pressure-responsive synthetic rubber, grade to suit the intended service, conforming to ASTM D-2000. Mechanical Coupling bolts shall be zinc plated (ASTM B-633) heat treated carbon steel track head conforming to ASTM A-449 and ASTM A-183, minimum tensile strength 110,000 psi.
    - a) Rigid Type: Victaulic Style 107H / W07. Coupling housings with offsetting, angle-pattern bolt pads shall be used to provide system rigidity and support and hanging in accordance with ANSI B31.1, B31.9, and NFPA 13. Above 12in, coupling keys shall be wedge shaped for increased strength. Installation ready rigid coupling for direct stab installation without field disassembly. Gasket shall be Grade "EHP" EPDM compound with red color code designed for operating temperatures from -30°F to +250°F.
    - b) Flexible Type: Victaulic 177N / W77. Use in locations where vibration attenuation and thermal expansion compensation (including risers). Flexible couplings may be used in lieu of flexible connectors at equipment connections. Installation ready flexible coupling for direct stab installation without field disassembly. Gasket shall be Grade "EHP" EPDM compound with red color code designed for operating temperatures from -30°F to +250°F.
    - c) Fittings: Cast of ductile iron conforming to ASTM A-536, Grade 65-45-12, provided with an alkyd enamel finish. Factory-fabricated grooved end header all-in-one assembly for fluid distribution, consisting of an ASTM A53, Grade B, standard weight pipe spool with required outlet connections. Grooved ends roll grooved to Victaulic dimensions, with enamel coating.

## 2.3 IDENTIFICATION

- A. Pipe Identification Markers: Furnish and install pipe identification markers on all piping installed under this contract. It shall consist of self-adhesive labels of black letters imprinted on color coded backgrounds indicating pipe fill and direction of flow. Lettering shall be 2" high on pipes 3" diameter and over and 3/4" high on pipes under 3". Markers shall be applied to pipe, or to insulation in case of insulated pipes, on 15' centers and at each valve, whichever is closer. Color code as follows:

	<u>Legend</u>	<u>Background</u>
a)	Steam Supply	Yellow
b)	Steam Condensate	Yellow
c)	Heating Hot Water	Yellow
d)	Condensate Drain	Green
e)	Refrigeration Piping	Green

- B. All pipe identification colors shall conform to ANSI Standard A-13.1. Pipe identification markers shall be vinyl cloth, 0.0085" thick, Seton Nameplate Corp., Setmark Type; or equal.
- C. Nameplates: Identify each valve, control entity or piece of equipment with stamped brass or engraved plastic nameplate permanently attached by riveting, wiring, etc. Set up complete identification system in cooperation with Owner's Physical Plant/Maintenance Department. Each drain plug or valve shall be tagged "DRAIN". Furnish and install engraved rigid laminated plastic nameplate to identify function of each control item on temperature control panel. Remote operating control switches shall have engraved faceplates to indicate function and/or operation controlled. Embossed and/or pressure sensitive plastic tape labels shall not be acceptable. Furnish engraved 2" x 1" black rigid laminated plastic nameplate for each motor starter furnished for mechanical equipment and present with motor starter to EC for mounting.

## 2.4 PIPING HANGER SYSTEMS

- A. Heating System Pipe Hangers: Furnish cast iron single pipe roll hangers, carbon steel clevis hangers, carbon steel copper plated hanger, as required for proper installation. Furnish C Type beam clamps, carbon steel electro-galvanized continuous threaded rod and accessories as required. Furnish as manufactured by Elcen Metal Products Co., Michigan Hanger Co., Inc.; or an approved equal.
- B. Non-Insulated System Pipe Hangers: Furnish clevis ring pipe hanger, carbon steel electro-galvanized finish, Model #401. Furnish steel c-clamps, continuous threaded rod and accessories.
- C. Furnish trapeze hanger system in addition or in place of hanger systems above as detailed on drawings.

## 2.5 TEE CONNECTIONS

- A. Two sizes or more smaller than main run in steel pipe, make with Bonney Forge, Inc., Weldolets or Threadolets; or equal. Copper tube run-out piping thus connected to steel mains shall be by means of bronze threaded adapter threaded into Threadolet.

## 2.6 LIABILITY

- A. Contractor shall be held liable throughout guarantee period for any damage from failure of piping due to poor or faulty workmanship and/or defective materials.



## 2.7 STEEL PIPE HANGERS

- A. Horizontal runs of pipe shall be securely held in place by means of suitable hangers. In general, hanger shall be clevis type with threaded rod supports. Chain or cold rolled flat steel straps are not acceptable. Supports shall be spaced according to the following schedule:

	<u>Pipe Size</u>	<u>Maximum Spacing</u>	<u>Minimum Rod Size</u>
1.	3/4 in.	5 ft.	3/8"
2.	1 in.	6 ft.	3/8"
3.	1-1/4 in.	6 ft.	3/8"
4.	1-1/2 in.	8 ft.	3/8"
5.	2 in.	10 ft.	3/8"
6.	2-1/2 in.	11 ft.	1/2"
7.	3 in.	12 ft.	1/2"
8.	4 in.	12 ft.	5/8"
9.	6 in.	10 ft.	3/4"
10.	8 in. and larger	10 ft.	3/4"

- B. Heating piping hangers shall be applied directly to piping. Cut-out insulation for hanger and cover with jacketing. Insulation shall be "butt-up" to hanger as tightly as possible.
- C. Where Piping is Supported From Open Web Steel Joists, and Running Perpendicular to the Joists:
1. Reduce the maximum hanger spacing for 8" pipe from 12 feet to 8 feet. Where two 6" or 8" pipes are running side by side, stagger the hangers so only the load from one pipe is applied to a joist. Where two 6" and two 8" pipes are running side by side, reduce the maximum hanger spacing for 6" pipe from 12 feet to 8 feet and for 8" pipe from 12 feet to 6 feet, and stagger the hangers so that no more than one 6" pipe and one 8" pipe are supported from a single joist. Where possible, support from steel beams or girders.
- D. Where Piping is Supported From Open Web Steel Joists, and Running Parallel to the Joists:
1. Reduce the maximum hanger spacing for 6" pipe from 12 feet to 10 feet and for 8" pipe from 12 feet to 8 feet. Where two 6" or 8" pipes are running side by side, stagger the hangers so only the load from one pipe is applied to each support location. Where two 6" and two 8" pipes are running side by side or where four 6" inch pipes are running side by side, reduce the maximum hanger spacing for 6" pipe from 12 feet to 8 feet and for 8" pipe from 12 feet to 6 feet, span unistrut supports between at least three joists, and stagger the hangers so that no more than two pipes are supported at each support point. Where possible, support from steel beams or girders.

## 2.8 COPPER TUBE HANGERS

- A. Pipe hangers for copper tube shall be copper plated hanger rings.

## 2.9 SLEEVES

- A. Pipes passing through masonry construction shall be fitted with sleeves. Each horizontal sleeve shall extend through its respective wall and be flush with each surface. Each vertical sleeve shall extend through its respective floor slab, be flush with underside of slab, and extend 1/2" above top of finished slab. Sleeves shall be two pipe sizes larger than uninsulated lines and one pipe size larger than overall diameter of insulated lines.
- B. See Section 230005 - HVAC Work General; for penetration requirements through fire rated partitions, walls, floors etc.

## 2.10 PIPE ENCLOSURES

- A. 16 GA metal piping enclosures by Sterling. Provide mounting strip and angle supports. Refer to drawings for three sided vertical (model #PCV-83) two sided vertical (model #PCV-82) or horizontal (model #PCH-11) enclosures. Color selection by architect.

VERTICAL PIPE ENCLOSURE			
PIPE SIZE (IN)	NUMBER OF PIPES	INSULATION THICKNESS	PIPE ENCLOSURE SIZE (IN)
3/4	2	1-1/2	10x5
1	2	1-1/2	10x5
1-1/4	2	1-1/2	10x5
1-1/2	2	2	12x6
2	2	2	14x8
2-1/2	2	2	16x8
3	2	2	16x10
4	2	2	18x10
6	2	2	20x12

## PART 3 - EXECUTION

### 3.1 GENERAL PIPE INSTALLATION

- A. The following shall describe methods of assembly to be followed in the installations of piping by the Contractor:
  - 1. All pipe shall be clean and free of internal mill scale, dirt, etc. before installation.
  - 2. All pipe shall be cut accurately to measurements established at the building and shall be worked into place without springing or forcing except where specifically called for. All pipe shall be out of the way of all windows, doors and other building openings or structural parts. All pipe shall be so installed that it can expand and contract freely without damage to any other portions of the work or to itself. All pipe, after having been cut, shall be reamed so as to present full pipe size. All changes in direction shall be made with proper pipe fittings. All pipe shall be

installed approximately as indicated upon the plans and as specified. Piping connections to pieces of equipment shall be in accordance with the details shown on the plans or as specified. All open ends of pipe or equipment shall be properly capped or plugged during the installation in order to keep dirt and foreign matter out of the system.

3. Run-outs and branches from mains to units above the mains shall be taken from the top of the main and sloped up to the units. Run-outs and/or branches for heating units below the mains shall be taken from the bottom of the main and sloped down to the units, except where specifically noted.
4. All changes in supply main size shall be made with eccentric fittings arranged so as not to pocket entrained air.
5. All changes in directions of pipe lines shall be made with proper welding fittings for welded pipe and proper screwed joint fittings for screwed pipe and proper soldering fittings for soldered or brazed tube connections.

### 3.2 EQUIPMENT AND SYSTEMS

- A. All equipment and systems as shown on the drawings or specified herein shall be installed in accordance with the provisions of each applicable section of these specifications and all local and state codes and regulations having jurisdiction.
- B. All installations shall be performed in a workmanlike manner as determined by the Architects or Owner.
- C. Accurately establish grade and elevation of all piping before setting sleeves. Arrange piping at equipment with necessary offsets, unions, flanges, valves, to allow for each part removal and maintenance, as approved.
- D. Pitch steam condensate and drain piping to allow for proper drainage.
- E. Offset piping and change elevation as required to coordinate with all other trades.
- F. Avoid contact with any part of other mechanical or electrical systems.
- G. Provide adequate means of draining and venting all units, risers, circuits and systems.
- H. Conceal all piping unless otherwise specified.
- I. Cap or plug equipment and pipe openings during construction. Install piping parallel with lines of building, properly spaced to provide clearance for insulation.
- J. Provide trap seal of adequate depth in overflow line on each drain pan installation.
- K. All cleanout plugs, bushings and nipples, required for gauge and instrument installation shall be brass.
- L. Do not install valves, unions and flanges in inaccessible locations.

- M. Materials used within a system and between systems shall be consistent. If this is not possible, install approved dielectric fittings.
- N. Ream pipes after cutting and clean before installing.
- O. Refer to Specification Section 232100 - Water Systems Specialties & Equipment; for water system fill requirements.

### 3.3 FABRICATION AND CONNECTIONS

- A. Area of interior welding/soldering shall be ventilated. Personnel shall use respirator protection in accordance with OSHA if ventilation cannot be accomplished during welding/soldering operations in the field.
- B. Fabrication methods as specified in Pipe & Fittings Products, shall be as follows:
- C. Welding:
  - 1. Contractor shall provide welders who are qualified to Section IX of the ASME Boiler and Pressure Vessel Code.
  - 2. All welds shall conform and be inspected in accordance with ASME B31.9 pressure piping.
  - 3. Comply, with Section II, Part C. ASME Boiler and Pressure Vessel Code for welding materials appropriate for the wall thickness and chemical analysis of the pipe being welded.
  - 4. Welding can be electric arc or oxy-acetylene and shall present a complete fusion of the weld metal and parent metals for the full depth and/or thickness of adjacent butted parent metals and for the complete circumference.
  - 5. Weld and fabrication sequence shall be arranged to avoid distortion or damage to piping and fittings. Cutting of pipe shall be done to achieve straight lines and squared surfaces.
- D. Flanged Connections:
  - 1. Flanged joints shall be carefully aligned and flange bolts, nuts and fastener bearing surfaces shall be lubricated with a heavy graphite oil mixture.
  - 2. Initial tightening of flange bolts shall be 1/2 of the final torque and shall be tightened in a proper sequence pattern. Final tightening shall be uniform with each bolt pulling the same load. Bolts shall be re-tightened 24 hours after final tightening. Torque values shall be in accordance with industrial standards.
  - 3. Furnish gasket material, thickness and type suitable for fluid to be handled, and design temperatures and pressures.

- E. Soft Solder Joints - 95/5: Thoroughly clean, apply flux, heat mating parts and apply solder to flow over and form a complete bond of mating parts. Remove excess solder and hold each joint rigid and still until completely cooled. Soft solder shall be 95% tin - 5% antimony, Mueller Brass Co., #95; or equal. Bring soldering flux on job in 2 oz. cans only and keep sealed when not in use.
- F. Screw Joints: Shall be made with standard taper pipe threads, properly cut and made up with "permatex", or equal, pipe dope applied to male ends. The use of teflon type tape shall not be permitted.
- G. Grooved Connections: Pipe ends shall be clean and free from indentations, projections and roll marks in the area from pipe end to groove for proper gasket sealing. The gasket style and elastomeric material (grade) shall be verified as suitable for the intended service as specified. A Victaulic factory trained representative (direct employee) shall provide on-site training for contractor's field personnel in the use of grooving tools, application of groove, and product installation. All groove depths shall be checked manually or by grooving tool (RG5200i). A Victaulic representative shall periodically visit the job site and review installation.
- H. Mechanical Press Fittings: Pipe ends shall be cut on a right angle (square) to the tube. Pipe ends shall be reamed and chamfered, all grease, oil or dirt shall be removed from the tube end with a clean rag. Visually examine the fitting sealing element to ensure there is no damage, and it is properly seated into the fitting. Insert tube fully into the fitting. Make a mark with a felt tip pen on the pipe at the face of the fitting. Always examine the tube to insure it is fully inserted into the fitting prior to pressing the joint. Utilize manufacturer's recommended tool(s) to make final connection. Sealing elements shall be verified for the intended use. Installers shall attend manufacturer's installation training class prior to start of work.

### 3.4 TESTING

- A. Preparation and testing shall be in accordance with ASME B31.9.
- B. Refer to Specification Section 230593 - Testing, Adjusting and Balancing; for adjusting and balancing of systems.
- C. Preparation:
  - 1. Leave joints including welds uninsulated and exposed for examination during the test.
  - 2. Provide temporary restraints for expansion joints which cannot sustain the reactions due to test pressure. If temporary restraints are not practical, isolate expansion joints from testing.
  - 3. Flush system with clean water. Clean strainers.

4. Isolate equipment that is not to be subjected to the test pressure from the piping. If a valve is used to isolate the equipment, its closure shall be capable of sealing against the test pressure without damage to the valve. Flanged joints at which blinds are inserted to isolate equipment need not be tested.
5. Install relief valve set at a pressure no more than 1/3 higher than the test pressure, to protect against damage by expansion of liquid or other source of over-pressure during the test.

D. Hydrostatic Testing (Hydronic Systems):

1. Use ambient temperature water as the testing medium, except where there is a risk of damage due to freezing. Another liquid may be used if it is safe for workmen and compatible with the piping system components.
2. Use vents installed at high points in the system to release trapped air while filling the system. Use drains installed at low points for complete removal of the liquid.
3. Examine system to see that equipment and components that cannot withstand test pressures are properly isolated. Examine test equipment to ensure that it is tight and that low pressure filling lines are disconnected.
4. Subject piping system to a hydrostatic test pressure which at every point in the system is not less than 100 psi or 1.5 times the design pressure. The test pressure shall not exceed the maximum pressure for any vessel, pump, valve or other component in the system under test. Make a check to verify the stress due to pressure at the bottom of vertical runs does not exceed either 90% of specified minimum yield strength, or 1.7 times the "SE" value in Appendix A of ASME B31.9, Code for Pressure Piping, Building Services Piping.
5. After the hydrostatic test pressure has been applied for at least 2 hours, examine piping, joints and connections for leakage. Eliminate leaks by tightening, repairing or replacing components as appropriate and repeat hydrostatic test until there are no leaks.
6. Clean and flush hydronic piping systems. Remove, clean and replace strainer screens. After cleaning and flushing hydronic piping system, but before balancing, remove disposable fine mesh strainers in pump suction diffusers.

E. Test Medium: The test medium shall be air, nitrogen, or carbon dioxide. OXYGEN SHALL NEVER BE USED.

F. Pressure Testing and Inspection - General:

1. Prior to acceptance and initial operation, all piping installations shall be inspected and tested to determine that the materials, design, fabrication and installation practices comply with Code Requirements.

2. Inspection shall consist of visual examination, during or after manufacture, fabrication, assembly or pressure tests as appropriate. Supplementary types of non-destructive inspection techniques, such as magnetic-particle, radiographic, ultrasonic, etc. shall not be required unless specifically listed herein or in the engineering design.
3. In the event repairs or additions are made following pressure test, the affected piping shall be tested, except that, in the case of minor repairs or additions, testing shall be permitted to be omitted where precautionary measures are taken to ensure sound construction.
4. Because it is sometimes necessary to divide a piping system into test sections and install test heads, connecting piping and other necessary appurtenances for testing, it is not required that the tie-in sections of pipe be pressure tested. Tie-in connections, however, shall be tested with soap solution after gas has been introduced and the pressure has been increased sufficiently to give some indications should leaks exist.

G. Test Preparation:

1. Pipe joints, including welds, shall be left exposed for examination during the test. If the pipe end joints have been previously tested in accordance with Code Requirements, they shall be permitted to be covered or concealed.
2. Equipment that is not to be included in the test shall be either disconnected from the piping or isolated by blanks, blind flanges, or caps. Flanged joints at which blinds are inserted to blank off other equipment during the test shall not be required to be tested.
3. Where the piping system is connected to equipment or components designed for operating pressures of less than the test pressure, such equipment or equipment components shall be isolated from the piping system by disconnecting them and capping the outlet(s).

H. Test Pressure:

1. Test pressure shall be measured with a manometer or with a pressure measuring device designed and calibrated to read, record, or indicate a pressure loss due to leakage during the pressure test period. The source of pressure shall be isolated before the pressure tests are made.
2. The test pressure to be used shall be no less than 1-1/2 times the proposed maximum working pressure, but not less than 3 psig (20 kPa gauge), irrespective of design pressure. Where the test pressure exceeds 125 psig (862 kPa gauge), the test pressure shall not exceed a value that produces a hoop stress in the piping greater than 50 percent of the specified minimum yield strength of the pipe.



3. Test duration shall be not less than 1/2 hour for each 500 cubic feet of pipe volume or fraction thereof. When testing a system having a volume less than 10 cubic feet, the test duration shall be permitted to be reduced to 10 minutes. For piping systems having a volume of more than 24,000 cubic feet, the duration of the test shall not be required to exceed 24 hours.

I. Detection of Leaks and Defects:

1. The piping system shall withstand the test pressure specified without showing any evidence of leakage or other defects. Any reduction of test pressures as indicated by pressure gauges shall be deemed to indicate the presence of a leak unless such reduction can be readily attributed to some other cause.
2. The leakage shall be located by means of an approved combustible gas detector, soap and water, or an equivalent non-flammable solution. Matches, candles, open flames, or other methods that could provide a source of ignition shall not be used.
3. CAUTION: Since some leak test solutions, including soap and water, may cause corrosion or stress cracking, the piping shall be rinsed with water after testing, unless it has been determined the leak test solution is non-corrosive.
4. Where leakage or other defects are located, the affected portion of the piping system shall be repaired or replaced and re-tested.

- J. Test Records: Records shall be made of inspection and all tests performed. These records shall indicate which portions of the piping system conform to Code Requirements or were pressure tested.

END OF SECTION 232113

Hamlin Design Group  
PRJ 201 Oakside Elementary  
PRJ 202 Uriah Hill School  
PRJ 203 Woodside School  
PRJ 204 Middle School

The City School District of Peekskill  
SED 66-15-00-01-0-005-020  
SED 66-15-00-01-0-007-014  
SED 66-15-00-01-0-008-017  
SED 66-15-00-01-0-014-005

## SECTION 232115 - INITIAL FILL & CLEANING (ALL HYDRONIC SYSTEMS)

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 RELATED SECTIONS

- A. 232500 - Chemical Water Treatment
- B. 235000 - Boil-Out Boiler Commissioning
- C. 230593 - Testing, Adjusting and Balancing

#### 1.3 SUBMITTALS

- A. Product data.
- B. A written report is to be completed as specified in Part 3.

### PART 2 - PRODUCTS

#### 2.1 GENERAL

- A. Trisodium phosphate or other cleaning agent.

### PART 3 - EXECUTION

#### 3.1 FILLING & FLUSHING

- A. Contractor to install hose assemblies in pipe loop prior to unit installation.
- B. Connect hose assemblies directly from supply to return piping (where each unit is to be located) to allow circulation through entire loop for thorough flushing.
- C. Fill system with clean, fresh water and properly vent.
- D. Hydrostatically test the system to check for leaks and fix any leaks as soon as discovered.
- E. Position valves to bypass heat rejecter and supplementary water heater. Start both pumps to circulate water through system.
- F. Check strainers often and clean as needed.
- G. Continue flushing, using the system pumps, until water coming out of the pipe loop to open the drain has become clear. NOTE: Insure that make-up water is added fast enough to replace what is being flushed out.
- H. Flush system for at least two (2) hours until the water is clear and debris flushed out.

- I. Remove temporary filter in suction diffuser at pump.

### 3.2 CLEANING

- A. **NOTE: BOIL-OUT MUST BE COMPLETED BEFORE PROCEEDING WITH SYSTEM CLEANING, SEE SECTION 235000.**
- B. Fill system with fresh water and add a cleaning agent such as trisodium phosphate (TSP).
- C. Adjust bypass valves at head rejecter and supplementary water heater to normal operation position.
- D. Disconnect power to heat rejecter and air conditioners so they will not operate while system is being cleaned.
- E. Circulate the cleaning solution through the system, with water heater controls temporarily adjusted to raise the solution temperature to 105°F - 110°F. NOTE: DO NOT raise temperature above 110°F.
- F. Alternate operation of primary and standby pumps and circulate solution for several hours.
- G. Turn off water heater and pump, completely drain system and refill with fresh water.
- H. If there is any indication of debris in system or if tested water is slightly acid, the cleaning process must be repeated (The pH must be between 7.0 and 8.0).
- I. Install hose assemblies.
- J. Adjust flow control valves in the return lines to establish the proper GPM. System balancing is to be accomplished prior to start-up of the equipment.
- K. Field services shall be provided by a factory trained representative to fully set-up and adjust the units, after the installations have been completed and before the units are placed in service. Written start-up report to be furnished. Factory alignment, lubrication, three phase motor rotation, etc. shall all be completed and checked before pumps are placed in service.
- L. Provide written report to Architect stating that all steps of filling, flushing and cleaning of system have been fully completed. Also include test results to insure that water pH is between 7.0 and 8.0.

### 3.3 HYDRONIC

- A. New Systems:
  - 1. Check pre-charge pressure of diaphragm-type expansion tank. This pressure must match system fill pressure (if it does not, follow manufacturer's instructions for pressurizing tank).
  - 2. PRV must be set at same pressure as tank.
  - 3. Close all AV's except high capacity AV (AF-1) in boiler room.

4. Fill system with fresh, clean water until water runs freely from AF-1.
5. Test pH of water: it must be between 7.0 and 8.0.
6. Vent all units, mains, etc. in systems.
7. Hydrostatically test the system for leaks and repair any leaks as soon as discovered.
8. Run pumps with cold water for 20 to 30 minutes.
9. Stop pumps and start boiler burner. Allow boiler water temperature to reach 220°F, then turn off burner. Wait one minute then start pump and let run for 10 minutes. (If any panel radiation is present, allow boiler water to cool to 140°F before starting pump.)
10. Stop pumps and vent system once again.
11. After approximately 30 days of system operation, contractor shall be responsible for blow-down of all main strainers and removal of temporary filter from the suction diffuser.
12. Provide written report to Architect stating tank and system pressure, pH of water and date of strainer blow-downs and filter removal.

B. Existing Systems: In addition to above steps:

1. Make necessary connections of new piping to existing.
2. Re-fill the system by flushing system with clean water until discharge runs clean. Test pH of water; it must be between 7.0 and 8.0.
3. Contractor shall be responsible (to the owner's satisfaction) for replacing any chemicals, inhibitors, glycol, etc. lost in the connection process.
4. Vent new and existing systems.
5. Hydrostatically test new and existing systems, and insure that any discovered leaks will be repaired. Special attention is required to insure that there is no leakage from existing valves, AV's or other equipment. Contractor shall be responsible for replacing ceilings or other surfaces damaged by leaks from existing systems.
6. If Contractor discovers severely degraded piping, he shall immediately notify the Architect, in writing.
7. After the system has been operating for 30 days, Contractor is responsible for blow-down of main strainers.
8. Provide written report to Architect stating the completion of above procedure and dates of completion.

END OF SECTION 232115

## SECTION 233300 - DUCTWORK ACCESSORIES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUBMITTALS

- A. Schedule of all components.
- B. Product data sheets on all equipment.
- C. Submit shop drawings on all equipment. Include all performance and dimensional data.

#### 1.3 GENERAL REQUIREMENTS

- A. All control dampers shall have published performance data taken from test made in accordance with AMCA Standard 500 and in compliance with the AMCA certified ratings program for air performance and air leakage performance.
- B. All fire dampers shall be rated for 1-1/2 hrs (unless specifically noted otherwise) under UL Standard 555 and shall meet NFPA 90A construction requirements.
- C. Backdraft dampers shall have performance data published under the guidelines of AMCA and conform to all safety standards as set forth by NFPA 90A.

### PART 2 - PRODUCTS

#### 2.1 VOLUME DAMPERS

- A. Provide where indicated on drawings or required to control air flow, for air balancing, size as required, manually operated.
- B. For Rectangular Ducts up to 12" Max Dimension: Single blade volume damper for use by air balancing contractor. Damper may be fabricated by sheetmetal contractor. Damper blade shall be fabricated from stiff material and be free from operating noise. Ensure sufficient clearance between damper blade and duct wall to prevent noise. Provide external position indication and locking quadrant.
- C. For Rectangular Ducts Over 12": Furnish and install where indicated on drawings, size as required, manually operated, opposed blade damper, 16 ga. galvanized steel construction, concealed linkage, with manual locking quadrant. Model #VCD-20, Greenheck Fan Corporation; or equal.

- D. For Round Ducts: When volume damper is not an integral part of branch connection, furnish and install where indicated, size as required, manually operated, round air balancing damper, galvanized steel construction with manual locking quadrant. Model VCDR-53, Greenheck Fan Corporation.
- E. BD-1: Backdraft damper, nonmetallic type with blades constructed of neoprene coated fiberglass. Extruded aluminum channel. Model #BD51, Pottorff Mfg.; or an approved equal. Don't have a vinyl blade damper.
- F. BD-2: Counter balanced backdraft damper, constructed of 75 aluminum blades with neoprene blade seal and steel axles will ride on ball bearing. Model #EM-30, Greenheck Fan Corporation.
- G. CD-1: Control damper, aluminum construction, parallel blade, Oilite Bronze bearings, Stainless steel jamb seals and vinyl blade seals, stainless steel linkage. Model #VCD-43, Greenheck Fan Corporation.

## 2.2 FIRE DAMPERS

- A. FRD-A: Fire dampers used in transfer air sleeves between adjacent rooms above ceilings, UL listed 1-1/2 hour rating. Nailor Industries Model #0110 or equal.
- B. FRD-B: Fire dampers shall be manufactured, tested and labeled in accordance with UL 555 Safety Standard for Fire Dampers - Sixth Edition, June 1999, and shall have 1-1/2 hour fire resistance rating. Each fire damper shall bear a UL label verifying fire resistance rating in addition to intended mounting position. Fire dampers shall be suitably constructed for vertical or horizontal installation as required for each specific location. Each fire damper shall be complete with a 165°F (74°C) UL Listed fusible link. Fire dampers shall each include a steel sleeve of appropriate length/gauge and retaining angles, supplied by damper manufacturer to ensure proper installation in accordance with damper manufacturer's instructions. Damper to have blades out of air stream. Contractor shall provide and install an access door at each fire damper, of appropriate size to allow for inspection, testing and fusible link replacement. Information submitted for approval shall include confirmation of UL qualifications, pressure drop data and manufacturer's installation instructions. Fire dampers shall be Nailor Industries Models 0120 (Type B), or equal. Use Model 0130V or 0130H for round ducts.
- C. FRD-S: Provide fire/smoke dampers where indicated on drawings. UL 555S classified Class II leakage rating at 250 degrees and UL 555 listed 1-1/2 hour labeled. Nailor Model # 1270ERL with min. 16" long 20 gauge sleeve and 120 volt electric actuator, with actuator out of airstream, and 165°F heat responsive device. Contractor shall provide and install an access door at each fire damper, of appropriate size to allow for inspection and testing. Electrical contractor shall furnish smoke detector to heating contractor – heating contractor to install within 5'-0" of damper. Install detector per manufacturer's recommendations and requirements.

## 2.3 DUCT ACCESS DOORS

- A. Furnish and install where indicated on plans and/or required for access to life safety dampers, control probes, etc.; galvanized door with manual lock(s), double wall, 1" internal fiberglass insulation, galvanized steel frame, foam gasket seal, minimum 24 gauge construction. Label each access door at fire dampers with "Fire Damper" in letters no less than 1/2" high.
1. Hinged Type: Model #H-10, Buckley Air Products
  2. Double Latch Type: Model #C-10, Buckley Air Products

## 2.4 ARCHITECTURAL ACCESS DOORS

- A. Ceiling/Wall Access Door: door and frame for use in existing ceiling or walls. Door and frame fabricated from galvanized steel, thickness as scheduled, with rounded edges and concealed pivoting rod hinge. Frame shall be one piece construction with no miters or welds exposed on face. Door shall include screw driver type latch mechanism.
- B. For Existing Ceilings: Provide concealed 1-1/2"x 1-1/2" support angles to be used as a sub-structure to support door frame above existing ceiling.
- C. For Fire Rated Doors: Doors shall be UL Listed for fire rated service as scheduled. Door shall include heavy duty spring closer.

Tag	AD	ADF
Model #	BNTC 24x24	BIT 24x24
Manufacturer	Babcock-Davis	
Fire Rating (hours)	None	1.5
Fire Rating Label	None	B
Steel Thickness	16 gauge	16 gauge
Size (inches)	24x24	24x24
Weight (lbs)	16	24.5
Latches (Qty)	3	1
Notes	(1)(2)	(1)(2)

### Notes:

- (1) Finish factory prime coat, contractor shall field paint white to match ceiling where located.
- (2) Contractor shall verify actual size prior to ordering if required to fit actual ceiling tile arrangement, size may be adjusted to 22x22. However, no gaps are to be allowed from door frame flange and adjacent existing ceiling tiles around perimeter.

## 2.5 CODE REQUIREMENTS

- A. All work shall be in accordance with all applicable codes including NFPA 90A, 90B, and SMACNA requirements.



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The City School District of Peekskill  
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SED 66-15-00-01-0-007-014  
SED 66-15-00-01-0-008-017  
SED 66-15-00-01-0-014-005

### PART 3 - EXECUTION

#### 3.1 GENERAL

- A. Install all equipment in strict accordance with manufacturer's instructions.

#### 3.2 DAMPERS

- A. Contractor to furnish all required hardware to complete installation of air split damper and regulator.
- B. Provide access doors for dampers not accessible from grilles.
- C. Dampers shall be installed so as not to cause stress or strain on the frames. Fasteners shall not interfere with proper operation of blades or linkages.
- D. Lubricate and thoroughly clean all moving parts according to the manufacturer's recommendations before initial operation.
- E. Seal all seams.
- F. Make all necessary adjustments to linkages to insure dampers open fully and close tightly over full stroke of actuator.
- G. Replace any damaged parts including blades, seals, linkages, etc.
- H. Install automatic vent damper in strict accordance with manufacturer's instructions and NFPA 54.

END OF SECTION 233300

## SECTION 233310 - DUCTWORK HANGERS & SUPPORTS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS:

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specifications Sections apply to work of this section.

#### 1.2 SUBMITTALS

- A. See Section 233330 for submittal requirements.

#### 1.3 WORK INCLUDED

- A. Contractor shall provide all hangers and supports for all ductwork and air system equipment and accessories.
- B. Contractor shall field verify and coordinate all ductwork hangers and supports, dimensions, clearances, and ductwork elevations with new and existing building structure.

#### 1.4 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 233330 - Low Velocity Ductwork
- B. Section 230713 - Duct Insulation

#### 1.5 QUALITY ASSURANCE

- A. SMACNA Manual: Methods of supporting ductwork shall be in accordance with the SMACNA Manual, Section 1 - Low Velocity Systems", unless otherwise shown on the drawings or specified herein.
- B. SMACNA - Sheetmetal and Air Conditioning Contractors National Association, Inc.
- C. Electrically operated and power actuated tools for installing welded studs and power driven fasteners shall be listed by a nationally recognized test agency.

### PART 2 - PRODUCTS

#### 2.1 DUCT HANGERS

- A. All Hangers Shall Be Rod Type Hangers: Mild carbon steel, unless otherwise specified; fully threaded or threaded each end, with (2) removable nuts each end for positioning and locking rod in place. Unless galvanized or cadmium plated, provide a shop coat of red lead or zinc chromate primer paint.

- B. Hangers for ducts shall be as specified in the SMACNA Manual, with the following exceptions:
1. Lower hanger attachments for rectangular duct with any dimension 18" and above shall be trapeze hangers, supported by threaded rods (3/8" dia. min.).
  2. Trapeze hangers shall be minimum 1-1/2" x 1-1/2" x 1/4" angle or larger size as required by larger or heavier ductwork. Ductmate trapeze hanger size AS and AT is acceptable.
  3. Lower hanger attachments for rectangular duct with maximum dimension less than 18" may be flat strap attached directly to duct. Fasteners penetrating ducts must be completely sealed.
  4. Wire used as supports or as banding shall not be acceptable.
  5. Fasteners used on hanger system shall not penetrate supported ductwork. (Exception: Flat strap hangers, see above.)
  6. Threaded support rods shall utilize sufficient support, jamb, and lock nuts to allow adjustment of duct heights.

## 2.2 MISCELLANEOUS FASTENERS AND UPPER HANGER ATTACHMENTS

- A. Machine Bolts and Nuts: Galvanized or cadmium plated steel.
- B. Steel "C" Clamp with Locknut: Elcen Co.; No. 29L, with 25B steel retaining clips.
- C. Structural Aluminum Shapes and Aluminum Plates.
- D. Structural Steel Shapes and Steel Plates: ASTM A-36, shop primed.
- E. Self Drilling Expanding Fasteners: Phillips type.

## 2.3 BRANCH FITTINGS, JOINTS & TURNING VANES

- A. Provide supports necessary for lengths over 16" or heights over 8".

## PART 3 - EXECUTION

### 3.1 UPPER HANGER ATTACHMENTS

- A. General Notes: Upper hanger attachments for ductwork shall be secured to overhead structural steel or steel bar joists wherever possible, unless otherwise specified.
- B. In addition, when required by ductwork support spacing schedules, provide intermediate structural steel members, framed to span the structural steel or steel bar joists. The minimum size of structural steel members, for use as intermediate steel framing, shall be 2-1/2" x 2-1/2" x 1/4" steel angles. Intermediate steel members shall be shop prime coated prior to installation. Intermediate steel will be sized for span and load to show no deflection.
- C. Secure upper hanger attachments to bar joists at the panel points of joists.

- D. Do not drill holes in main structural steel members.
- E. Exercise extreme care in the field drilling of holes in precast or pre-stressed concrete work, so as to avoid damage to reinforcing. Power driven types of fastening devices shall have be utilized in the attachment of hangers to precast or pre-stressed concrete work.
- F. Upper hanger attachments shall be as specified in the Manual, with the following exceptions:
  - 1. Do not use flat bar, bent rod, power actuated drive pins or expansion nails as upper hanger attachments in concrete construction.
- G. Attachment to Structural Steel: Secure to steel beams with beam clamps, welded studs, power actuated fasteners, or "C" clamps with lock nuts and minimum 1/8"x1" wide safety bars.
- H. Do not use power actuated fasteners except by written permission from the Engineer's Representative.
- I. Do not attach welded studs or powder actuated fasteners to steel less than 3/16" in thickness.
- J. Do not use power drive on beam clamps.
- K. Attachment to New Poured Concrete Construction: Support hangers from concrete insets. Properly locate and install concrete inserts in concrete form work as required, in ample time so as not to delay the construction work. Bolt band iron hangers to inserts with 3/8" bolts. Screw rods into proper size inserts and secure with lock nuts and washers.
- L. Attachment to Cellular Steel or Fluted Metal Decks: Do not support ductwork from cellular steel or fluted metal roof decks. Attach hangers to structural steel members wherever possible, and where required intermediate structural steel supporting members shall be provided, framed to span the structural steel.
- M. For attachment to overhead cellular steel or fluted metal decking, other than roof decks, hangers may be attached by means of welded studs with double nuts. The maximum load on any one stud shall be 250 lbs. **UNDER NO CIRCUMSTANCES SHALL UPPER ATTACHMENTS PENETRATE STEEL DECKING, OR ROOF DECK.**
- N. Riser Supports: Support vertical rectangular ducts by means of two steel angles or channels, anchor bolted to floor slab or adjacent structural member at every floor through which the riser passes. Steel angles or channels shall contact a transverse joint and be secured to the joints by means of 1/8" bolts, or by welding.

- O. Steel angle or channel support sizes shall be as follows:

Max. Side Dimension	Support Angle	Support Channel	Bear on Concrete or Structural Support
36"	1"x1"x1/8"	1"x1/2"x1/8"	2"
48"	1-1/2"x1-1/2"x1/8"	1-1/2"x3/4"x1/8"	3"
60"	2"x2"x1/8"	2"x1"x1/8"	3"
Over 60"	2-1/2"x2-1/2"x3/16"	2"x1"x3/16"	4"

### 3.2 DUCT HANGER SPACING

- A. The duct hanging method must be in accordance with this specification and is subject to Engineer's approval.
- B. Duct hanger spacing shall be in strict accordance with SMACNA and as follows:
1. Rectangular Duct Hangers Min. Sizes:

<u>Max. Half of Duct Perimeter</u>	<u>Rod Pair at 10'Spacing</u>	<u>Rod Pair at 8'Spacing</u>	<u>Rod Pair at 6'Spacing</u>	<u>Rod Pair at 4'Spacing</u>
Up to 72	1/4"	1/4"	1/4"	1/4"
73 to 96	3/8"	1/4"	1/4"	1/4"
97 to 120	3/8"	3/8"	1/4"	1/4"
121 to 168	1/2"	3/8"	3/8"	3/8"
169 to 192	1/2"	1/2"	3/8"	3/8"
Above	SEE SMACNA FOR SPECIAL CONDITIONS			

2. Round Duct Hanger Strap Sizes:

<u>Duct Diameter</u>	<u>Strap Hangers</u>	<u>Max. Spacing</u>
Up to 26"	One 1" x 22 Ga.	12 Ft.
27" - 36"	One 1" x 18 Ga.	12 Ft.
37" - 50"	One 1" x 16 Ga.	12 Ft.
51" - 60"	Two 1" x 18 Ga.	12 Ft.

See SMACNA, Table 5-3 for allowable loading for trapeze angles.

END OF SECTION 233310

## SECTION 233330 - LOW VELOCITY DUCTWORK

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specifications Sections, apply to work of this section.

#### 1.2 SUBMITTAL

- A. Layouts of duct systems shown on contract drawings are diagrammatic. Actual duct layout and fabrication shop drawings are required to be submitted for approval. Coordinate these shop drawings with other trades and existing conditions, as required for proper installation, prior to submittal.
- B. Please note that ductwork CAD files will not be given to the contractor. Contractor is expected to field verify and draw all ductwork.
- C. General duct layout, 3/8" = 1'-0" scale, of all duct systems, including dimensions and elevations.
- D. Ductwork shop drawings shall be fabrication drawings, showing actual intended location of ductwork and clearances. Ductwork elevations and architect's ceiling heights shall be noted on drawings.
- E. All areas where ductwork is below the architect's ceiling height shall be noted and clouded.  
**FAILURE TO NOTE BOTH BOTTOM OF DUCT ELEVATIONS AND ARCHITECT'S CEILING HEIGHTS WILL BE CAUSE FOR REJECTION.**
- F. Duct shop drawings shall show actual existing and/or new structural steel arrangements, and shall be coordinated to properly fit in intended spaces.
- G. Sheetmetal contractor shall verify that ductwork layouts are coordinated with all other construction trades which might cause a conflict. This contractor is required to provide copies of duct shop drawings to all applicable contractors for their use in coordination efforts.
- H. Immediately notify Engineer if a duct layout conflict is discovered.
- I. Submittal packages which do not include all items listed in this section will be considered incomplete and will be returned to the contractor without review.
- J. If a significant number of shop drawings are required, individual drawings may be submitted for review. Duct construction booklet must accompany initial submittal or it will be considered incomplete and returned without review.

- K. Fabrication of installation of ductwork shall not be permitted unless duct shop drawings and construction booklet are approved by Engineer.
- L. Contractor will be required to remove ductwork installed without duct submittals conforming to requirements of this section and approved by the Engineer.

### 1.3 DUCT CONSTRUCTION BOOKLET

- A. Duct construction booklet shall be submitted with initial duct layout drawing submittal.
- B. The following is a basic list of materials, devices, methods, etc. that shall be described in the ductwork construction booklet submittal:
  - 1. Manufacturer's data sheets for all purchased duct accessory components (damper hardware, duct liner, access doors, etc.)
  - 2. Gauges of ductwork, material, method of construction, types of reinforcing and joints, etc.
  - 3. Transverse and Longitudinal Joints
  - 4. Duct Fitting Construction
  - 5. Duct Sealing & Sealants
  - 6. Duct Hangers, Type, Spacing, Upper, Lower
  - 7. Special Supply Air Duct Construction Details (i.e. 14 gauge)
  - 8. Branch Duct Connections Details
  - 9. Acoustic Lining
  - 10. Flexible Ductwork
  - 11. Flexible Connection (to AHU's etc.)
  - 12. Access Doors
  - 13. Duct Accessories
  - 14. Volume Dampers
  - 15. Locking Quadrants
  - 16. Remote Control Damper Regulators
  - 17. Turning Vanes
  - 18. Penetration Trim Frames
  - 19. Fire Damper Installation Details
  - 20. Fire Proofing Penetrations, Chase Safing
  - 21. Specialty Duct Construction and Installation Methods
  - 22. Other Specialty Equipment Connections

### 1.4 RELATED SUBMITTALS

- A. The following shop drawings are required under other specification sections and must be submitted as separate packages (in addition to ductwork submittals detailed in this section).
  - 1. Exhaust Fans
  - 2. Louvers
  - 3. Roof Hoods
  - 4. Diffusers, Registers, Grilles
  - 5. Ductwork Accessories:
    - a) Special volume control dampers



- b) Fire and/or smoke dampers
- c) Remote control damper actuators

#### 1.5 WORK REQUIRED

- A. Contractor shall furnish materials and labor and shall fabricate and erect all sheetmetal ductwork including connections to units, all dampers, registers, diffusers and accessories as shown on the drawings, described herein and/or as required to make the air handling installations complete.
- B. Complete supply and return air ductwork serving all units.
- C. All exhaust air ductwork.
- D. Relief air ductwork.
- E. Ductwork and connection into existing air systems where applicable in existing building.
- F. Installation of all intakes and discharges including exhaust fans, louvers, roof hoods.
- G. Specialty ductwork and specialty equipment for applicable kitchen, fume exhaust, safety hoods, and other specialty systems where indicated.
- H. Modification of existing air system equipment to meet new air system requirements (i.e. - fan drives, belts, sheaves, fan motors, etc.).
- I. Complete balancing of all air systems.
- J. Contractor shall field verify and coordinate all ductwork, dimensions, clearances, and ductwork elevations with existing building structure.

#### 1.6 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 230005 - HVAC Work General
- B. Section 230593 - Testing, Adjusting & Balancing
- C. Section 230713 - Ductwork Insulation
- D. Section 233300 - Ductwork Accessories
- E. Section 233310 - Ductwork Hangers & Supports

#### 1.7 QUALITY ASSURANCE

- A. SMACNA Manual: Gauges of materials, fabrication and installation of ductwork shall be in accordance with the SMACNA Manual, Section 1 - "Low Velocity Systems", unless otherwise shown on the drawings or specified herein.
- B. SMACNA - Sheetmetal and Air Conditioning Contractors National Association, Inc.
- C. New York State Energy Code.

- D. 2016 New York State Building Code.
- E. Electrically operated and power actuated tools for installing welded studs and power driven fasteners shall be listed by a nationally recognized test agency.

## 1.8 PRODUCT HANDLING

- A. Protection: Use all means necessary to protect materials of this Section before, during and after installation and to protect installed work and materials of all other trades.
- B. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the approval of the Engineer and at no additional cost to the Owner.
- C. Delivery and storage: Deliver all materials to the jobsite in their original unopened containers with all labels intact and legible at time of use. Store in strict accordance with the manufacturer's recommendations.
- D. Ductwork that is shop fabricated shall be delivered to the site in quantities acceptable to the storage area that the General Contractor has available.

## PART 2 - PRODUCTS

### 2.1 GENERAL

- A. For the purpose of establishing equality, certain manufacturers have been specified herein. In no way shall this be construed as limiting competition. Products of other manufacturer's may be proposed in accordance with the provisions of the Contract.
- B. Fabrication: All ducts, unless otherwise allowed, shall be true to dimensions indicated upon plans, straight and smooth on inside, with neatly finished joints. Securely anchor to building construction in acceptable manner, free from vibration under all conditions of operation, and properly brace and reinforce with aluminum angle or other structural members. Slip joints shall be in direction of flow. Elbows shall have centerline radius equal to 1-1/2 times width of duct.
- C. All ductwork with a 4 to 1 ratio, and higher shall have a Condu-lock internal reinforcing at midpoint between joints, both horizontally and vertically.

### 2.2 SHEETMETAL

- A. Galvanized Steel: ASTM A653/A653M lock forming quality – zinc-coated (galvanized): ASTM A653/A653M commercial coating class – 0.9 oz. per sq. ft.

B. 2" W.G. Low Pressure Rectangular Duct Construction:

1. Note: These gauges are 1 gauge heavier than required by SMACNA.

<u>Longest Side</u>	<u>Gauge</u>	<u>SMACNA Rigid Class (1)</u>	<u>Stiffeners Spacing</u>
0-12"	24	A	5'
13-30"	22	B	5'
31-54"	20	B	5'
55-84"	18	E	5'

C. 2" W.G. Low Pressure Round Duct Construction:

<u>Diameter</u>	<u>Gauge</u>
0-12"	26
13-24"	24
25-36"	22

- D. Aluminum Ductwork: Use 1 gauge heavier than required by SMACNA Standards.

2.3 LONGITUDINAL JOINTS FOR RECTANGULAR DUCT

- A. Seams shall be formed and assembled with proper dimensions for tight and secure fit. Notching shall be minimal consistent with transverse joint requirements.
- B. Standard longitudinal seam shall be Pittsburgh Lock Standing seams are not acceptable.

2.4 TRANSVERSE JOINTS FOR RECTANGULAR DUCT

- A. Joint type shall be selected on the basis of  $\pm 2"$  wg. Pressure class, materials, support intervals, and other provisions for proper assembly of ductwork.
- B. All transverse joints with any dimension greater than 16" shall be constructed with the Duct Mate system; or an approved equal. All transverse joints 16" and less shall be slip and drive.
- C. Contractor shall submit for approval the intended joint type with the duct construction detail book submittal.
- D. Turning Vanes and Vane Runners: Weld runners to duct and weld vanes to runners, all as shown on the drawings. All turning vanes shall be air foil type.

2.5 DUCTWORK FITTINGS

- A. All elbows on main supply ducts shall be radiused type fittings.
- B. Where square elbows are allowed, turning vanes shall be used. Square fittings without turning vanes are not permitted.

## 2.6 BRANCH CONNECTIONS

- A. Furnish and install where indicated on drawings, size as required, the following:
  - 1. For rectangular branch ducts: 45 degree cinch collar, each branch duct to include a volume damper.
  - 2. For round duct branches: High efficiency take-off type fitting with integral volume damper.
  - 3. Branch duct connections regardless of size or type will be fully sealed by an approved method.

## 2.7 ROUND DUCT CONSTRUCTION

- A. Round duct seams shall be spiral lockseam type. Snap lock or lap seams are not acceptable. Duct and fittings shall be single wall Uni-Seal Duct, United McGill Corp.; or equal, unless noted otherwise.

## 2.8 DUCT SEALING REQUIREMENTS

- A. All ductwork, fittings, connections to equipment, damper connections, branch duct connections, and other duct system joints shall be sealed in accordance with the duct system sealing schedule.
- B. The term sealed requires the use of liquids, mastics, combination mastics and open weave fabric, gaskets, or other sealing compounds made exclusively for duct work applications. Oil base caulking and glazing compounds shall not be used.
- C. Tapes shall not be applied to metal surfaces or to dry sealant.
- D. Liquid: As recommended by the manufacturer of the ductwork.
- E. Mastic: 3M Co. #ED-800 or 900.
- F. Gaskets: Soft neoprene or reinforced inert plastic of the self conforming type.
- G. Special Note: All sealants must be applied in ambient temperatures exceeding manufacturer's recommendations to insure proper setup.
- H. Seal all penetrations with Manville Pyro-Fiber safing; or equal. Provide safing clips and joint sealant.

## 2.9 DUCT SYSTEM SEALING SCHEDULE

- A. Supply, Return & Exhaust Ductwork: Completely seal all transverse joints and longitudinal seams.

- B. Connection to Equipment: Use flanged connections to equipment, provide gasket to seal between flanges. Bent sheetmetal is not acceptable as a flange. Use steel angle or heavy gauge flat bar as a back up surface.

## 2.10 DUCT LINER

- A. Furnish and install where indicated on drawings, acoustic duct liner.
- B. Duct liner shall: made from flame attenuated glass fibers bonded with a thermosetting resin, air stream side to be coated with a non abrasive black surface. Furnish 2" thick, permacoat Linacoustic manufactured by Johns Manville; or equal. Duct liner rated for use at 250°F, 5000 fpm, with a k-factor of 0.25 and acoustical performance NRC of 0.70.
- C. Ductwork having internal lining is not to be externally insulated, unless otherwise noted.
- D. Any lined duct that has had water on the liner, shall be deemed unusable and will be required to be immediately removed from the site. The contractor shall provide an new section at no cost to the owner.
- E. Note: Duct sizes shown are net inside duct dimensions, not including internal liner. Failure to comply with this requirement will be grounds for rejection.

## 2.11 FLEXIBLE DUCTWORK

- A. Furnish and install where indicated on drawings, bi-directional reinforced metallized vapor barrier with triple ply stand-up seam; acoustically rated black CPE liner permanently bonded to a coated spring steel wire helix and supporting a thick blanket of fiberglass insulation. UL listed, Class 1 air duct. Flexible Tubing Division, Thermaflex, Type MKE; or equal. For connections to rectangular duct, use Bellmouth fittings with integral volume damper. Flex duct is not to be connected directly to rectangular main ducts. Duct centerline radius to duct diameter ratio not to exceed 1.5. Flex duct to have minimum R-value of 6.0.
- B. Maximum length of flexible ductwork not to exceed 8'-0".

## 2.12 EQUIPMENT CONNECTIONS

- A. All equipment shall be connected to ductwork with flexible duct collars.
- B. Flexible connection shall be heavy glass fabric, coated with "Durolon", weighing approximately 24 oz. per sq. yard, as manufactured by Duro Dyne Corp.
  - 1. For ducts 30" and below use 3" free length
  - 2. For ducts above 30" use 5" free length.

## 2.13 TRIM FRAMES

- A. Whenever ductwork passes through masonry, furnish and install mitered angle trim frames around ductwork to conceal rough masonry opening.

### PART 3 - EXECUTION

#### 3.1 APPLICATION

- A. Properly seam, brace, stiffen, support and render ducts mechanically air tight. Where SMACNA plates and/or the specifications indicate duct stiffeners or reinforcing angles, they shall be continuous around all four sides and interlock at corners.
- B. Adjust ducts to suit local conditions, and if necessary to accomplish this, dimensions may be changed, as approved, but maintain cross sectional area. Install ductwork so as to provide maximum headroom, unless otherwise noted on the drawings.
- C. In addition to having all shop joints in ductwork fabricated in accordance with the Manual, all field joints shall be sealed air tight in accordance with the duct seal schedule.
- D. Where turning vanes, balancing damper or any other kind of products are installed, ductwork must be reinforced at all four sides and interlocked at corners.

#### 3.2 FLEXIBLE DUCTWORK CONNECTIONS

- A. Flexible connections shall be made with tie straps as made by Panduit; or equal. Straps shall be used to clamp both inner and outer liner to diffuser and branch ductwork. (2) straps are required at each end of flexible ductwork.

#### 3.3 CONNECTIONS TO MISCELLANEOUS DUCT EQUIPMENT

- A. All duct connections to duct coils, etc. must be made with smooth transitions in accordance with SMACNA. Duct dimensions specified upstream and downstream (net free area) must be maintained. Sizing ductwork to match miscellaneous equipment is not acceptable, unless design conditions are met.

END OF SECTION 233330

## SECTION 233416 - CENTRIFUGAL FANS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General and Supplementary conditions and Division 1 Specification Sections, apply to work in this section.

#### 1.2 SUBMITTALS

- A. Schedule of exhaust fans and all accessories.
- B. Sound power ratings.
- C. Product data sheets for all equipment.
- D. Dimensioned shop drawings.
- E. Special Note: Fans sizes may be selected for future capacities. Fan size substitutions which do not meet intended future capacities will not be accepted.

#### 1.3 GENERAL REQUIREMENTS

- A. Provide supply, and exhaust fans to fit intended use and location as indicated on plans and/or specified.
- B. Capacity, size and arrangement, static pressure, brake horsepower, component parts and accessories as scheduled and/or as necessary to obtain required results and allow for proper maintenance. Motor efficiency shall comply with EISA standards.
- C. Ratings based on tests made in strict accordance with current AMCA sound and performance standards including standard #210.
- D. Each size fan to be supplied shall be tested in the manufacturer's laboratory under simulated installation conditions. Ratings based on test, not on interpolated or extrapolated calculation.
- E. Submit certified performance tests by AMCA for all centrifugal fans 5,000 CFM and larger.
- F. Guaranteed full capacity delivery through duct systems finally installed and under conditions listed.
- G. Guaranteed sound-power level ratings not exceeding those of design equipment.
- H. All equipment statically and dynamically balanced to acceptable tolerances with all weights permanently fastened.
- I. When dampers are supplied, furnish all necessary relays and devices to permit operation.



## PART 2 - PRODUCTS

### 2.1 CENTRIFUGAL FANS DESCRIPTION

- A. Centrifugal fan belt driven (unless otherwise noted). Fabricated from formed and curved material with continuously welded seams. Provide removable covers or access doors to allow access to internal parts. Drive frame structure constructed of heavy gauge galvanized steel.
- B. Drive assembly and wheel shall be removable without disassembly of fan housing. Fan shaft shall be painted to avoid corrosion. Furnish accessory hinging kit to facilitate access to fan internal components and ductwork.

### 2.2 MOTORS

- A. All motors shall be general purpose squirrel-cage induction type, NEMA Design 8, Class 8 insulation, continuous duty, 40°C ambient, single or multiple speed as scheduled.
- B. All three phase motors shall be NEMA Premium Efficiency design. Motor efficiency shall be indicated on the motor nameplate by the manufacturer per IEEE Standard 112 Method 8 in accordance with following tables:

#### **Open Drip Proof (ODP)**

Horsepower	1200 RPM	1800 RPM	3600RPM
1	82.5%	85.5%	77.0%
1.5	86.5%	86.5%	84.0%
2	87.5%	86.5%	85.5%
3	88.5%	89.5%	85.5%
5	89.5%	89.5%	86.5%
7.5	90.2%	91.0%	88.5%
10	91.7%	91.7%	89.5%
15	91.7%	93.0%	90.2%
20	92.4%	93.0%	91.0%
25	93.0%	93.6%	91.7%
30	93.6%	94.1%	91.7%

#### **Totally Enclosed Fan-Cooled (TEFC)**

Horsepower	1200 RPM	1800 RPM	3600 RPM
1	82.5%	85.5%	77.0%
1.5	87.5%	86.5%	84.0%
2	88.5%	86.5%	85.5%
3	89.5%	89.5%	85.5%
5	89.5%	89.5%	86.5%
7.5	91.0%	91.7%	98.5%
10	91.0%	91.7%	90.2%
15	91.7%	92.4%	91.0%
20	91.7%	93.0%	91.0%
25	93.0%	93.6%	91.7%
30	93.0%	93.6%	91.7%

- C. Single speed motors shall operate at 1750 RPM unless otherwise indicated.
- D. For All Motors with Motor Starters:
  - 1. Provide premium efficiency motor.
  - 2. Fractional HP motors shall be equipped with internal automatic reset thermal overload switch.
  - 3. Provide factory mounted and wired safety disconnect switch; locate in motor compartment. When disconnect will not fit in motor compartment furnish weatherproof NEMA 3R safety switch for external mounting.
- E. Motors for Units with Variable Frequency Drives:
  - 1. Motor shall be rated for inverter duty.
  - 2. Provide motor of continuous duty, 1.15 SF, NEMA Class F insulation
  - 3. For fractional horse motors with variable frequency applications provide permanently split capacitor or shaded pole type motor.
  - 4. See Specification Section 238505 - Variable Frequency Drive Systems for further details.

## 2.3 FAN DRIVE ASSEMBLIES

- A. Fan manufacturer shall furnish motors, V-belts and drives complete and ready to operate. Drives shall include the following:
  - 1. Drives rated at 150% of motor horsepower.
  - 2. Motors 5 HP and larger: Minimum of two belts.
  - 3. Use only matched belt sets for multiple drives.
  - 4. Cast iron or cast steel pulleys.
  - 5. Provide test holes in belt guards for speed checks.
  - 6. Provide shaft guards where shafts extend beyond belt guards.
  - 7. Adjustable type motor pulley with 15% speed adjustment above and below rated speed.
  - 8. Drive ratio not over 4:1 except as otherwise approved.

B. For Variable Frequency Applications:

1. Do not use belt drives
2. All variable frequency applications shall utilize direct drive fans.

2.4 FAN BEARINGS

- A. Fan manufacturer shall furnish all fans with self-aligning, grease lubricated, ball or spherical roller bearings selected in accordance with rating method of Anti-Friction Bearing Manufacturers' Association, so "rating life" is not less than 50,000 "life hours" continuous operation at maximum speed and pressure for each AMCA fan class. If requested by Engineers, submit bearing selection calculations for approval.

2.5 VIBRATION ISOLATION

- A. Fan manufacturer to furnish vibration isolation equipment for each piece of equipment supplied.

2.6 ROOF CURBS

- A. Furnish prefabricated welded galvanized steel roof curb for all roof fans. Roof curb with rigid fiberglass insulation and wood nailer held in place by metal wrap-around. Standard height to be 12" above finished roof unless otherwise noted. Roof curbs will be fully assembled and placed onto the roof by the MC for installation by GC.
- B. Bottoms of curbs to sit level on roof. Contractor is to verify any roof pitches prior to submittal. Provide pressure treated wood blocking to raise roof curb base to top of finished roof surface.
- C. Roof curb to include metal liner to protect insulation (NO EXCEPTIONS!).
- D. Cant strips formed into curb body. Provide raised cant for use with insulated roof decks. For fans located on rubber roof membranes raised cant is not to be supplied with curb.
- E. For units with dampers furnished by fan manufacturer provide damper shelf mounted inside of curb. Alert duct sub-contractor to this condition for proper damper and duct installation.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install equipment in strict accordance with manufacturer's instructions and so as to be compatible with intent of the respective system performance requirements.

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- B. Field services shall be provided by a factory trained representative to fully set-up and adjust the new units, after the installations have been completed and before the units are placed in service. Written start-up report to be furnished. Factory alignment, mechanical seals, lubrication, three phase motor rotation, and all necessary commissioning tests shall be completed and checked before units are placed in service.
- C. Install vibration isolators in strict accordance with manufacturer's instructions.
- D. Provide all necessary supporting ironwork for equipment requiring same.
- E. Provide guards for all exposed belts, shafts or fan wheels.
- F. Change pulley sizes as many times as necessary, as part of contract, to make systems deliver specified quantities of air.
- G. Roof curb must be roofed and flashed to the top of wooden nailer to assure weather tightness.
- H. Bolt fan housing to curb.

END OF SECTION 233416

## SECTION 233710 - LOUVERS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUBMITTALS

- A. Submit product cut sheets, indicating performance data, sizes, accessories, etc.
- B. Submit color chart for Architect's approval

### PART 2 - PRODUCTS

#### 2.1 LOUVERS

- A. LO-1: Greenheck Model #ESJ-202; or equal, stationary formed aluminum louver, size as shown on drawings. In general, louver to be non-flanged for brick and flanged for metal storefront or metal siding – contractor review drawings and in field prior to ordering louver. 2" deep, blade with rain hook and lip at front and rear edges, 3" spacing at 37 degrees. Blades and frames of extruded aluminum construction with integral caulking recess. Blades shall be #6063-T5 aluminum. Louver to have AAMA 2605 compliant coatings (70% Kynar PVDF/100% Fluoropolymer FEVE). Contractor shall furnish color selection as per Architect's instructions. Provide polyvinyl chloride coated wire bird screen 1/2" sq. mesh mounted on inside face.
- B. LO-2: Greenheck Model #ESK-402; or equal, stationary drainable extruded aluminum louver, size as shown on drawings. In general, louver to be non-flanged for brick and flanged for metal storefront or metal siding – contractor review drawings and in field prior to ordering louver. 4" deep, drainable blade lip at front and rear edges, 4" spacing at 45 degrees. Blades and frame of .081" extruded aluminum construction with integral caulking recess. Blades shall be #6063-T5 aluminum. Louver to have AAMA 2605 compliant coatings (70% Kynar PVDF/100% Fluoropolymer FEVE). Contractor shall furnish color selection as per architects' instructions. Provide polyvinyl chloride coated wire bird screen 1/2" sq. mesh mounted on inside face.

### PART 3 - EXECUTION

#### 3.1 GENERAL

- A. Contractor to install louver in existing masonry opening and caulk between louver and wall and secure to wall.
- B. Contractor to field verify exact masonry opening size prior to ordering louver.
- C. GC to provide opening.
- D. Install in accordance with manufacturer's instructions.

END OF SECTION 233710

## SECTION 233713 - DIFFUSERS, REGISTERS AND GRILLES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to work of this section.

#### 1.2 SUBMITTALS

- A. Schedule indicating drawing no., room location, quantity, size, throw, direction of throw, accessories, finish, material type, color chart, etc.
- B. Product data sheet for each unit indicating throw, noise criteria ratings, directional data (four-way, etc.) material, accessories, mounting details, etc.
- C. Noise criteria shall conform with specified equipment performance data.
- D. If requested by Engineer, provide sample of diffuser, register, grille, etc.

#### 1.3 GENERAL REQUIREMENTS

- A. Duct drawings are diagrammatic and do not provide exact locations for diffusers, registers and grilles. Contractor shall reference reflected ceiling plans or instructions by Architect for a more exact location of diffusers, etc., with respect to ceiling grid, light fixture and sprinkler etc.
- B. Each manufacturer shall check noise level ratings for their equipment to insure that the sizes selected will not produce noise to exceed 30 db, "A" scale, measured at occupant level; notify Engineer of any problems in this regard and change equipment size accordingly.

#### 1.4 REQUIREMENTS FOR DIFFUSERS, REGISTERS AND GRILLES

- A. All units and accessories shall be installed "sight-proof" where possible.
- B. Borders and frames shall be of same material and color as specified for grille face.
- C. Total quantity of air equally divided, or as required and/or shown, where diffusers blow in more than one direction. Provide blank off plate (finished to match unit) to match blow pattern shown on drawings.
- D. Each supply register and diffuser shall be guaranteed to deliver indicated capacity and proper throw with draftless diffusion, and within acceptable noise level.
- E. Limit terminal velocity at walls of room, below 25 fpm, measured 4' above floor.

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- F. Contractor shall provide proper duct connection to all diffusers, registers and grilles. Ductwork connections shall be as required by unit manufacturer. Connections required by Contractor include but are not limited to square/round adapter, transitions, flanges, neck rings, etc.
- G. Because of intricate system designs and special performances required, all devices may not be of same make.
- H. Suitable for recessed mounted unless otherwise indicated.
- I. Diffusers and registers that are scheduled with integral opposed blade volume damper at neck must match unit construction and must be able to be adjusted through face, without removing unit.
- J. Diffusers, registers and grilles do not require volume control dampers unless specifically indicated.
- K. All exposed fasteners must be tamper proof.
- L. Security Grille Face: Where indicated, provide heavy duty security type, tamper proof, secure grille face. Grille shall be 12 ga. thick cold rolled steel 1/2" sq. perforated grille. Fasteners shall be located 6" C/C around perimeter. Unit shall have white prime finish suitable for field painting. Provide A.J. Manufacturing Co.; or equal.

## PART 2 - PRODUCTS

### 2.1 GENERAL

- A. See drawings for schedule.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. All equipment specified under this section shall be installed where called for on plans and in compliance with the contract documents.
- B. Install equipment in strict accordance with manufacturer's instructions and so as to be compatible with intent of the respective system performance requirements.
- C. Diffusers in lay-in type ceiling tiles shall be located at center of tile, squared with tile edges.

END OF SECTION 233713



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## SECTION 238223 - UNIT VENTILATORS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to the work of this section.

#### 1.2 SUBMITTALS

- A. Schedule of all components.
- B. Schedule of all accessories.
- C. Indicate unit capacities on all equipment.
- D. Indicate all field connection locations.
- E. Unit Vent Arrangement drawings.
- F. Unit accessory arrangement drawings.
- G. Provide dimensional plan view drawings for accessory cabinets installations.
- H. Wiring diagrams.
- I. Submit color charts (unit and louver color selection by Architect).
- J. Parts list, Operating & Maintenance manuals.
- K. Installation instructions.
- L. Written report co-signed by clerk of works confirming final filter set installation.

#### 1.3 QUALITY ASSURANCE

- A. Unit ventilators shall be listed by Underwriters Laboratories Inc. (UL) for the United States and Canada.
- B. Motors shall conform to the latest applicable requirements of NEMA, IEEE, ANSI and NEC Standards.
- C. Unit ventilation rate to be certified and tested per Air Conditioning and Refrigeration Institute (ARI) Standard 840.
- D. Unit to be certified and labeled compliant with the seismic design provisions of the 2016 New York State Building Code including independent testing agency requirements.

#### 1.4 GENERAL REQUIREMENTS

- A. Unit vent supplier shall have locally available competent mechanics to provide all types of service for all supplied materials and equipment.
- B. Service mechanics shall be factory trained and shall be certified, by the manufacturer, to perform all types of service on supplied equipment.
- C. As a part of the initial installation, service mechanics shall start up and adjust units for proper operation.

- D. All equipment factory supplied with unit (including manufacturer's controls or other Temperature Control components) shall be properly adjusted, on site, by service mechanics.
- E. Equipment supplier shall provide service on all supplied equipment for full guarantee period at no cost to the Owner. Installation service shall include all work necessary for repair of defective, improperly installed or improperly adjusted equipment.
- F. Motor efficiency shall comply with EISA standards.

## PART 2 - PRODUCTS

### 2.1 GENERAL REQUIREMENTS

- A. Furnish self contained unit ventilator for HVAC service of size, capacity, construction and speed as specified. Units to be fully equipped for intended service as shown on drawings and as specified.
- B. Unit ventilator supplier shall locally maintain factory trained technicians capable of servicing supplied units.

### 2.2 SOUND POWER REQUIREMENTS

- A. Schedule:

Unit Max CFM	Unit Size	Unit Speed	Sound Power Data (db re: 10 <sup>-12</sup> watts)						
750	S07	High	57.4	51.8	52.5	52.6	51.2	46.9	35.2
		Medium	50.1	44.9	45.6	44.8	42.8	34.2	19.9
		Low	45.6	40.4	40.8	39.1	35.7	24.4	12.0
100 0	S10	High	57.0	52.8	53.9	53.7	51.5	46.8	35.9
		Medium	52.9	48.6	50.2	49.6	46.5	40.1	27.9
		Low	49.4	45.4	47.0	45.5	42.0	33.6	20.7
125 0	S13	High	62.4	55.2	55.7	55.3	54.4	49.7	38.5
		Medium	59.3	52.1	52.5	51.7	50.4	44.0	31.8
		Low	55.6	48.6	49.1	47.2	45.6	37.1	24.0
150 0	S15	High	63.8	56.6	58.0	58.2	56.4	52.4	41.9
		Medium	58.4	51.3	52.7	52.4	49.5	43.5	30.5
		Low	54.8	47.6	49.4	47.5	44.2	36.2	21.5
Center Frequency			125	250	500	1000	2000	4000	8000
Octave Band			2	3	4	5	6	7	8

- B. Sound tests were conducted using a qualified reverberant room per ANSI S1.31 and ANSI S12.32.

- C. Sound test data is based on standard cfm at standard air (fixed density of air at 70°F) in accordance with ARI procedures based upon ARI 350.
- D. To calculate the Noise Criteria (NC) for a room, use the sound power level for each octave band for the particular unit speed and subtract the actual room effect. The resulting sound pressure number for each octave band can then be graphed on a NC chart to determine the room NC level.
- E. If necessary, the unit manufacturer may use a larger unit running at medium or low fan speed to meet the required maximum noise levels. However, provisions must be made to accommodate the larger units at no cost to the Owner.

## 2.3 UNIT CONSTRUCTION

- A. Frame: Unitized welded galvanized steel chassis frame. Units with assembled sheet metal panels are not acceptable. Heavy gauge exterior cabinet panels phosphatized with baked enamel finish. Access panels shall have tamper resistant fasteners.
- B. Horizontal Units (Ceiling Mounted): Furnish unit with (2) hinged bottom access panels with retainer chains; discharge opening shall be either 1) bar stock grille with 4-way adjustable side deflection vanes, or 2) duct collar; as shown on plans. Condensate pan drain shall be a minimum of 5" from drain connection centerline to bottom of unit. Recessed units shall be furnished with trim frame to match unit finish.
- C. Fans and Motors: Fans shall be double inlet forward curved centrifugal type modular design statically and dynamically balanced assembly. Fan housings shall be coated with high density sound deadening material. Motors shall be direct drive, speed controlled by multi tap transformer with high-low-off switch. Furnish motors with auto reset thermal overload. Fans and controls shall be protected with factory installed cartridge fuses. Vertical units shall have sleeve bearings. Horizontal units shall have permanently lubricated ball bearings on motor and fan shaft.
- D. Dampers: Furnish units with factory installed face and bypass dampers, insulated OA damper, and return air damper. All dampers shall have low leakage blade and edge seals, and nylon bearings.
  - 1. Coils: Hydronic coils shall have copper tubes with mechanically expanded and bonded aluminum corrugated fins. Furnish hydronic coils with manual air vent and threaded drain plug.
  - 2. DX coils shall be furnished complete with factory installed thermal expansion valve. All cooling units shall be furnished with galvanized steel insulated drain pan with field reversible connections.
- E. Filters: Furnish throw away filter (wire mesh permanent filters on electric heat units). Furnish (1) additional set of throw away filters for installation by Contractor when installation is complete (project close out).

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- F. Control Receptacles: Furnish units with receptacles for temperature control, power control and condenser control.

## 2.4 TEMPERATURE CONTROLS

- A. By temperature controls contractor. See Specification Section 230993 for details.

## 2.5 HORIZONTAL MOUNTED UNIT ACCESSORIES

- A. Furnish unit ventilator with a high flow rate, pan type condensate removal pump, designed to fit within cabinet. Unit shall be completely submersible, die-cast aluminum motor housing, check valve, epoxy finish, nylon volute and impeller, ABS plastic float, epoxy coated metal switch mechanism and all brass parts. Pump to provide 42 feet hd @ 15 gpm. Furnish unit with control float, filter screen, 6 foot/3 conductor cord for 1/30 ho, 120V/1Ph. operation. Furnish Model #VCMX-20VLS, as manufactured by Little Giant Pump Co.; or an approved equal.

## PART 3 - EXECUTION

### 3.1 GENERAL

- A. Unit to be installed in strict compliance with manufacturer's instructions.
- B. Field services shall be provided by a factory trained representative to fully set-up and adjust the new units, after the installations have been completed and before the units are placed in service. Written start-up report to be furnished. Factory alignment, mechanical seals, lubrication, three phase motor rotation, and all necessary commissioning tests shall be completed and checked before units are placed in service.
- C. Contractor shall install galvanized sheetmetal wall sleeve for outside air intake opening. Secure OA wall sleeves to wall rough opening.
- D. Contractor shall seal any openings water tight around wall sleeve. (Top, bottom and each end).
- E. Pitch bottom of wall sleeve toward bottom of louver with non-shrink, non-metallic grout.
- F. Care must be taken to insure weep holes in louver are not blocked.
- G. Cabinets shall be leveled and exactly aligned with units and adjacent cabinets.
- H. At the end of project in the presence of the owner's representative, Contractor shall remove and dispose of initial set of filters and replace with new additional set of filters on each unit. Furnish written report to Engineer confirming final filter set installation.

END OF SECTION 238223

## SECTION 238224 - SELF-CONTAINED UNIT VENTILATORS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to the work of this section.

#### 1.2 SUBMITTALS

- A. Shop drawings shall include unit capacities on all equipment in this section.
- B. Submit color chart.
- C. Parts list, operating, maintenance instructions and installation instructions.
- D. Submittals shall be marked to show specified information.

### PART 2 - PRODUCTS

#### 2.1 GENERAL REQUIREMENTS

- A. Furnish self contained unit ventilator for heating service of size, capacity, construction and speed as specified hereinafter. Units to be fully equipped for intended service as shown on drawings and as specified. Unit ventilator supplier shall locally maintain factory trained technicians capable of servicing supplied units. Motor efficiency shall comply with EISA standards.

#### 2.2 CABINET AND CHASSIS:

- A. Unit frames shall be of unitized, welded construction, with structural elements aligned in an assembly jig prior to welding, to insure proper dimensions, rigidity, and squareness.
- B. Internal sheet metal parts shall be constructed of galvanized steel to inhibit corrosion.
- C. Exterior cabinet panels shall be fabricated from furniture grade steel of not less than 16 gauge steel with no sharp edges and no unsightly screw heads and shall receive an electrostatically applied powder paint, and be oven baked with environmentally friendly thermosetting urethane powder finish to provide a high quality appearance. Finish color shall be as selected by Architect from manufacturer's standard colors.
- D. The interior areas of the unit ventilator shall be insulated for sound attenuation and to provide protection against condensation of moisture on or within the unit. The unit shall be provided with an ultra-quiet sound package consisting of acoustically matched low speed fans to fan housing, sound barrier insulation material (non-fiberglass) adhered to the bottom underside of the unit top panel, sides of the fan section and sound absorbing insulation (non-fiberglass) material applied to the unit front panel.
- E. Units shall be constructed so that testing and troubleshooting can be accomplished in the end pockets of operating units, without affecting the normal air flow patterns through the unit.

- F. Each unit shall be provided with a non-fused power interrupt switch that disconnects the main power to the unit for servicing or when the unit is to be shut down for an extended period of time. The fan motor and controls shall have the hot line(s) protected by factory installed cartridge type fuse(s).

## 2.3 COILS:

- A. All coils shall be installed in a draw through position to assure uniform air distribution over the full-face area of the coil, and an even unit discharge temperature.
- B. All heating and cooling coils shall be constructed with copper tubes and mechanically bonded aluminum corrugated plate type fins. All coils shall have aluminum individual unshared fin surfaces. An air break shall exist between coils.
- C. Water heating coils shall be furnished with a threaded drain plug at the lowest point, and a manual air vent at the high point of the coil. A factory installed low temperature freeze stat shall be provided on the leaving edge of the water heating coil in a wave-like configuration to sense multiple locations and shall react to possible freezing conditions. The unit-mounted controls shall incorporate this device.
- D. Refrigerant coils shall be supplied with factory-installed thermal expansion valves in lieu of capillary tubes to achieve evaporator performance and to protect the compressor from floodback of liquid refrigerant, venturi type refrigerant distributor and a refrigerant low temperature limit.

## 2.4 FANS AND MOTOR:

- A. The fan and motor assembly shall be of a low speed design to assure maximum quietness and efficiency.
- B. Fans shall be double-inlet, forward-curved, centrifugal type with offset aerodynamic blades. Fans and shaft shall be statically and dynamically balanced as an assembly in the unit before shipment.
- C. Fan housings shall be constructed of galvanized steel incorporating logarithmic expansion for quiet operation. Fan and motor assembly shall be of the direct drive type. Belt drive fans shall not be allowed.
- D. Supply motors shall be 115 volt, single phase, 60 Hz, NEMA permanent split capacitor (PSC), plug-in type with auto reset internal thermal overload device designed specifically for unit ventilator operation. Motors shall be located out of the conditioned air stream.
- E. Units shall have sleeve type motor and fan shaft bearings, and shall not require oiling more than annually. All bearings shall be located out of the airstream. Bearings in the air stream are not acceptable.
- F. Motor speed shall be controlled by factory mounted multi-tap transformer for three (3) speeds, HIGH-MEDIUM-LOW-OFF (not accessible from the exterior of the unit). Fan motor and controls shall each have hot leg protected by a factory installed cartridge fuse.

## 2.5 OUTDOOR & ROOM DAMPERS:

- A. Each unit shall be provided with separate room air and outdoor air dampers.
- B. The room air damper shall be fabricated from aluminum, and be counterbalanced against backpressure to close by gusts of wind pressure, thereby preventing outdoor air from blowing directly into the room.
- C. The outdoor air damper shall be two piece, double wall construction fabricated from galvanized steel, with ½" thick, 1½ lb. density glassfiber insulation encapsulated between the welded blade halves for rigidity and to inhibit corrosion. The outdoor air damper shall have additional foam insulation on the exterior surface damper blade and on the ends of the outdoor air chamber. A single blade damper, which can be twisted and will leak air, will not be considered.
- D. Dampers shall be fitted with blended mohair seals along all sealing edges. Pressure adhesive sponge neoprene or plastic clip-on brush type sealers for damper seals are not acceptable. Rubber type gasket using pressure adhesive for fastening to metal and exposed to the outside air is not acceptable.
- E. Dampers shall use the turned-metal principle on long closing ends with no metal-to-metal contact for proper sealing.
- F. The damper shaft shall be mechanically fastened to the blade, and shall operate in bearings made of nylon or other material, which does not require lubrication.

## 2.6 FILTER:

- A. Each unit ventilator shall be equipped with a two-piece filter located to provide filtration of the return air/outdoor air mixture. The entire filter surface must be useable for filtration of 100% room air or 100% of outdoor air. The filter shall be easily accessible from the front, and removable in two pieces without removal of the unit return air damper stop. The unit shall ship with a factory installed 1" thick fiberglass, single-use type.
- B. Spare filters shall be:
  - 1. 1" thick fiberglass, single-use type.

## 2.7 REFRIGERATION SYSTEM:

- A. The refrigeration section shall be constructed of galvanized steel and shall include a factory sealed, factory piped assembly consisting of a hermetically sealed compressor, an outdoor section consisting of one condenser coil, multiple condenser fans with one motor, and an indoor evaporator coil with indoor fan section. No condensate drain piping system shall be required as the cooling condensate is to be disposed of by directing it into the outdoor condenser fan scrolls for re-evaporation on the hot condenser coil. The entire refrigeration system shall ship as an integral completed assembly, which shall be evacuated, charged and run tested prior to shipment.



- B. The condenser fan board and fan housings shall be constructed of galvanized steel. Condenser fan wheels shall be double inlet, forward curved centrifugal type. Condenser fan housings shall be constructed of galvanized steel and have pick up slots for slinging indoor condensate upon the condenser coil for evaporation. One long condenser fan wheel without a fan housing is not acceptable. Fan and motor assembly shall be of the direct drive type. Belt drive fans shall not be allowed.
- C. The indoor refrigerant cooling heat transfer coil shall include a thermostatic expansion valve with external equalizer and venturi type refrigerant distributor. A low refrigerant temperature sensor shall be factory installed in a u-bend of the refrigerant indoor coil to protect the system during low refrigerant suction conditions.
- D. Refrigerant shall be metered by a thermostatic expansion valve in lieu of capillary tubing to achieve evaporator performance and to protect the compressor from floodback of liquid refrigerant.
- E. Unit shall have scroll compressors for maximum quietness. Compressors will operate with two stages for efficiency and improved sound. Compressor shall operate at low stage for slow and medium fan speed to improve dehumidification and reduced sound level. Compressor and fan will operate at high speed for sensible enhancement.
- F. The unit shall be furnished and wired with compressor thermal/current overload and high-pressure cutout. Gauge ports shall be provided to allow reading of refrigerant pressures at the suction and discharge of the compressor. Compressor shall be equipped with internal pressure relief valve to protect against excessive pressure buildup.
- G. The outdoor condenser coils shall be constructed of copper tubes mechanically expanded to raised lanced aluminum plate fins mechanically bonded thereto and shall be positioned above a stainless steel drain pan.
- H. Single-phase units shall have permanent split capacitor (PSC) compressor motor with start assist consisting of a compressor start capacitor and compressor start relay.
- I. Acoustic Treatment
  - 1. The refrigeration system shall come with an Ultra Quiet configuration using the following: The compressor shall be mounted on neoprene compressor isolators for external vibration isolation. The compressor shall be connected by attenuation loops in both the suction and discharge lines to prevent transmission of vibration to other components within the section. In addition the refrigerant piping shall include braided copper tubing in the suction and discharge lines to further reduce the transmission of compressor pulsations. Straight compressor discharge lines without attenuation loops and/or braided copper flex-tubing are not acceptable. Compressor enclosure panels shall be 16-gauge minimum and crossbroken for additional rigidity to dampen vibration. Compressor jackets or compressors without their own enclosure cabinets shall not be acceptable. The complete interior of the compressor compartment shall be lined with a multi-functional material that serves as a sound barrier, an absorber of sound and also must act as a decoupler to the compressor enclosure. This multi-functional material shall have a mylar coating on the face to

act as a sound reflector and to increase the strength of the material. Damping material shall be textured foam type. The exterior of the compressor compartment shall be coated with a high density damping material to eliminate impact noise and vibration. The right end panel, right hand front [panel, 36" (914 mm) of the right hand end of the center front panel and the hinged top access door shall be coated with a high density material to eliminate noise and vibration.

## 2.8 CONTROL COMPONENTS

- A. Each unit ventilator shall be furnished with a factory installed and wired, microprocessor based DDC Unit Ventilator Controller (UVC), by the manufacturer of the unit ventilator, which is pre-programmed, factory pre-tested prior to shipment and capable of complete, stand-alone unit control or incorporation into a building-wide network using an optional plug-in communication module. The UVC shall be preprogrammed with the application code required to operate the unit using ASHRAE Cycle II. The unit control system shall include all required temperature sensors, input/output boards, main microprocessor modules, Local User Interface (referred to as LUI) Touch Pad with Digital LED Display, wiring, 24 volt power and direct coupled damper actuators. The UVC shall support up to 6 analog inputs, 12 binary inputs, and 9 binary outputs plus additional I/O points of 4 analog inputs and 8 binary outputs.
- B. The Outdoor Air/Return Air Damper Actuator shall be direct coupled, floating point actuator that spring returns the outdoor air damper shut upon a loss of power.
- C. The hot water heating coil shall use a factory furnished, field installed, two position End Of Cycle (EOC) control valve to shut off the heating medium at the end of the heating cycle. Upon a power failure, the heating EOC valve shall spring return to the normally open position for flow of water. End of cycle valves without spring return to the normal position upon a power failure shall not be acceptable. The EOC shall be of the 2-way or 3-way configuration as specified in the valve specifications.
- D. A low refrigerant temperature sensor shall be factory installed on a U-bend of the coil to protect the refrigerant system during low refrigerant suction conditions.
- E. All units shall be Valve Control. The Modulating Valve Actuator shall be direct coupled, floating point actuator that is non-spring returned.
- F. The hot water heating coil shall use a factory furnished, field installed, modulating control valve to modulate the heating medium during the heating cycle. Upon a power failure, the modulating heating valve shall spring return to the normally open position for flow of water. Modulating valves without spring return to the normal position upon a power failure shall not be acceptable. The modulating valves shall be of the 2-way or 3-way configuration as specified in the valve specifications.

- G. The LUI shall provide a unit mounted interface which indicates the current unit operating state, room temperature set point, and can be used to adjust the unit ventilator operating parameters (operating mode, fan speed and occupancy mode). The LUI shall have a digit display, 7 keys (1 key hidden for parameter menu access), 9 individual LED indicators and 3-level password protected security feature.
- H. The unit controller shall monitor room conditions, and automatically adjust unit operations (fan speed, temperatures, etc.) to maintain pre-programmed temperature setting selection ranges and ventilation requirements. The control sequence shall be on the basis of ASHRAE Cycle II for normal classroom locations, but shall have exhaust fan interlock for override to bring in full outside air for laboratory/science room applications. The fan speeds shall be high constant, medium constant, low constant and auto, which shall vary the air flow in direct relation to the room load. The fan shall not change speeds in less than ten minutes in any one mode. Two constant fan speed operation shall not be acceptable.
- I. Each Local User Interface (LUI) Touch Pad shall have a Digital LED Display status/fault indication.
- J. Controls shall allow monitoring and adjustment from a portable IBM compatible PC using the applicable software. When using this PC and software, the unit shall be capable of reacting to commands for changes in control sequence and set points.
- K. All units shall come equipped with a factory mounted room temperature sensor located in a sampling chamber (front, center panel) where room air is continuously drawn through for fast response to temperature changes in the room. When using a remote wall-mounted temperature sensor the ability shall exist to simply disconnect the unit-mounted temperature sensor using the provided quick disconnect plug.
- L. A discharge air temperature sensor shall be factory located on the second fan from the right to constantly sense unit discharge air temperatures. The unit's discharge air temperature sensor shall work in conjunction with the room temperature sensor to provide for stable discharge air temperatures, even in the event of rapid changes in outdoor air quantities.
- M. An outdoor air temperature sensor shall be factory located in the outside air prior to the outside air damper to continually sense outdoor air temperature.
- N. A tenant override switch shall be factory mounted next to the Local User Interface (LUI) Touch Pad to provide a momentary contact closure that causes the unit to enter the "tenant override" operating mode for a set time period (adjustable) of 120 minutes. The tenant override switch shall cause a unit operating in the unoccupied mode (temperature set-back/set-up, and no outdoor ventilation) to return to the occupied mode for two hours (adjustable) and then the system shall automatically return to un-occupied mode. The room temperature sensor and override switch shall:
  - 1. be an optional wall mounted temperature sensor, with integral tenant override capability.

- O. Tenant Override/set-up control shall be provided by:
  - 1. The network DDC control system.
- P. The unit shall have three (3) multi-pin External Signal Connection Plugs factory provided and pre-wired with short wire whips that are capped for field wiring of:
  - 1. A Remote Wall Mounted Temperature Sensor.
  - 2. External Input Signals (by others): unoccupied, remote shutdown, ventilation lockout, dewpoint/humidity, or exhaust interlock signals. (Available inputs may vary by unit model. Not all functions can be used at the same time.)
  - 3. External Output Options (by others): lights on/off, motorized water valve open/close, fault indication signal, pump restart, exhaust fan on/off or auxiliary heat signal. (Available outputs may vary by unit model. Not all functions can be used at the same time.)
- Q. An outdoor air humidity sensor shall be factory located in the outside air prior to the outside air damper to continually sense outdoor air humidity for units using outdoor enthalpy or indoor/outdoor enthalpy type economizer.
- R. A room humidity sensor shall be factory located in a sampling chamber (front, center panel) where room air is continuously drawn through for fast response to humidity changes in the room using indoor/outdoor enthalpy type economizer using indoor/outdoor enthalpy type economizer.

## 2.9 CONTROL FUNCTIONS

- A. The Unit Ventilator Digital Controller (here after referred to as UVC) shall support ASHRAE Cycle II operation.
- B. A discharge air temperature sensor shall be installed in all unit ventilators. The ASHRAE II control algorithm shall override room control and modify the heating, ventilating, and cooling functions (as available) to prevent the discharge air temperature from falling below the Ventilation Cooling Low Limit (here after referred to as VCLL) setpoint.
- C. Description of Operation
  - 1. The Unit Ventilator UVC shall use State Machine programming concepts to define and control unit ventilator operation. This shall eliminate the possibility of simultaneous heating and cooling, rapid cycling, etc. and simplify sequence verification during unit commissioning or troubleshooting.
  - 2. Super States shall group two or more related states into a single control function such as cooling, or heating, etc. States shall be where all the actual work takes place. Thus within each state the UVC shall enable PI loops and other logic sequences required to control unit ventilator operation within that particular state, while other functions and PI-loops not needed during that state may be disabled. Transitions shall be the logic paths used to determine which State should be made

active. These shall be the “questions” the UVC will continually consider/determine for which path is followed and which state is active.

3. The UVC States and Super States shall be used to define the “normal” unit modes, such as Off, Fan Only, Heat, Emergency Heat, Cool, Auto, Night Purge, and Dehumidification. The UVC shall support several “non-normal” unit modes such as Purge, Pressurize, De-pressurize, and Shutdown, which can be forced via a network connection and override typical UVC operation.

D. Modes of Operation

1. The UVC shall provide several “normal” Modes of unit operation, these shall include Off, Fan Only, Heat, Emergency Heat, Cool, Heat and Cool, Auto, and Night Purge.

E. Off Mode

1. An Off Mode shall be provided so that the UVC can be forced into a powered off condition. The Off mode shall be a “stop” state for the unit ventilator; it shall not be a power off state. The Local User Interface module (here after referred to as LUI) or a network connection shall be able to force the unit into the Off mode.
2. Non-normal unit modes (i.e. Purge, Pressurize, and De-pressurize modes) accessed via a network connection shall be able to force the UVC to perform “special” functions during which the UVC shall appear to be in the Off mode.

F. Fan Only Mode

1. A Fan Only Mode shall be provided so that the UVC can be forced into a Fan Only operation. The LUI or a network connection shall be able to force the unit into the Fan Only Mode.

G. Heat Mode

1. A Heat Mode shall be provided to force the UVC shall use primary heat (wet heat) as needed to maintain the effective heating setpoint. The LUI or a network connection shall be able to force the unit into the Heat mode.
2. When the Heat mode super state becomes active, the UVC shall automatically determine which UVC State to make active; Heat, Low Limit, or Cant Heat based upon the transitions for each of those states. The UVC shall remain in this super state until one of the transition out conditions become true.
3. The Heat State shall be the “normal” state that the UVC will go into when Heat mode is active. When the Heat State becomes active, the UVC shall continually calculate the Discharge Air Temperature Setpoint (here after referred to as DATS) required to maintain the effective heat setpoint (Space Temperature Setpoint). The calculated DATS shall not be allowed to go above Discharge Air High Limit (here after referred to as DAHL). The modulating valve shall be positioned to maintain the classroom temperature setpoint. The UVC shall use primary heat (wet heat) as

needed to maintain the current DATS. The UVC shall monitor the wet heat coil leaving air temperature thermostat (if provided) in order to prevent coil freezing conditions (see Wet Heat Coil Leaving Air Temperature Thermostat).

4. A Low Limit Heat State shall be a “non-normal” state that shall become active if during Heat mode the unit reaches 100% heating and is unable to meet the current Discharge Air Temperature Setpoint required to maintain the effective heating setpoint.
5. The Cant Heat State shall be a “non-normal” state that the UVC can go into when Heat mode is active. Sensor faults, etc. during the Heat mode shall cause the UVC to make the Cant Heat State active. When the Cant Heat State becomes active, no heating or ventilation shall take place. The OA damper shall be closed. The UVC shall monitor the wet heat coil leaving air temperature thermostat, when provided, in order to prevent coil freezing conditions.

#### H. Cool Mode

1. A Cool mode shall be provided to force the UVC into Cool Only operation. The Cool mode shall use primary cooling (economizer) and secondary cooling (mechanical compressor type) as needed to maintain the effective cooling setpoint. The LUI or a network connection shall be able to compel the unit into the Cool mode. Additionally, the UVC when set to Auto mode shall automatically compel the unit into the Cool mode as needed.
2. When the Cool mode becomes active, the UVC shall automatically determine which UVC state to make active, Econ, Econ Mech, Mech, DA Heat, Low Limit, Cant Cool, or Dehumidify based upon the transitions for each of those states.
3. An Econ State shall be provided as a “normal” state that the UVC can go into when Cool mode is active. The Econ State shall be typically active in the Cool mode when primary cooling (economizer) is available and adequate to meet the cooling requirements. When the Econ State becomes active, the UVC shall use economizer cooling as needed to maintain the effective cooling setpoint. The UVC shall monitor the DAT to ensure it does not fall below Ventilation Cooling Low Limit (here after referred to as VCLL) setpoint. The UVC shall monitor the wet heat coil leaving air temperature thermostat (if provided) in order to prevent coil freezing conditions.
4. An Econ Mech State shall be provided as a “normal” state that the UVC can go into when Cool mode is active. The Econ Mech state shall typically be active in the Cool mode when primary cooling (economizer) alone is not adequate to meet the cooling requirements and both primary cooling and secondary cooling are available. When the Econ Mech State becomes active, the OA damper shall be set to 100% open, and the UVC shall use the units mechanical cooling capabilities as needed to maintain the effective cooling setpoint. The UVC shall monitor the DAT to ensure it does not fall below the Mechanical Cooling Low Limit (here after referred to as MCLL) setpoint. The UVC shall monitor the wet heat coil leaving air temperature thermostat (if provided) in order to prevent coil freezing conditions.



5. A Mech State shall be provided as a “normal” state that the UVC can go into when Cool mode is active. The Mech State shall be typically active in the Cool mode when primary cooling (economizer) is not available and secondary cooling is available. When the Mech State becomes active, the UVC shall use the units mechanical cooling capabilities as needed to maintain the effective cooling setpoint. The UVC shall monitor the DAT to ensure it does not fall below the Mechanical Cooling Low Limit (here after referred to as MCLL) setpoint. The UVC shall monitor the wet heat coil leaving air temperature thermostat (if provided) in order to prevent coil freezing conditions. The UVC shall be configured to operate the compressor as secondary (mechanical) cooling when the economizer is available, when the economizer is not available and the compressor is available then the UVC shall use the compressor when cooling is required. A compressor envelope shall be established using a sensor on the indoor and outdoor coils to monitor refrigeration temperature conditions. This envelope shall protect the compressor from adverse operating conditions, which can damage or shorten compressor life by ending compressor operation if coil temperatures exceed the defined operating envelope.
6. A Mech State shall be provided as a “normal” state that the UVC can go into when Cool mode is active. The Mech State shall be typically active in the Cool mode when primary cooling (economizer) is not available and secondary cooling (compressor) is available. When the Mech State becomes active, the UVC shall use the unit's mechanical cooling capabilities as needed to maintain the effective cooling setpoint. The UVC shall be configured to operate the compressor as secondary (mechanical) cooling when the economizer is available, when the economizer is not available and the compressor is available then the UVC shall use the compressor when cooling is required. A compressor envelope shall be established using a sensor on the indoor and outdoor coils to monitor refrigeration temperature conditions. This envelope shall protect the compressor from adverse operating conditions, which can damage or shorten compressor life by ending compressor operation if coil temperatures exceed the defined operating envelope.
7. A DA Heat State shall be provided as a “normal” state that the UVC can go into when Cool mode is active. The DA Heat State shall be typically active when reheat is required to maintain VCLL while maintaining the required OA damper position. When DA Heat State is active, then the UVC shall use the units heating capability as needed to maintain the VCLL setpoint. The Heat Timer (3-minutes fixed) shall begin counting. The UVC shall monitor the wet heat coil leaving air temperature thermostat in order to prevent coil freezing conditions. The UVC shall remain in this state until one of the transition out conditions become true, or until one of the super state transition out conditions becomes true.
8. A Low Limit State shall be provided as a “non-normal” state that the UVC can go into while Cool mode is active. The Low Limit state shall typically follows the DA Heat state when the UVC has reached 100% heat and still cannot maintain VCLL. When the Low Limit State becomes active, the Low Limit PI-loop shall override the OAD minimum position and adjust the OAD toward closed as necessary to maintain the DAT setpoint.



I. Auto Mode

1. An Auto mode shall be provided so that the UVC can be set to automatically determine if heating, cooling or dehumidification is required. The Auto mode shall be the default start-up UVC mode. Auto mode shall be made up of the Heat, Cool and Dehumidify modes. With the UVC set to auto mode, the UVC shall determine which mode (Heat, Cool and Dehumidify) to use.

J. Emergency Heat Mode

1. An Emergency Heat mode shall be provided for situations where the UVC is in a mode that does not normally allow heating, such as Off, Cool, Fan Only, Night Purge, etc. If Emergency Heat mode is enabled and the space temperature falls below the EHS, the UVC shall automatically force itself into the Emergency Heat mode from Off, Cool, Night Purge, Fan Only, Purge, Pressurize, De-pressurize, and Shutdown. Additionally, the LUI or a network connection shall be used to force the unit into the Emergency Heat mode. Emergency Heat mode shall consist of two UVC states: Full Heat and Cant Heat.
2. A Full Heat State shall be provided as the “normal” state that the UVC will go into when Emergency Heat mode is active. When Emergency Heat (EHS) mode becomes active, the UVC shall go into 100% heating until the space temperature raises to the EHS plus a fixed differential (9°F / 5°C). In the Emergency Heat mode the space fan shall be set to high speed, and the OA damper will operate normally.
3. The Cant Heat State shall be a “non-normal” state that the UVC can go into when Emergency Heat mode is active. Sensor faults, etc. during the Heat mode shall cause the UVC to make the Cant Heat State active. When the Cant Heat State becomes active, no heating or ventilation shall take place. The OA damper shall be closed. The UVC shall monitor the wet heat coil leaving air temperature thermostat (if provided) in order to prevent coil freezing conditions.

K. Night Purge Mode

1. A Night Purge mode shall be provided to quickly ventilate a space. Night purge shall be used to remove odor build up at the end of each day, or after cleaning, painting, or other odor generating operations occur within the space. Night Purge shall be full ventilation with exhaust mode, during which room comfort will be compromised. The LUI or a network connection shall be able to force the unit into the Night Purge mode.
2. When Night Purge mode becomes active, the UVC shall stop all normal heating and cooling as any new energy used to treat the incoming air would be wasted in the purging process. In the Night Purge mode the unit classroom air fan shall be set to high speed, the OA damper will be set to 100% open, and the Exhaust Fan binary output shall be set to On. If not set to another mode within 1-hour, the UVC shall force itself into the Fan Only mode. If the space temperature drops below the EHS, and the Emergency Heat function is enabled, the UVC shall be forced into the

Emergency Heat mode. The UVC shall continue to monitor the wet heat coil leaving air temperature thermostat (if provided) in order to prevent coil freezing conditions.

L. Non-Normal Unit Modes

1. Additional UVC modes shall be provided that are considered non-normal unit modes. These shall include Pressurize, Depressurize, Purge, Shutdown and Energy Hold Off. These modes shall force the UVC to perform very specific and limited functions and shall be used with caution and only for short periods as needed. These modes shall be accessed only via a network connection.
2. In each of these non-normal UVC modes, if the space temperature drops below EHS, and the Emergency Heat function enables, the UVC shall be forced into the Emergency Heat Super State mode and then return once the Emergency Heat function is satisfied.
3. A Shutdown mode shall be provided that is the equivalent of the Off mode, but shall be an Off mode forced by a network connection. When in Shutdown mode the UVC shall stop all normal heating, cooling, ventilation (OA damper shall be closed), and fan operation. By default emergency heat shall not be used during the shutdown mode, however, the UVC can be configured (Emergency Heat Shutdown Configuration) to allow emergency heat operation during shutdown mode. The Shutdown mode shall be accessed via a network connection and a binary input to the UVC.
4. The UVC shall support an Energy Hold Off state, which when active forces the UVC to stop all normal heating, cooling and ventilation. This shall typically be used by a network connection to force the UVC to cease heating, cooling and ventilation when conditions exist where heating, cooling and ventilation are not required or desired. Energy Hold Off mode shall be similar to Shutdown mode except that Energy Hold Off always allows Emergency Heat if required. The Energy Hold Off mode shall be only accessed via a network connection.
5. The UVC shall in the Purge mode use the unit Classroom or Indoor Air Fan (here after referred to as IAF), OAD, and exhaust output as needed to purge the space. The UVC shall stop all normal heating and cooling but allow Emergency Heat if required. The purge mode shall be only accessed via a network connection.
6. The UVC shall in the Pressurize mode use the IAF, OAD, and exhaust output as needed to pressurize the space. The UVC shall stop all normal heating and cooling but shall allow Emergency Heat if required. The Pressurize Mode shall be accessed only via a network connection.
7. The UVC shall in the Depressurize mode use the IAF, OAD, and exhaust output as needed to depressurize the space. The UVC shall stop all normal heating and cooling but does allow Emergency Heat if required. The Depressurize Mode shall only be accessed via a network connection.

M. Occupancy Modes

1. The UVC shall be provided with four occupancy modes: Occupied, Standby, Unoccupied, and Bypass. The Occupancy mode shall effect which heating and cooling temperature setpoints shall be used, IAF operation, and OAD operation. The Manual Adjust Occupancy and Networked Occupancy Sensor network variables, along with the Unoccupied and Tenant Override binary inputs, shall be used to determine the Effective Occupancy.
2. The Occupied mode shall be the normal daytime mode of UVC operation. During Occupied mode the UVC shall use the occupied heating and cooling setpoints, the OAD shall operate normally, and by default the IAF shall remain on. A Networked Occupancy Sensor shall be able to interfaced with the Occupancy Sensor Input variable to select occupancy modes. When the Occupancy Sensor Input variable is used, it shall automatically override any hard-wired unoccupied binary input signal.
3. The Unoccupied Occupancy mode shall be the normal nighttime mode of UVC operation. During Unoccupied mode the UVC shall use the Unoccupied heating and cooling setpoints, the OAD shall remain closed, and the IAF shall cycle as needed for heating or cooling. The IAF shall remain off when there is no need for heating or cooling. A Unit-mounted factory-installed electronic 24-hour/7-day Time Clock shall be provided when the unit operates in Stand-alone or no Network is available. This time clock shall be factory wired to the UVC Unoccupied binary input and shall be settable to automatically place the unit into Occupied and Unoccupied modes based upon its user-configured schedule.
4. The Standby mode shall be a non-normal daytime mode of UVC operation. During Standby mode the UVC shall use the standby heating and cooling setpoints, the OAD shall remain closed, and by default the IAF shall remain on.
5. The Bypass mode (also called Tenant Override) shall be the equivalent of a temporary occupied mode. Once the Bypass mode is initiated it shall remain in effect for a set period of time (120-minutes default). During the Bypass mode the UVC shall use the occupied heating and cooling setpoints, the OAD shall operate normally, and by default the IAF shall remain on. A Tenant Override Switch shall be factory installed in all floor-mounted units. This Tenant Override Switch shall be located near the LUI on the unit. The Tenant Override Switch shall provide a momentary contact closure that can be used by room occupants to temporarily force the UVC into the Bypass Occupancy mode from Unoccupied mode. The optional Remote Wall-mounted Sensors shall include a Tenant Override Switch. This Tenant Override Switch shall provide a momentary contact closure that can be used by room occupants to temporarily force the UVC into the Bypass Occupancy mode from Unoccupied mode. The optional Remote Wall-mounted Sensors shall each indicate a UVC status LED. This status LED shall aid in diagnostics by indicating the UVC Occupancy mode and Fault condition.

N. Space Temperature Setpoints

1. The UVC shall use the six occupancy-based temperature setpoints for heating and cooling, Occupancy mode, and the value of the Network variables Space Temp Setpoint Input, Setpoint Offset Input and Setpoint Shift Input as the basis to determine the Effective Setpoint Output. The UVC shall calculate the effective setpoint based upon the unit mode, the occupancy mode, and the values of several network variables. The effective setpoint shall then be used as the temperature setpoint that the UVC will maintain.

O. LUI Setpoint Offset Adjustment

1. The LUI shall be used to make adjustments to the value of the Setpoint Offset Input variable.

P. Expanded Remote Wall-Mounted Sensor with +/- 3°F Adjustment

1. When the optional Remote Wall-mounted Sensor with +/- 3°F adjustment dial is used, the UVC shall effectively write the value of the setpoint adjustment dial to the Setpoint Offset Input variable.

Q. Indoor Air Fan Operation

1. The UVC shall support a three-speed IAF with Low, Medium, and High speed. The UVC will calculate the effective fan speed and operation based upon the unit mode, the occupancy mode, and the values of several network variables.
2. The UVC shall be provided with a user selectable Auto Fan Mode feature. When in auto fan mode, the UVC shall use the space temperature PI loop to automatically adjust the fan speed as needed to maintain space temperature. This shall ensure that the UVC will maintain the lowest and quietest fan speeds whenever possible. When in Auto Fan Mode, a maximum of 6 fan speed changes per hour shall be allowed (by default), this shall prevent frequent automatic fan speed changes from disturbing room occupants. During occupied, standby and bypass modes the IAF shall, by default, remain On. During unoccupied mode the IAF shall typically remain off and shall cycle with calls for heating and cooling. The UVC shall be provided with a Fan Cycling Configuration variable that can be used to force the IAF to cycle with calls for heating and cooling during the Occupied, Standby and Bypass Occupancy modes. When the fan is off, the OA damper shall be closed. This feature shall only be used when it is acceptable that normal ventilation is not required. When the IAF is set to cycle, or during the Unoccupied mode, or when the UVC is placed into Off mode, the UVC shall be configured to continue fan operation for a time period (30-seconds default) after heating or cooling is complete.

R. Outdoor Air Damper Operation

1. The UVC shall be configured for an Outdoor Air Damper operated by a floating-point actuator. The OA damper actuator shall contain a spring to ensure that the OA damper is closed upon loss of power. The OA damper shall be typically open to the current minimum position during the Occupied and Bypass occupancy modes, and closed during the Unoccupied and Standby Occupancy modes.
2. The UVC shall be configured to maintain three Outdoor Air Damper minimum positions based upon the operation of the IAF. This shall allow the ability for each unit to be job site configured to provide the amount of fresh air required to the space at each of the three IAF speeds.
3. The Economizer function shall be used by the UVC to determine if the OA is adequate for economizer (primary) cooling. When both the economizer and mechanical cooling are available, the economizer shall be used as primary cooling and the UVC shall add mechanical cooling only if the economizer is not adequate to meet the current cooling load (i.e. the OA damper reaches 100% and cooling is still required). The UVC shall be configured to support the economizer type of (optional) Temperature Comparison with Enthalpy Comparison Economizer for which the UVC shall use four configuration variables for the Temperature Comparison with Enthalpy Comparison Economizer: Economizer OA Temperature Setpoint, Economizer Temperature Differential and Economizer OA Enthalpy Setpoint, and Economizer Enthalpy Differential. The Economizer Temperature Differential shall compare the classroom air temperature to the OA temperature. The Economizer Enthalpy Differential shall compare the classroom air Relative Humidity to the OA Relative Humidity. If the temperature difference is greater than the economizer temperature differential and the Economizer OA temperature is below the temperature setpoint and the OA Relative Humidity difference is below the enthalpy setpoint and the enthalpy difference is greater than the enthalpy differential than the Economizer function shall be energized.

S. Modulating Valve Control (STEAM UNITS)

1. The UVC shall be configured for a modulating valve operated by a floating-point actuator.
2. The UVC shall be configured for a wet heat modulating valve. The modulating valve actuator shall contain a spring which will ensure that the wet heat valve is driven open upon a loss of power.

T. Actuator Auto-Zero, Overdrive and Sync

1. The UVC at power-up shall auto-zero actuators OA damper, F&BP damper and Valve before going into normal operation to ensure proper positioning, this may take as long as 150-seconds after power-up.
2. The UVC shall be configured such that whenever the floating-point actuator is commanded to go to 0% or 100%, the UVC shall overdrive the actuator one full stroke period past the 0% or 100% position to ensure proper positioning.



3. Additionally, the UVC shall be configured to sync all actuators once every 12-hours of operation.

U. Water Coil Leaving Air Temperature Thermostat (Freezestat)

1. A normally-closed Low Temperature Thermostat (Freezestat) shall be factory provided to detect low leaving air temperature conditions on the unit indoor air hot water coil. This thermostat shall be mounted on the discharge airside of the units hot water coil. The low temperature thermostat cutout shall be 38°F (3°C) +/-2 and the cut-in shall be 45°F (7°C) +/-2. When the low temperature thermostat detects low leaving air temperatures (contacts open) the following shall occur during Valve Control Heating operation: when the freezestat cuts-out the OAD shall close immediately, the heating modulating valve shall fully open immediately, any mechanical cooling shall be de-energized immediately. If heating is required, the modulating valve shall modulate, as needed, auxiliary heat may be used as needed. When the Freezestat resets or cuts-in the UVC shall return to normal operation.

V. External Binary Inputs (Inputs vary by model type. Not all functions can be used at the same time)

1. The UVC shall be provided with three (3) binary inputs that can provide the following functions. These inputs each shall allow a single set of dry-contacts (no voltage source) to be used as a signal to the UVC, multiple units can be connected to a single set of dry-contacts.
2. External Binary Input 1 shall be able to be configured as an Unoccupied (default) or dewpoint/humidity signal. The Unoccupied Input Signal shall allow a single set of dry-contacts to be used to signal the UVC to go into Unoccupied or Occupied mode. When the contacts close (Unoccupied) the UVC shall go into Unoccupied mode, when the contacts open (Occupied) the UVC shall go into Occupied mode. The (optional) Dewpoint/Humidity Input Signal shall allow a single set of dry-contacts to be used to signal the UVC to go into Active or Passive Dehumidification. When the contacts close (High Humidity) the UVC shall go into Dehumidification, when the contacts open (Low Humidity) the UVC shall stop dehumidification. The device used must incorporate its own differential dewpoint or differential humidity.
3. External Binary Input 2 shall only be used for remote shutdown. The Remote Shutdown Input Signal shall allow a single set of dry-contacts to be used to signal the UVC to go into Shutdown mode. When the contacts close (Shutdown) the UVC shall go into Shutdown mode, when the contacts open the UVC shall return to Normal operation. See Non-Normal Unit Modes.
4. External Binary Input 3 shall be able to be configured as a Ventilation Lockout (default) or Exhaust Interlock Signal. The Ventilation Lockout Input Signal input shall allow a single set of dry-contacts to be used to signal the UVC to close the OA damper. When the contacts close (Ventilation Lockout Signal) the UVC shall close the OA damper, when the contacts open the UVC shall return to normal OA damper operation. The Exhaust Interlock Input Signal input shall allow a single set of dry-contacts to be used to signal the UVC that an Exhaust Fan within the space has been

energized, the UVC shall reposition the OA damper to a user adjustable minimum position (Exhaust Interlock OA Damper Min Position Setpoint). When the contacts close (Exhaust fan on signal) the UVC shall use the value defined by the Exhaust Interlock OA Damper Min Position Setpoint as the minimum OA damper position regardless of IAF speed, when the contacts open the UVC shall return to normal OA damper operation.

5. The UVC shall be provided with three (3) binary outputs that can provide the following functions (outputs vary by model type. Not all functions can be used at the same time). These outputs shall be relay type outputs that shall to be used with signal level voltages (24vac max) only. External Binary Output 1 output shall only be able to be used as a signal for Space Lights. The Lights On/Off Signal relay output shall provide one set of NO dry-contacts that shall be used to signal the operation of the Space Lights. When the UVC is in Occupied, Standby or Bypass Occupancy modes the relay output shall signal the lights on (contacts closed), when the UVC is in Unoccupied occupancy mode the relay output shall signal the lights off (contacts open). External Binary Output 2 shall only be able to be used as a fault signal. A Fault Signal relay output shall provide a NO, NC, and Common connections that can be used to signal a fault condition. When a fault exists, the UVC shall energize this relay output, when the fault or faults are cleared the UVC shall de-energize this relay output. External Binary Output 3 shall only be able to be used to operate an Auxiliary Heat device (default) or signal Exhaust Fan operation. The Auxiliary Heat Signal relay output shall provide one set of NO dry-contacts that can be used to operate an Auxiliary Heat device. The UVC shall be by default configured to operate a NO Auxiliary Heat device (de-energize when heat is required) such as a wet heat valve actuator with a spring setup to open upon power failure. However, the Auxiliary Heat Configuration variable shall be able to be used to set the UVC to use a NC Auxiliary Heat device (energize when heat is required) such as electric heat. The Exhaust Fan On/Off Signal relay output shall provide one set of NO dry-contacts that can be used to signal the operation of an Exhaust Fan. When the OA damper opens more than the Energize Exhaust Fan OA Damper Setpoint then the relay output shall signal the Exhaust Fan on (contacts closed), when the OA damper closes below this setpoint the relay output shall signal the Exhaust Fan off (contacts open).

## 2.10 UNIT VENTILATOR OPTIONS/ACCESSORIES:

### A. Wall Sleeve

1. Unit manufacturer shall provide a galvanized steel, one-piece wall sleeve that is to be set into the wall opening and butted up directly against the intake louver. The Wall Sleeve shall be provided for the following types of unit ventilator installation (contractor to verify):
  - a) 16 5/8" unit ventilator exposure into the classroom.
  - b) 19 5/8" unit ventilator exposure into the classroom.
  - c) 21 7/8" unit ventilator exposure into the classroom.
  - d) 28" unit ventilator exposure into the classroom.



2. Where it is not possible to butt the wall sleeve against the wall intake louver, the contractor shall fabricate and install two (2) horizontal sheet metal baffles between louver and wall sleeve to provide an airtight separation between condenser discharge and condenser outside air, and condenser outside air and room outside air. The wall sleeve is to be permanently fastened in place and shall be suitably sealed, caulked, or grouted by the contractor around the entire perimeter to prevent air leakage.
3. The wall sleeve shall be fitted with an electrical junction box containing a main “on-off” switch. All field-wiring connections shall be made in this wall sleeve junction box.
4. It shall be the installing contractor’s responsibility to make the final load side power wiring connections between the wall sleeve junction box and the unit terminal block.
5. The wall sleeve with electrical junction box shall be cartoned separately and shipped to the jobsite preceding the unit ventilator.

B. Outdoor Air Intake Louver (contractor to verify):

1. Outdoor air intake louver shall be provided by unit ventilator manufacturer except as otherwise noted on the drawings. Masonry wall intake louver shall be constructed with vertical double brake type blades with weep holes in the louver frame and diamond pattern expanded aluminum bird screen on the interior side. Louver shall be fabricated of extruded aluminum 6063-T5. The louver shall be divided in half horizontally across the louver to prevent condenser air recirculation. All louvers shall be 28” (711 mm) high by 2.14” (51 mm) thick. The louver length shall be the entire length of the unit outside section. The intake assembly and frame shall be 16 Ga. vertical chevron type aluminum blades in a 12 Ga. frame, with:  
-REFER TO DRAWING FOR NOTES-
  - a) manufacturer’s oven baked powder paint finish and color for selection by the Architect.
  - b) clear anodized finish.
2. Panel wall or masonry wall intake louver shall be constructed with vertical blade double brake type blades. Provide weep holes along face of bottom frame and diamond pattern expanded aluminum bird screen on the interior side. Louver shall be fabricated of extruded aluminum 6063-T5. The louver shall be divided in half horizontally across the louver to prevent condenser air recirculation. All louvers shall be 28” (711 mm) high by 2.14” (51 mm) thick. The louver length shall be the entire length of the unit outside section. Each intake louver assembly shall be furnished with a matching four sided flange around the perimeter of the opening of same material and finish as louver. The intake assembly and frame shall be: 16 Ga. vertical blade double brake type aluminum blades in a 14 Ga. frame, with (SELECT ONE):
  - a) unfinished capable of field painting.
  - b) manufacturer’s oven baked powder paint finish and color for selection by the Architect.
  - c) clear anodized finish.

3. Intake Grille - Each intake louver assembly shall be furnished with a decorative aluminum intake grille with square holes to match the louver opening, maximizing the air opening. The grille shall come with holes for mounting to building exteriors. The grille shall be of same material and finish as the louver.

## 2.11 BASIS OF DESIGN

- A. Daikin.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Install all equipment in strict accordance with manufacturer's instructions and so as to be compatible with the intent of the respective system performance requirement.
- B. The System Integrator/Controls contractor shall be responsible for the integration of all factory provided unit mounted controls and unit communications as required/specified for unit integration into the Building Automation System and proper unit operation.
- C. Install equipment exposed to finished areas after walls and ceiling are finished and painted. Avoid damage. Contractor shall clean each unit and accessory section of construction dust and debris, prior to turning systems over to the owner.
- D. Unit Ventilators: Locate as indicated, level and shim units and anchor to structure. Coordinate exact location of wall louvers. Ensure wall sleeve and splitters are installed correctly. Install shelving where indicated. Provide necessary wall trim pieces for continuous wall-to-wall installation.
- E. Contractor shall install clean filters in each unit at time of system commissioning, and shall deliver to the owner one complete set of spare filters, and one spare motor of each type used in the project.
- F. Installer shall engage the services of manufacturer's factory trained service technician to provide check, test, and start-up of each unit ventilator system.
- G. Contractor shall provide one-year warranty for furnishing parts and labor for replacing any part of the unit ventilator or accessory sections, which becomes defective in operation. Unit ventilator manufacturer's representative shall maintain a local stock of replacement parts to support the systems specified herein.

### 3.2 GENERAL

- A. Unit to be installed in strict compliance with manufacturer's instructions.
- B. Field services shall be provided by a factory trained representative to fully set-up and adjust the new units, after the installations have been completed and before the units are placed in service.

Hamlin Design Group  
PRJ 201 Oakside Elementary  
PRJ 202 Uriah Hill School  
PRJ 203 Woodside School  
PRJ 204 Middle School

The City School District of Peekskill  
SED 66-15-00-01-0-005-020  
SED 66-15-00-01-0-007-014  
SED 66-15-00-01-0-008-017  
SED 66-15-00-01-0-014-005

- C. Written start-up report to be furnished. Factory alignment, mechanical seals, lubrication, three phase motor rotation, and all necessary commissioning tests shall be completed and checked before units are placed in service.
- D. GC to provide openings for wall louvers.
- E. Contractor shall seal any openings water tight around wall sleeve. (Top, bottom and each end).
- F. Pitch bottom of wall sleeve toward bottom of louver with non-shrink, non-metallic grout.
- G. Care must be taken to ensure weep holes in louver are not blocked.

END OF SECTION 238224

## SECTION 238230 - TERMINAL RADIATION UNITS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to work of this section.

#### 1.2 SUBMITTALS

- A. Submit manufacturer's specifications for terminal units showing dimensions, capacities, ratings, performance characteristics, gauges and finishes of materials, and installation instructions.
- B. Schedule of equipment identified by room number with complete equipment description. Identify units with designations used on drawings.
- C. Submit assembly type shop drawings showing unit dimensions, construction details, and field connection details.
- D. Submit manufacturer's electrical requirements for power supply wiring to terminal units. Submit manufacturer's ladder type wiring diagrams for interlock and control wiring. Clearly differentiate between portions of wiring that are factory installed and portions to be field installed.
- E. At Engineer's request submit samples of each type of cabinet furnished.
- F. Provide color chart for Architect's use.

### PART 2 - PRODUCTS

#### 2.1 FINNED TUBE RADIATION

- A. General: Provide finned tube radiation of lengths and in locations as indicated, and of capacities, style and having accessories as scheduled.
- B. Locate finned tube radiation on outside walls as indicated, and in accordance with manufacturer's installation instructions.
- C. Center Elements under windows. Where multiple windows occur over units, divide element into equal segments centered under each window.
- D. Install end trim where units butt against walls. Install end caps on units which do not butt walls. Install access panels centered in front of each shutoff valve, balancing cock, steam trap, or temperature control valve.
- E. Cabinets: Minimum 20 gauge cold rolled steel full backplate, minimum 16 gauge front. Brace and reinforce front minimum of 4'-0" O.C. without visible fasteners.

Hamlin Design Group  
PRJ 201 Oakside Elementary  
PRJ 202 Uriah Hill School  
PRJ 203 Woodside School  
PRJ 204 Middle School

The City School District of Peekskill  
SED 66-15-00-01-0-005-020  
SED 66-15-00-01-0-007-014  
SED 66-15-00-01-0-008-017  
SED 66-15-00-01-0-014-005

- F. Elements - For Hot Water: Copper tube and aluminum fins, with tube mechanically expanded into fin collars to eliminate noise and ensure durability and performance at scheduled ratings.
- G. Finish: Flat black heat resisting paint for backplate; factory finished baked enamel, standard colors, selected by Architect on fronts and accessories.
- H. Accessories: See drawings for arrangements. Provide accessories as shown on drawings, or specification, or as required for complete installation.
  - 1. End panels, inside and outside corners, and enclosure extensions.
  - 2. Access panels in front of all control, balancing and other valves, air vents and traps.
  - 3. Factory mounted dampers, sill extensions, mullion channels and pilaster covers.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION (HYDRONIC UNITS)

- A. Isolate each unit with valves to permit servicing of control valves, as shown on pertinent diagrams on plans.
- B. Contractor responsible for correct end connections and coil arrangements, with respect to installation of control valves, traps, vents, etc.
- C. Refer to Architects at once, any correction, discrepancy or suggested change in size or location.
- D. Install all equipment in strict accordance with manufacturer's instructions.
- E. Where covers require cutting joints shall be made to fit as closely as possible and shall be free from burrs and jagged edges. Unacceptable cuts shall be corrected at Contractor's expense.
- F. Each unit shall have a minimum of (1) one union type connection on each end. Valves or traps with such type connections are acceptable as substitutes.
- G. Eccentric reducers are required at all points on horizontal piping where pipe sizes change.
- H. Provide manual air vent on return of each heating unit on all up-feed hot water installations.

END OF SECTION 238230

## SECTION 238414 - CRAWLSPACE DEHUMIDIFIERS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawing and general provisions of the Contract including the General and Supplementary Conditions and Division 1 Specification Sections apply to the work of this section.

#### 1.2 SUBMITTALS

- A. Submit shop drawings on equipment specified hereinafter.
- B. Submit overall dimension drawings, field wiring diagram, installation drawing and product data including air flow, total power consumption, moisture removal capacity and refrigerant charge.
- C. Operating and Maintenance Data; Electrical wiring diagrams, installation and maintenance instructions and an owner's manual shall be supplied with each unit.

#### 1.3 GENERAL REQUIREMENTS

- A. Provide units of size capacity, construction, service and location as shown on drawings and specified hereinafter.
- B. Provide all necessary bracing and supports.

#### 1.4 QUALITY AND SAFETY ASSURANCE

- A. Units shall be ETL or CSA listed.
- B. Coils shall be UL or CSA listed.
- C. Blower motors and compressors shall be UL or CSA listed. Blower motors shall have a service factor rating of 1.15 or higher and must be stamped or marked high efficiency.
- D. Piping in accordance with BOCA code P-308.2 for corrosion resistant coating of copper tubing and M-702.0 for joints and connections. All refrigerant pipes shall be copper type "L" and vinyl-coated for corrosion prevention.
- E. Units shall be completely factory assembled, wired, piped and tested.
- F. Manufacturer of the packaged system for medium and high temperature industrial humidity control shall have a minimum of five years experience in the production of these systems.
- G. The system shall have a limited warranty for one full year from start-up or 15 months from shipment, whichever comes first.
- H. The entire cabinet shall be painted internally and externally.

## PART 2 - PRODUCTS

### 2.1 UNIT SELECTION

- A. Furnish and install Dectron DRY-O-TRON Model DA3 Energy Recycling Dehumidifier.

### 2.2 GENERAL

- A. Furnish and install medium and high temperature industrial dehumidification system. The system shall be specifically designed to help control humidity in the facility. Performance and specifications shall meet or exceed that shown on the equipment schedule.
- B. The dehumidifier shall be a single package unit. Each unit shall include compressor, evaporator (dehumidifying coil), condenser (air reheat coil), three-way refrigerant valve, receiver with pressure relief valve set at 400 psig, pressure control valve and pressure differential valve, two shut-off valves to isolate the outdoor condenser, two shut-off valves to isolate the receiver, supply air fan, fan motor, motor starters (3 phase only) and controls in one complete enclosure. All controls shall be factory adjusted and preset to the design conditions.

### 2.3 PRINCIPLE OF OPERATION

- A. The humid air from the facility passes through the dehumidifying coil and is cooled below its dew point, thereby condensing moisture. The heat captured by this process and the heat generated by the compressor power consumption are absorbed by a mechanical refrigeration system. The unit shall be designed to reject heat to the air or provide air conditioning. The leaving supply air dry bulb temperature is always higher than the entering return air temperature, except when air conditioning is in operation.

### 2.4 CABINET

- A. Removable service panels shall be furnished to provide access to all internal parts.
- B. Each unit shall have a built-in electrical control panel in a separate compartment in order not to disturb the air flow within the dehumidifier during electrical servicing.
- C. The unit shall have a built-in air filter rack.
- D. A 10 inch return duct connection complete with filter rack shall be provided.

### 2.5 CONDENSATION PREVENTION

- A. Condensation on the outer surfaces of the unit during operation shall not be acceptable. Units must be designed to prevent water vapor from condensing on the outer surfaces of the unit enclosure.



## 2.6 EVAPORATOR (DEHUMIDIFIER COIL)

- A. Shall not be less than six rows deep for maximum moisture removal capacity with air velocity not to exceed 500 fpm, with 1/2 inch OD seamless copper tubes mechanically expanded to assure high heat transfer with maximum twelve flat aluminum fins per inch.
- B. Corrugated or facetized fins shall not be acceptable.
- C. Coil shall have a 16-gauge galvanized casing and end plates coated with 660 clear coat.
- D. Coils shall be factory tested at air pressures not less than 400 psig in a water bath.

## 2.7 CONDENSER (AIR REHEAT COIL)

- A. Shall not be less than six rows deep for maximum heat transfer with 1/2 inch OD seamless copper tubes mechanically expanded to assure high heat transfer with maximum eight aluminum fins per inch.
- B. Coil shall have a 16-gauge galvanized casing and end plates coated with 660 clear coat.
- C. Coils shall be factory tested at air pressures not less than 400 psig in a water bath.

## 2.8 DRAIN PAN

- A. Each unit shall be equipped with a drain pan under the entire evaporator coil and prevent condensate carryover.
- B. The drain pan shall be made of 20-gauge type 304 stainless steel and shall be heated during operation to prevent ice formation.
- C. The drain pan shall have an internally mounted P-trap and condensate drain of rubber construction, heated during operation to prevent ice formation.

## 2.9 BLOWER

- A. Shall be double width, double inlet, multi-blade forward curved centrifugal type fan wheel, dynamically and statically balanced and tested, mounted on a solid steel shaft coated with silicon.
- B. The blower shall have a galvanized steel wheel and galvanized steel casing painted with a baked enamel finish.
- C. Blower bearings shall be grease -lubricated for 200,000 hours average life.

## 2.10 BLOWER MOTOR

- A. Shall be open drip-proof, class B insulation, induction type, 40C rise, pre-lubricated ball bearings mounted on an adjustable base.
- B. Blower motor shall be equipped with internal thermal protection

- C. Motors shall be UL or CSA approved.

## 2.11 BLOWER BELT DRIVE

- A. Shall be single V-belt with a safety factor not less than 1.2, dynamically balanced cast iron fixed pitch fan sheave and dynamically balanced cast iron variable pitch motor sheave.

## 2.12 COMPRESSOR

- A. Single phase units shall have hermetic or scroll compressor, suction gas-cooled, suitable for refrigerant R-410A equipped with internal solid state sensor thermal protection, resilient type external mounting.
- B. Compressor manufacturer must have a wholesale outlet for replacement parts in the nearest major city.

## 2.13 REFRIGERATION CIRCUIT

- A. Shall have an in-line solder type liquid line filter drier.
- B. Tamper proof, hermetically sealed non-adjustable high and low pressure controls and refrigeration service valves shall be installed using Schrader-type valves.
- C. Refrigeration service valves shall be located outside of the air-stream.
- D. Suction line shall be fully insulated with not less than 1/2 inch closed cell insulation.

## 2.14 CONTROL PANEL

- A. Shall be built-in within a separate compartment in order not to disturb the air flow during servicing.
- B. Compressor shall be controlled by contactors.
- C. Fan motor and compressor shall be protected with internal thermal overloads.
- D. Power block terminal shall be provided for proper wire size.
- E. Color coding and wire numbering shall be provided for easy troubleshooting. All wires shall be in a wire duct.
- F. Compressor shall have a time delay start to prevent short cycling.
- G. All wiring shall be installed in accordance with UL or CSA safety electrical code regulations, and shall be in accordance with NFPA. All components used shall be UL or CSA listed.
- H. A 24VAC/100VA power supply shall be provided to operate a ventilation system during the economizer cooling mode.

## 2.15 AIR FILTERS

- A. Shall be 1 inch disposable type suitable for commercial application, to handle average dust loading. Initial resistance at 100% R.A.F. of 0.08 inch W.G. and average arrestance efficiency of 80% based on 500 fpm air velocity.

## 2.16 MICROPROCESSOR CONTROL

- A. Unit shall be monitored and controlled with a solid state microprocessor system with remote mounted control panel located in the room.
- B. The following LED indications shall be provided on the remote control panel:
  - 1. System On - Indicates that the environment control system is on and the blower is running.
  - 2. Dehumidify - Indicates that the system is dehumidifying the space and recycling the energy where required.
  - 3. Cool - Indicates that the air conditioning mode is operating.
  - 4. Ventilation - Indicates that the outdoor air ventilation system is operating (economizer cooling mode).
  - 5. Aux Heat - Indicates that the auxiliary space heating is operating.
  - 6. Service - Flashes to indicate that the unit requires service. A service code shall be provided so that a service diagnosis can be performed quickly and efficiently. Built-in diagnostics shall be provided to detect:
    - a) Sensor failures
    - b) Refrigerant high and low pressure
    - c) High and low dew point
    - d) Low water flow
    - e) Communication fault
    - f) System off
    - g) Anti-short cycle delay
- C. The following set points shall be accessible on the remote control panel LED display:
  - 1. Space temperature
  - 2. Space relative humidity
- D. The following monitored conditions shall be available on the remote control panel LED display:
  - 1. Space temperature
  - 2. Space relative humidity

3. Evaporator air temperature
  4. Supply air temperature
  5. Service codes from built-in diagnostics
- E. The following keys shall be provided on the remote control panel:
1. System on/off - Controls the on/off status of the entire system. Blower shall continue to operate.
  2. Service - used in conjunction with service codes and built-in diagnostics to troubleshoot the system.
  3. Display - used to select the information shown on the LED display.
  4. Up and down arrow - used to adjust set points and scroll through service codes.
- F. The following sensors shall be factory mounted in the unit:
1. Return air temperature
  2. Supply air temperature
  3. Air off evaporator temperature
  4. Return air relative humidity
- G. The following sensors shall be factory mounted in the remote control panel:
1. Space air temperature
- H. The remote control panel shall be easily detachable from the room location and plug directly onto the unit to simplify initial start-up and service diagnosis.
- I. The remote control panel shall be connected to the unit via a three-wire shielded cable.

## 2.17 AIR COOLED AIR CONDITIONING

- A. Unit shall be equipped with air conditioning feature to reject all compressor heat to an outdoor air-cooled condenser. The outdoor condenser shall be equipped with transformer and 24VAC control including contactor for fan motor.
- B. Unit shall be provided with a dry contact rated for 24VAC/5A to operate the remote outdoor condenser control.
- C. Refrigeration circuit shall include three-way refrigerant valve, receiver with pressure relief valve set at 400 psig sized to hold the outdoor condenser charge, pressure control valve and pressure differential valve, and two shutoff valves to isolate the outdoor condenser.
- D. Unit shall include an oil separator package (Only required for units with line distances greater than 100ft total linear ft (one way)

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- E. Hot gas lines shall be fully insulated with not less than 1/2 inch closed cell insulation. Units without insulated hot gas lines in the air stream shall not be acceptable.

### PART 3 - EXECUTION

#### 3.1 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Handle dehumidifier unit carefully to prevent damage, breaking, denting and scoring. Damaged units or damaged components shall not be installed. Replace all damaged parts with new parts from the manufacturer.
- B. If unit is to be stored prior to installation store in a clean, dry place. Protect from weather, dirt, fumes, water, construction and physical damage.
- C. Comply with manufacturer's rigging and installation instructions for unloading the unit and moving it to the final location.

#### 3.2 INSTALLATION

- A. Execute the work in accordance with the specifications and in accordance with the manufacturer's instructions and only by workmen experienced in this type of work.
- B. Provide a service platform with adequate clearances for each unit. A step ladder shall absolutely not be used for service access.

END OF SECTION 238414

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DIVISION 26  
ELECTRICAL SPECIFICATIONS (EC)  
INDEX

SECTION	TITLE
260010	Electrical Work General
260015	Electrical Demolition
260190	Supporting Devices
260195	Electrical Identification
260519	Wire and Cable (600V and Below)
260533	Conduit
260534	Surface Raceways
260540	Boxes
262400	Power Distribution

## SECTION 260010 - ELECTRICAL WORK GENERAL

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract including all General Conditions, Supplementary Conditions, Division 1 specification sections as well as Information to Bidders requirements that are included in the project documents, apply to the work of this Contract.

#### 1.2 ALLOWANCES, ALTERNATES AND UNIT PRICES

- A. Refer to Division 1 specifications for allowances, alternates and unit prices required as part of this Contract.

#### 1.3 INTENT

- A. The intent of the drawings and these specifications is to provide all systems complete and operative. Whether indicated on the drawings and/or included in the specification or not, provide all materials, equipment and labor usually furnished with such systems.

#### 1.4 DEFINITIONS

As Called for	Materials, equipment including the execution specified/shown in the contract documents.
Code Requirements	Minimum requirements.
Concealed	Work installed in pipe and duct shafts, chases or recesses, inside walls, above ceilings, in slabs or below grade.
Design Make	Indicates minimum requirements for equipment.
ERL	Existing to be relocated. (see definition of relocate).
EXR	Existing to remain. Make connections to maintain circuit.
Exposed	Work not identified as concealed.
Acceptance	Owner acceptance of the project from Contractor upon certification by Owner's Representative.
Furnished by Others	Receive delivery at job site or where called for and install.
Inspection	Visual observations by Owner's site Representative.
Install	Mount or set equipment, device or fixture and make electric connections.



Labeled Make	Refers to classification by a standards agency. Refer to the article, BASIS OF DESIGN.
Provide	Furnish and install complete.
Relocate	Disassemble, disconnect, and transport equipment to new locations, then clean, test, and install ready for use.
Replace	Remove and provide new item.
Review	A general contractual conformance check of specified products.
Roughing	Pipe, duct, conduit, equipment layout and installation.
Satisfactory	As specified in contract documents.
Site Representative	Construction Manager or Owner's Inspector at the work site.
Refer to General Conditions of the Contract for additional definitions.	

## 1.5 SCOPE OF WORK

A. In general, the scope of work includes, but is not necessarily limited to the following:

1. Power distribution: panel board replacement, feeders and conduits.
2. Grounding of all services, raceway systems, disconnects and devices, etc.
3. Power circuits to mechanical equipment.
4. Removal work.

## 1.6 BASIS OF DESIGN

A. The contract documents are prepared on basis of one manufacturer as "design equipment," even though other manufacturers' names are listed as acceptable makes. If Contractor elects to use one of the listed makes other than "design equipment," submit detailed drawings, indicating proposed installation of equipment. Show maintenance clearances, service removal space required, and other pertinent revisions to the design arrangement. Make required changes in the work of other trades, at no increase in any contract. Provide larger electrical feeders, circuit breakers, equipment, additional control devices and other miscellaneous equipment required for proper operation, and assume responsibility for proper location of roughing and connections by other trades. Remove and replace door frames, access doors, walls ceilings or floors required to install other than design make equipment. If revised arrangement submittal is rejected, revise and resubmit specified "design equipment" item which conforms to contract documents.

## 1.7 QUALITY ASSURANCE

- A. Manufactures of equipment shall be firms regularly engaged in the production of factory fabricated systems and equipment whose products have been in satisfactory use in similar service for not less than (3) years.
- B. Suppliers of equipment must have factory trained and authorized personnel for the service of all equipment provided

## 1.8 LICENSING

- A. Where required the contractor shall hold a license, issued or recognized by the authority having Jurisdiction, to perform electrical work.

## 1.9 INSPECTIONS

- A. Provide rough in and final inspection by an electrical inspector certified by the AIAEI (the American International Association of Electrical Inspectors).

## 1.10 REMOVAL, DISPOSAL AND HAZARDOUS MATERIALS

- A. All removed electrical equipment shall be removed from the site and properly disposed of.
- B. All hazardous materials must be disposed of in compliance with ENCON and all other regulatory agencies.
- C. The Owner may wish to keep certain equipment, therefore, check with Owner before removals to determine what may be salvageable.

## 1.11 CONTINUITY OF UTILITY SERVICES

- A. It is of paramount importance that each utility service operate continuously and without interruption. Whenever this contractor plans to make changes or alterations to any existing utility service, such plans shall result in no or minimum service interruption or inconvenience to Owner. This contractor shall plan and schedule any change or alteration to an existing utility service with Architect and Owner. Such planning, timing, and/or scheduling shall be approved by both these parties.

## 1.12 CODES AND STANDARDS

- A. New York State Uniform Fire Prevention and Building Code: Provide all work in compliance with and meet the requirements of the latest issue.
- B. National Electrical Code: All work covered under these Contract Documents shall conform to the latest issue of the National Electrical Code.

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- C. Standards: All equipment shall meet all the requirements of ANSI, NEMA, IES, and IEEE standards.
- D. Listing: All equipment and devices for which Underwriters' Laboratory has a listing service, shall be UL listed and bear the UL listing label.
- E. All materials and installation shall comply with:
  - 1. Building Code of New York State.
  - 2. Energy Conservation Construction Code of New York State.
  - 3. Fire Code of New York State.
  - 4. National Fire Protection Association (NFPA).
  - 5. New York State Department of Labor Rules and Regulations.
  - 6. The Americans with Disabilities Act.
  - 7. Local Utilities.
  - 8. New York State Department of Health.
  - 9. Local Municipality/City Codes and Ordinances and the Authority Having Jurisdiction.
  - 10. Local Fire Department.
  - 11. Insurance Carrier.
  - 12. New York State Department of Education.

#### 1.13 SUBMITTALS & SUBMISSION REQUIREMENTS

- A. All submittals shall be in accordance with Division 1 requirements, the following requirements listed below, and also as indicated in each specification section. All submittals not complying with the listing above will be returned to the contractor without being reviewed. Rejection by Architect or Engineer of any items submitted shall require resubmittal of acceptable items.
  - 1. Within (30) days after receiving signed contract or notice to proceed, submit to Architect for review complete descriptive dimensional data and ratings for equipment and materials proposed to be furnished and installed. Submit (8) copies of data unless otherwise specified by the architect.
  - 2. All materials submitted shall clearly state the job name and specification section(s) that it applies to.
  - 3. Any package containing more than one piece of equipment or material shall also contain a schedule clearly listing all items in submittal. Schedule page (s) shall also indicate project name and building name.
  - 4. All submittals must be clearly marked using nomenclature used in this specification for proper item identification, schedule of usages, model numbers, construction materials, performance, data, etc.

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5. Projects involving multiple buildings must have the submittals separated by building. Submittals in which buildings are combined will not be accepted. (Exception: When specifically approved by engineer, basic materials may be submitted once.)
  6. The Contractor shall insure that dimensions of equipment to be used conform to the space allocated for the equipment on the drawings.
  7. Submittals traced or copied from contract drawings are not acceptable and will be returned without review.
  8. In the event material and/or equipment is installed prior to obtaining approval of shop drawings, and in the sole opinion of the Owner's Agent, this material and/or equipment does not meet the specifications, the Contractor shall be liable for the removal and the replacement at no additional cost to the contract.
- B. Samples: When requested by Engineer, provide samples of both specified equipment and proposed substitutions for review by the Owner's Agent. Such equipment shall be delivered to a location designated, or erected at the job site as directed. When neither is physically possible, arrange for the Owner's Agent to visit an acceptable site where the proposed equipment can be inspected.
- C. Substitutions:
1. Submittals for equipment or materials other than as specified shall be accepted for review by the Owner's agent.
  2. Approval of substitute equipment shall be based on functional, physical and aesthetic compatibility to the equipment specified as determined by the Owner's agent and approved by the engineer.
  3. Where substitute equipment is approved, the contractor shall be responsible for, and bear the cost of any necessary changes by his trade or other trades to make the system complete and operable.
  4. Contractor is fully responsible for providing coordination between all trades affected by equipment substitution.
  5. When requested, contractor shall submit layout drawings indicating new dimensions and arrangements of substituted equipment. Layout drawings shall indicate all revisions necessary for all services affected by substitution.

#### 1.14 FIELD INSPECTION

- A. As there are various conditions at the site which do not show on the accompanying drawings, or which are at variance with the conditions indicated on the drawings, it is important that each bidder visit the site and acquaint himself with existing conditions and take these conditions into consideration when preparing his proposal. Each bidder shall obtain information or make any measurement desired. Lack of knowledge relative to existing conditions will not be allowed as a basis for extra compensation.
- B. This contractor and his subcontractors shall inspect existing equipment to remain prior to any of his new work in order to determine that all equipment is in good operating condition. If equipment is found to be lacking components, is inoperable, damaged, etc., contractor shall provide immediate written notice to the Owner. The Owner or his representative shall determine if any additional work is necessary and the method by which any work shall be performed.

#### 1.15 PERMITS, CERTIFICATES AND FEES

- A. This Contractor shall obtain and pay for permits, certificates, fees etc. listed below. Costs for permits, fees etc. shall be included in the base bid amount.
  - 1. All required applications and permits to begin work.
  - 2. Certificate of inspection including Third-Party Agency.
  - 3. All municipal connection charges.
  - 4. All local utility charges (power, telephone, cable, etc.).
  - 5. Fees and charges shall be obtained directly from the respective authority having jurisdiction.

#### 1.16 GUARANTEE

- A. Contractor shall guarantee all work furnished through this contract including work performed by sub-contractors, for a period of (1) year (unless otherwise noted), from the date of final acceptance. Contractor agrees to repair or replace any defective work or materials at no additional cost to the Owner. Contractor shall also pay for any damage to other work resulting from repairs to defects. Contractor shall furnish written guarantees to the Owner's agent in accordance with the general conditions.

#### 1.17 TESTING AND INSPECTION

- A. Inspections required for any ordinances, regulations, instructions, laws, rules, standards and practices that require any work to be inspected or tested shall be performed. Contractor shall give Owner, Architect and Engineer timely notice of readiness of work for inspection or testing and the date fixed for said inspection or testing.
- B. Third-Party Agency must inspect completed installation and present Owner with Certificate of Inspection showing approval.

- C. Required local or municipal inspection. Process and present Owner with certificate indicating approval of such governing bodies.
- D. Contractor shall submit a written report to Architect, copy to Engineer, on results of each inspection or test on system or equipment supplied. Report shall contain all pertinent information, recommendations, approvals, additional work required, etc.
- E. Contractor is responsible to check rotation on all three-phase equipment prior to turning on equipment for temporary or permanent use.
- F. Panelboard, Circuit Breaker, Transformer and Fuse Tests:
  - 1. Energize all possible lighting and equipment loads for a period of not less than eight hours.
  - 2. Check all fuses and circuit breakers for faulty tripping and excessive heat.
  - 3. Tabulate phase current on all feeders.
  - 4. Tabulate voltages at each panelboard (phase to phase and phase to neutral).
  - 5. Reconnect branch circuits that vary over 5% between high and low current.
  - 6. Reconnect transformer taps as required to adjust for high or low voltages.
  - 7. All tabulation sheets shall be presented to the Architect for approval, make any corrections determined by the Architect.

#### 1.18 RECORD DOCUMENTS

- A. When required by general conditions or other Division 1 Section this Contractor shall prepare and turn over to Owner's agent record as-built documents. As-built drawings will include actual equipment location layout, service connections, etc.
- B. In all projects, contractor shall provide record drawings of all underground equipment and service runs. As-built drawings for underground work will include dimensions to actual locations finish grade elevations, and actual invert to underground structures equipment and service runs.

#### 1.19 PENETRATIONS THRU FIRE RATED CONSTRUCTION

- A. Contractor is to assume all walls are fire rated construction.
- B. All penetrations by this contract through rated construction shall be sealed fire safe by a UL listed approved method.
- C. All electrical penetrations through walls, floors, etc. shall be conduit sleeved.
- D. All conduit penetrations through fire rated partitions, walls, floors, etc. shall be installed as follows; penetration shall be oversized 1/2" to 3/4" maximum. This Contractor shall pack with fireproofing insulation, type FS cerablanket. Outside of penetrations shall be caulked and sealed with flame stop V, as manufactured by Flame Stop, Inc.; or an approved equal. Flame stop sealant shall be troweled smooth for finishing as required.

## 1.20 INTENT OF DRAWINGS

- A. The drawings are diagrammatic, unless detailed dimensioned drawings are included. Drawings show approximate locations of equipment, fixtures, panelboards, and wiring devices. Exact locations are subject to the approval of the Owner's Representative. The general run of electrical feeders, branch circuits, and conduits, indicated on the drawings, is not intended to be the exact routing. Circuit designations, in the form of "Home Runs" on branches, indicate the designation of the branch circuit, and the panelboard or interconnection box from which the branch circuit is served.
- B. Drawings show general design and arrangement. Verify exact location and elevations at the job location. Do not scale plans and diagrams.
- C. Drawings do not show all offsets, fittings, interferences, and elevation changes. Adjust installation of conduit, equipment location, etc. to accommodate work with the obstacles and interferences. Where a major and important rearrangement is necessary, report same to Architect for review. Obtain written approval for all major changes.
- D. Prior to roughing in any back boxes for power or communications devices, thoroughly examine the architectural elevations, enlarged plans and details. Also exam vendor drawings and manufacturer instructions for equipment furnished by others or as part of this contract. Install back boxes in locations and at heights as indicated on these documents. If the locations are not detailed, issue an RFI to the construction manager to obtain them. Boxes that are roughed in without detailed location and heights will re-located at no additional cost to the contract by the electrical contractor.
- E. Cooperate with all Contracts and Owners and determine the exact route of all raceway and location of all equipment.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. All materials, unless otherwise specified, shall be new and be the standard products of the manufacturer. Used equipment or damaged material will be rejected.
- B. The listing of a manufacturer as "acceptable" does not indicate acceptance of a standard or catalogued item of equipment. All equipment and systems conform to the Specifications.

### 2.2 U.L. LISTING

- A. Equipment shall bear the Underwriter's Laboratories (UL), or other approved agency listing label. This listing requirement applies to the entire assembly. Any modifications to equipment to suit the intent of the specifications shall be performed in accordance with the National Electric Code and listed by U.L.



## 2.3 FIRE STOPPING

### A. Electrical Wiring:

1. Fire-stopping for Openings through Fire and Smoke Rated Walls and Floor Assemblies shall be listed or classified by an approved independent testing laboratory for "Through-Penetration Fire-Stop Systems." The system shall meet the requirements of "Fire Tests of Through-Penetration Fire-Stops" designated ASTM E814.
2. Acceptable Manufacturers:
  - a) Dow Corning Fire-Stop System Foams and Sealants.
  - b) Nelson Electric Fire-Stop System Putty, CLK and WRP.
  - c) Thomas & Betts - S-100 FS500/600.
  - d) Carborundum Fyre Putty.
  - e) Hilti Firestop Systems.

## PART 3 - EXECUTION

### 3.1 ROUGHING

- A. Obtain approved roughing diagrams and exact locations of equipment for items furnished under other Divisions of the specifications. Do not rough in without approved drawing.
- B. Due to small scale of Drawings, it is not possible to indicate all offsets, fittings, changes in elevation, etc. Verify final locations for rough-ins with field measurements and with the equipment being connected. Verify exact location and elevations at work site prior to any rough in work. DO NOT SCALE PLANS. If field conditions, details, changes in equipment or shop drawing information require a significant change to the original documents, contact the owners' representative for approval before proceeding.
- C. All equipment locations shall be coordinated with other trades to eliminate interference with required clearances for equipment maintenance and inspections.
- D. Coordinate work with other trades and determine exact routing of all duct, pipe, conduit, etc., before fabrication and installation. Coordinate with Architectural Drawings. Verify with Owner's Representative exact location of all equipment in finished areas, such as thermostat, fixture and switch mounting heights, and equipment mounting heights. Coordinate all work with the architectural reflected ceiling plans and/or existing Architecture. Mechanical and electrical drawings show design arrangement only for diffusers, grilles, registers, air terminals, lighting fixtures, sprinklers, speakers and other items. Do not rough-in contract work without reflected ceiling location plans.
- E. Before roughing for equipment furnished by Owner or in other contracts, obtain from Architect and other Contractors, approved roughing drawings giving exact location for each piece of equipment. Do not "rough in" services without final layout drawings approved for construction. Cooperate with other trades to insure proper location and size of connections to insure proper functioning of all systems and equipment. Obtain written

authorization from the Owners representative or other contractor for any “rough ins” that, due to project schedule, are required before approved coordination drawings are available. Any work installed without written authorization or approved coordination drawings, causing a conflict will be relocated by the electrical contractor at no expense to the Owner.

- F. For equipment and connections provided in this contract, prepare roughing drawings as follows:
1. Existing equipment being relocated: Measure the existing equipment and prepare drawings for installation in new location.
  2. New equipment: Obtain equipment roughing drawings and dimensions, then prepare rough-in drawings.
  3. Where more than one trade is involved in an area, space or chase, all shall cooperate and install their own work to utilize the space equally between them in proportion to their individual requirements. In general, ductwork shall be given preference except where grading of piping becomes a problem, followed by piping then electrical wiring. If, after installation of any equipment, piping, ducts, conduit, and boxes, it is determined that ample maintenance and passage space has not been provided, rearrange work and/or furnish other equipment as required for ample maintenance space. Any changes in the size or location of the material or equipment supplied, which may be necessary in order to meet field conditions or in order to avoid conflicts between trades, shall be brought to the immediate attention of the Owner's Representative and approval received before such alterations are made.
  4. Provide easy, safe, and code mandated clearances at controllers, motor starters, valve access, and other equipment requiring maintenance and operation. Contractor shall relocate existing work in the way of new construction. VISIT SITE BEFORE BIDDING TO DETERMINE SCOPE OF WORK. Provide new materials, including new piping and insulation for relocated work.

### 3.2 CUTTING AND PATCHING

- A. This contractor shall bear the cost of all cutting and patching required by and for the installation of this work. This contractor shall perform all cutting and patching unless otherwise indicated on drawings or if directed by the Architect.
- B. Patching of fire rated floors, walls, partitions, etc. shall be made using new materials equal to the fire rating of the existing.
- C. Should changes, omissions or errors in electrical work require cutting, patching or making alterations in any portion of new construction, such work will be performed by GC at contractor's expense.

- D. Cutting and patching of roof surfaces and structures shall only be performed by a qualified contractor, as approved by the Architect. The work of this contract shall bear the cost of above mentioned cutting and patching. This contractor shall insure that existing roof warranties remain in force.
- E. This contractor shall furnish lintels, sized to accommodate structure above opening, where cutting and patching is to be performed on load bearing walls. Contractor shall obtain written approval for all lintels prior to installation.
- F. Cutting shall be done in a manner which will not adversely affect the strength of the building. Holes and openings shall be neatly cut so as to provide a finished appearance and shall be patched around the edge where required for a finished appearance. Provide temporary bracing, shoring, etc. as required.
- G. Patching shall be structurally sound and match the existing materials and finish of adjacent materials. Patching is required in finished areas, wherever existing work is removed, at the sides of openings, etc. Patching shall include repairs, painting, etc.
- H. At the completion of the work, all evidence of alteration will be as inconspicuous as possible.

### 3.3 OPENINGS, SLEEVES, AND CHASES

- A. Certain chases, openings, and shafts will be provided as shown as part of General Construction Plans and Specifications.
- B. Provide all other openings and sleeves for conduit etc. through floors, walls, partitions, ceilings, roofs, etc. for Division 26-E work.
- C. Assume responsibility for correct and final location and size of such openings; furnish templates if required. Correct improperly located and sized or omitted chases and openings as required. Plug all abandoned sleeves left as part of this Contract.

### 3.4 SEALING AND FIRESTOPPING

- A. Installation of Fire-stopping for Openings Through Fire and Smoke Rated Walls and Floor Assemblies shall be as follows:
  - 1. Provide fire-stop system seals at all locations where piping, tubing, conduit, electrical busways/cables/wires, ductwork and similar utilities pass through or penetrate fire rated wall or floor assembly. Provide fire-stop seal between sleeve and wall for dry wall construction.
  - 2. The minimum required fire resistance ratings of the wall or floor assembly shall be maintained by the fire-stop system. The installation shall provide an air and watertight seal.

3. The methods used shall incorporate qualities that permit the easy removal or addition of electrical conduits or cables without drilling or use of special tools. The product shall adhere to itself to allow repairs to be made with the same material and permit the vibration, expansion and/or contraction of any items passing through the penetration without cracking, crumbling and resulting reduction in fire rating.
4. Provide rigid steel sleeves where non-armored cables pass through fire rated walls and barriers.

### 3.5 SUPPORTS

- A. Provide required supports for work of this Contract, including beams, angles, channel, hangers, rods, columns, plates, bases, braces, etc. to properly support all work.
- B. Provide steel angles, channels and other materials necessary for the proper support and erection of motor starters, distribution panelboards, large disconnect switches, pendant-mounted lighting fixtures, etc.
- C. Panelboards, cabinets, large pull boxes, cable support boxes and starters shall be secured to ceiling and floor slab and not supported from conduits. Small panelboards, etc., as approved by Owner's Representative, may be supported on walls. Racks for support of conduit and heavy electrical equipment shall be secured to building construction by substantial structural supports.
- D. Provide concrete bases for all floor mounted equipment. Provide 3,000 lb. concrete, chamfer edges, trowel finish, securely bond to floor by roughening slab and coating with cement grout. Bases 2" high; shape and size to accommodate equipment. Set anchor bolts in sleeves before pouring and after anchoring and leveling, fill equipment bases with grout.
- E. See Specification Section 260530 – Supporting Devices for additional requirements

### 3.6 CONCEALMENT

- A. Unless otherwise specifically indicated, all work shall be concealed above ceiling space, in wall space, below slabs in crawl spaces, and elsewhere throughout the building.
- B. In areas with no ceilings, install only after Architect reviews and comments on arrangement and appearance.

### 3.7 ROOF AND ROOF DECK CUTTING AND FLASHING

- A. All penetrations through roofing and decking shall be accomplished by the roofing manufacturer's Certified Roofing Contractor in order to maintain roof system warranty.

### 3.8 EQUIPMENT INSTALLATION

- A. All installations shall comply with the following requirements:
1. Provide code required disconnects for all electrical equipment that is furnished or connected by the electrical contractor.
  2. Coordinate electrical systems, equipment, and materials installation with other building components. Be responsible for any changes in openings and locations necessitated by the equipment installed.
  3. The architect shall control the placement of all wall and ceiling mounted electrical equipment and devices in all rooms with the exception of mechanical and electrical equipment rooms. When drawing details are not available, consult with the Architects representative for actual location.
  4. Verify all dimensions with field measurements.
  5. Arrange for all chases, slots and openings in other building components that are not indicated on drawings, to allow for electrical installations.
  6. Coordinate the installation of required supporting devices and sleeves to be set in poured-in-place concrete and other structural components, as they are constructed.
  7. Coordinate ordering and installation of all equipment with long lead times or having a major impact on work by other trades so as not to delay the job or impact the construction schedule. Pay close attention to equipment that must be installed prior to building enclosure.
  8. Where mounting heights are not detailed or dimensioned, install systems, materials and equipment to provide the maximum headroom possible.
  9. Install systems, materials and equipment to conform with approved submittal data, including coordination drawings, to greatest extent possible. Conform to arrangements indicated by the Contract Documents, recognizing that portions of the work are shown only in diagrammatic form. Where coordination requirements conflict with individual system requirements, refer the conflict to the Architect.
  10. Store Materials on dry base, at least 6" above-ground or floor. Store so as not to interfere with other work or obstruct access to buildings or facilities. Provide waterproof/windproof covering. Remove and provide special storage for items subject to moisture damage. Protect against theft or damage from any cause. Replace items stolen or damaged, at no cost to Owner.
  11. Set all equipment to accurate line and grade, level all equipment and align all equipment components.

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12. All tolerances in alignment and leveling, and the quality of workmanship for each stage of work shall be as required by the manufacturer and subject to approval by the owners representative.
  13. All finished equipment surfaces damaged during construction shall be brought to "as new" condition by touch up or repainting. Any rust shall be removed and primed prior to repainting.
  14. Workmanship shall be as called for in the "Standard of Installation" published by the National Electrical Contractors Association (NECA).
  15. Provide all scaffolding, rigging, hoisting and services necessary for erection and delivery of equipment and apparatus furnished into the premises. These items shall be removed from premises when no longer required.
  16. No electrical equipment shall be hidden or covered up prior to inspection by the owners' representative. All work that is determined to be unsatisfactory shall be corrected immediately.
  17. All electrical work shall be installed level and plumb, parallel and perpendicular to other building systems and components.
  18. Conceal all contract work above ceilings and in walls, below slabs, and elsewhere throughout building. If concealment is impossible or impractical, notify Owner's Representative before starting that part of the work and install only after his approval. In areas with no ceilings, install only after Owner's Representative reviews and comments on arrangement and appearance.
  19. Install access panel or door where units are concealed behind finished surfaces.
- B. Provide complete power connections to all electrical equipment. Provide control connections to equipment where indicated on the drawings. Provide disconnect ahead of each piece of equipment. Ground all equipment in accordance with the latest version of the National Electrical Code.
- C. Provide all power wiring, electric equipment, control wiring, switches, lights, receptacles, and connections as required for proper equipment operation of Owner-Furnished Equipment and Equipment furnished by other contracts,
- D. Refer to Manufacturer's drawings/specifications for requirements of special equipment. Verify connection requirements before bidding and confirm prior to roughing.
- E. This contractor shall coordinate scheduling and installation of work with other contractors, sub-contractors and other trades. The contractor is also required to coordinate all work with owner supplied materials, direct contracts, and normal building operations, if any.

- F. All finished work shall be neat and workmanlike. All work of a special nature shall be performed by skilled and qualified workmen who can present credentials showing experience in said trade. New systems shall be delivered to Owner complete in perfect working order, tested and balanced in full accordance with plans and specifications. Existing systems shall function in same manner as before this work was performed. Any malfunctions which arise in existing systems as a result of demolition or alteration of parts of such systems shall be corrected.
- G. Layout of equipment, accessories and electrical systems in plan is generally diagrammatic unless specifically dimensioned or detailed. Check project drawings and existing site conditions before installing work for interference's as governed by structural or other conditions. Owner reserves the right to make reasonable changes in location of equipment, accessories or electrical systems prior to "roughing-in" without involving additional expense. Exact dimensions shown upon plans will be subject to verification and confirmation of exact conditions at site at time of construction. "Plus or minus" dimensions are shown upon drawing as a guide only. Exact surrounding conditions are governed by final equipment selection and/or other like details.
- H. Furnish all new equipment and materials as described herein. Any material, operation, method or device mentioned, listed or noted within this specification, if not specifically mentioned as furnished or installed by others, shall be furnished and installed by this contractor.

### 3.9 FIRE ALARM DETECTOR COVERS

- A. Electrical Contractor is responsible to provide dust covers on all detectors whether new or existing in any area of construction. This shall be done in any area of construction even if there is no electrical work being done in this area. Coordinate with all trades.

### 3.10 ROOF PENETRATIONS

- A. Electrical Contractor is to refer to Division 7 for warranty requirements on existing roofs prior to any roof penetrations made.

### 3.11 PAINTING

- A. This Contract Includes the following:
  - 1. Painting for all cut and patch work performed as part of Division 26 contract.
  - 2. Painting required for touch-up of surfaces damaged due to the installation of electrical work.
  - 3. Painting as required to repair finish of equipment furnished.
  - 4. Painting of all surface mounted raceways in finished areas.

### 3.12 CLEANING

- A. After all tests are made and installations completed satisfactorily:
- B. Thoroughly clean entire installation, both exposed surfaces and interiors.



- C. Remove all debris caused by work.
- D. Remove tools, surplus, materials, when work is finally accepted.

### 3.13 CONTINUITY OF SERVICES

- A. The building will be in use during construction operations. Maintain existing systems in operation within all rooms of building at all times. Refer to "General Conditions of the Contract for Construction" for temporary facilities for additional contract requirements. Schedules for various phases of contract work shall be coordinated with all other trades and with Owner's Representative. Provide, as part of contract, temporary mechanical and electrical connections and relocation as required to accomplish the above. Obtain approval in writing as to date, time, and location for shut-down of existing mechanical/electrical facilities or services.

### 3.14 START UP AND OWNER INSTRUCTIONS

- A. Before acceptance of the work, furnish necessary skilled labor to operate all systems by seasons. Instruct the Owners designated personnel on the proper operation and maintenance of systems and equipment. Obtain written acknowledgment from person instructed prior to acceptance repeat the instructions if asked to do so. Contractor is fully responsible for systems until acceptance, even though operated by Owner's personnel, unless otherwise agreed in writing. Provide, operating, maintenance and starting precautions and procedures to be followed by the Owner for operating systems and equipment. Mount the instruction in clear plastic holder on or adjacent to the equipment.
- B. Where supervision by a manufacturer is called for, provide manufacturer's certified technician or engineer to supervise the startup, testing and adjustment of the equipment or system. Where two or more manufacturer's are involved (i.e., variable frequency drive and air handling unit) both manufacturer's shall be present at start up. The manufacturer shall provide a written report detailing the testing and start-up including problems that occurred and their method of resolution.
- C. Services: Provide services required, for all equipment specified under this contract, for a period of (1) year after written acceptance by the Owner.

### 3.15 OPERATION AND MAINTENANCE MANUALS

- A. Provide Operation and Maintenance Manuals. For projects containing multiple buildings, manuals shall be submitted separately for each building. Include the following:
  - 1. As-Built drawings.
  - 2. Equipment wiring diagrams.
  - 3. Manufacturer's instructions.
  - 4. Include typewritten instructions, describing equipment, starting/operating procedures, and emergency operating instructions.
  - 5. Recommended maintenance procedures.
  - 6. Include name, address, and telephone number of supplier manufacturer.
  - 7. Representative and service agency for all major equipment items.

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8. Panel schedules in hard copy and word or excel format.
  9. Bind above items in a three-ring binder with name of project on the cover.
  10. Provide CD or DVD with all data in word, pdf, or excel format.
- B. Refer to specific specification electrical specification sections for additional requirements.
- C. Deliver to Owner's Representative before request for acceptance.

### 3.16 ASBESTOS RECOGNITION AND PRECAUTIONS

- A. The contractor shall be responsible for coordination of all required removal work, coring, cutting and patching with the owners asbestos management plan. Prior to performing such work identify areas containing asbestos. Notify the Owner so that they may make arrangements for abatement and/or containment prior to work proceeding. The contractor shall be responsible for cleaning all areas where asbestos is released due to the failure to coordinate with the asbestos management plan. Refer to Division 1 sections for further requirements.
- B. The disturbance or dislocation of asbestos-containing materials causes asbestos fibers to be released into the building's atmosphere, thereby creating a health hazard to workmen and building occupants. Consistent with Industrial Code Rule 56 and the content of recognized asbestos-control work, the Contractor shall apprise all of his workers, supervisory personnel, subcontractors, Owner and Consultants who will be at the job site of the seriousness of the hazard and of proper safeguards and work procedures which must be followed, as described in New York State Department of Labor Industrial Code Rule 56.
- C. Refer to specification 014990 for additional information.

END OF SECTION 260010

## SECTION 260015 - ELECTRICAL DEMOLITION

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract including the General and Supplementary Conditions of Division 1 of the Specification Sections, apply to the work of this section.

#### 1.2 SECTION INCLUDES

- A. Interior demolition, removal and abandonment of interior electrical systems including fire alarm.
- B. Cleaning and repair of existing equipment to remain.

### PART 2 - PRODUCTS

#### 2.1 MATERIALS AND EQUIPMENT

- A. Materials and equipment for patching work: As specified in individual sections.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Prior to beginning work inspect and test all existing electrical systems that will be affected by the work in this contract. Provide a report to the Owner indicating any problems or defects found. If no problems or system defects are submitted, the contractor shall be responsible for correcting problems found at the completion of the project that are determined to be caused by the work of this contract.
- B. Inspect the entire work area for defects in the existing construction such as scratches, holes etc. Submit a complete list and photographs of existing damage, to the owner prior to beginning work. If existing damage is not documented the contractor shall repair all damage to like new condition, that is determined to have been caused by the work in this contract.
- C. Verify circuiting arrangements are as shown on Drawings.
- D. Verify that abandoned wiring and equipment serve only abandoned facilities.
- E. Demolition Drawings are based on casual field observation and existing record documents. Report discrepancies to Architect/Engineer before disturbing existing installation.
- F. Beginning of demolition means installer accepts existing conditions.

### 3.2 PREPARATION

- A. Disconnect electrical systems in walls, floors, and ceilings scheduled for removal.
- B. Coordinate utility service outages with the owner and Utility Company.
- C. Provide temporary wiring and connections to maintain existing systems in service during construction.

### 3.3 DEMOLITION EXISTING ELECTRICAL WORK

- A. Demolish existing electrical work under provisions of Division 01, Division 02 and this section.
- B. Remove existing installations to accommodate requirements for new construction.
- C. Remove abandoned wiring to source of supply.
- D. Remove exposed abandoned conduit, including abandoned conduit above accessible ceiling finishes. Cut conduit flush with walls and floors, and patch surfaces.
- E. Disconnect abandoned outlets and remove devices. Provide blank cover for abandoned outlets which are not removed.
- F. Disconnect and remove abandoned panelboards and distribution equipment.
- G. Disconnect and remove electrical devices and equipment serving utilization equipment that has been removed.
- H. Disconnect and remove abandoned luminaires. Remove brackets, stems, hangers, and other accessories.
- I. Repair adjacent construction and finishes damaged during demolition work.
- J. Maintain access to existing electrical installations which remain active. Modify installation or provide access panel as appropriate.
- K. Where branch circuit home run is called to be reused label circuit in junction box and remove all branch and switch leg wiring.
- L. Where removal of branch circuit wiring effects devices or fixtures upstream or downstream, make permanent connections to maintain circuits. Existing circuits to must remain active. All required connections to maintain existing circuits must be made after normal hours and coordinated with the owner.

### 3.4 CLEANING AND REPAIR

- A. Clean and repair existing materials and equipment which remain or are to be reused.

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- B. Panelboards: Clean exposed surfaces and check tightness of electrical connections. Replace damaged circuit breakers and provide closure plates for vacant positions. Provide typed circuit directory showing revised circuiting arrangement.
- C. Luminaires: Use mild detergent to clean all exterior and interior surfaces; rinse with clean water, and wipe dry. Replace lamps and broken electrical parts.

END OF SECTION 260015

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## SECTION 260190 - SUPPORTING DEVICES

### PART 1 -GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract including the General and Supplementary Conditions of Division 1 of the Specification Sections, apply to the work of this section.

#### 1.2 SECTION INCLUDES

- A. Conduit and equipment supports.
- B. Anchors and fasteners.

#### 1.3 REFERENCES

- A. Refer to Division 1.
- B. NECA Standard of Installation (National Electrical Contractors Association).
- C. NFPA 70 - National Electrical Code.

#### 1.4 REGULATORY REQUIREMENTS

- A. Conform to requirements of NFPA 70.
- B. Products: Listed and classified by Underwriters Laboratories, Inc. as suitable for the purpose specified and indicated.

### PART 2 - PRODUCTS

#### 2.1 ANCHORING DEVICES

- A. Sleeve Anchors (FS FF-S-325 Group II, Type 3, Class 3): Molly/Emhart's Parasleeve Series, Phillips' Red Head AN, HN, FS Series, or Ramset's Dynabolt Series.
- B. Wedge Anchors (FS FF-S-325 Group II, Type 4, Class 1): Hilti's Kwik Bolt Series, Molly/Emhart's Parabolt Series, Phillips' Red Head WS, or Ramset's Trubolt Series.
- C. Self-Drilling Anchors (FS FF-S-325 Group III, Type 1): Phillips' Red Head Series S or Ramset's Ram Drill Series.
- D. Non-Drilling Anchors (FS FF-S-325 Group VIII, Type 1): Hilti's Drop-In Anchor Series, Phillips' Red Head J Series, or Ramset's Dynaset Series.
- E. Stud Anchors (FS FF-S-325 Group VIII, Type 2): Phillips' Red Head JS Series.

## 2.2 CAST-IN-PLACE CONCRETE INSERTS

- A. Continuous Slotted Type Concrete Insert, Galvanized:
  - 1. Load Rating 1300 lbs./ft.: Kindorf's D-986.
  - 2. Load Rating 2400 lbs./ft.: Kindorf's D-980.
  - 3. Load Rating 3000 lbs./ft.: Hohmann & Barnard Inc.'s Type CS-H.
  - 4. Load Rating 4500 lbs./ft.: Hohmann & Barnard Inc.'s Type CS-HD.
- B. Threaded Type Concrete Insert: Galvanized ferrous castings, internally threaded.
- C. Wedge Type Concrete Insert: Galvanized box-type ferrous castings, designed to accept bolts having special wedge shaped heads.

## 2.3 MISCELLANEOUS FASTENERS

- A. Except where shown otherwise on the Drawings, furnish type, size, and grade required for proper installation of the Work, selected from the following: Furnish galvanized fasteners for exterior use, or for items anchored to exterior walls, except where stainless steel is indicated.
  - 1. Standard Bolts and Nuts: ASTM A 307, Grade A, regular hexagon head.
  - 2. Lag Bolts: FS FF-B-561, square head type.
  - 3. Machine Screws: FS FF-S-92, cadmium plated steel.
  - 4. Machine Bolts: FS FF-B-584 heads; FF-N-836 nuts.
  - 5. Wood Screws: FS FF-S-111 flat head carbon steel.
  - 6. Plain Washers: FS FF-W-92, round, general assembly grade carbon steel.
  - 7. Lock Washers: FS FF-W-84, helical spring type carbon steel.
  - 8. Toggle Bolts: Tumble-wing type, FS FF-B-588, type, class and style as required to sustain load.
- B. Stainless Steel Fasteners: Type 302 for interior Work; Type 316 for exterior Work; Phillips head screws and bolts for exposed Work unless otherwise specified.

## 2.4 HANGER RODS

- A. Mid low carbon steel, unless otherwise specified; fully threaded or threaded each end, with nuts as required to position and lock rod in place. Unless galvanized or cadmium plated, provide a shop coat of red lead or zinc chromate primer paint.

## 2.5 "C" BEAM CLAMPS

- A. With Conduit Hangers:
  - 1. For 1 Inch Conduit Maximum: B-Line Systems Inc.'s BG-8, BP-8 Series, Caddy/Erico Products Inc.'s BC-8P and BC-8PSM Series, or GB Electrical Inc.'s HIT 110-412 Series.



2. For 3 Inch Conduit Maximum: Appleton Electric Co.'s BH-500 Series beam clamp with H50W/B Series hangers, Kindorf's 500 Series beam clamp with 6HO-B Series hanger, or OZ/Gedney Co.'s IS-500 Series beam clamp with H-OWB Series hanger.
3. For 4 Inch Conduit Maximum: Kindorf's E-231 beam clamp and E-234 anchor clip and C-149 series lay-in hanger; Unistrut Corp.'s P2676 beam clamp and P-1659A Series anchor clip with J1205 Series lay in hanger.
- B. For Hanger Rods:
  1. For 1/4 Inch Hanger Rods: B-Line Systems Inc.'s BC, Caddy/Erco Products Inc.'s BC, GB Electrical Inc.'s HIT 110, Kindorf's 500, 510, or Unistrut Corp.'s P1648S, P2398S, P2675, P2676.
  2. For 3/8 Inch Hanger Rods: Caddy/Erco Products Inc.'s BC, Kindorf's 231-3/8, 502, or Unistrut Corp.'s P1649AS, P2401S, P2675, P2676.
  3. For 1/2 Inch Rods: Appleton Electric Co. BH-500 Series, Kindorf's 500 Series, 231-1/2, OZ/Gedney Co.'s IS-500 Series, or Unistrut Corp.'s P1650AS, P2403S, P2676.
  4. For 5/8 Inch Rods: Unistrut Corp.'s P1651AS beam clamp and P1656A Series anchor clip.
  5. For 3/4 Inch Rods: Unistrut Corp.'s P1653S beam clamp and P1656A Series anchor clip.

## 2.6 CHANNEL SUPPORT SYSTEM

- A. Channel Material: 12 gage steel.
- B. Finishes:
  1. Phosphate and baked green enamel/epoxy.
  2. Pre-galvanized.
  3. Hot dipped galvanized.
  4. Polyvinyl chloride (PVC), minimum 15 mils thick.
- C. Fittings: Same material and finish as channel.
- D. UL Listed Systems:
  1. B-line Systems Inc.'s B-22 (1-5/8 x 1-5/8 inches), B-12 (1-5/8 x 2-7/16 inches), B-11 (1-5/8 x 3-1/4 inches).
  2. Grinnell Corp.'s Allied Power-Strut PS 200 (1-5/8 x 1-5/8 inches), PS 150 (1-5/8 x 2-7/16 inches), PS 100 (1-5/8 x 3-1/4 inches).

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3. Kindorf's B-900 (1-1/2 x 1-1/2 inches), B-901 (1-1/2 x 1-7/8 inches), B-902 (1-1/2 x 3 inches).
4. Unistrut Corp.'s P-3000 (1-3/8 x 1-5/8 inches), P-5500 (1-5/8 x 2-7/16 inches), P-5000 (1-5/8 x 3-1/4 inches).
5. Versabar Corp.'s VA-1 (1-5/8 x 1-5/8 inches), VA-3 (1-5/8 x 2-1/2 inches).

## 2.7 MISCELLANEOUS FITTINGS

- A. Side Beam Brackets: B-Line Systems Inc.'s B102, B103, B371-2, Kindorf's B-915, or Versabar Corp.'s VF-2305, VF-2507.
- B. Pipe Straps:
  1. Two Hole Steel Conduit Straps: B-Line Systems Inc.'s B-2100 Series, Kindorf's C-144 Series, or Unistrut Corp.'s P-2558 Series
  2. One Hole Malleable Iron Clamps: Kindorf's HS-400 Series, or OZ/ Gedney Co.'s 14-G Series, 15-G Series (EMT).
- C. Deck Clamps: Caddy/Erico Products Inc.'s DH-4-T1 Series.
- D. Fixture Stud and Strap: OZ/Gedney Co.'s SL-134, or Steel City's FE-431.
- E. Supporting Fittings for Pendent Mounted Industrial Type Fluorescent Fixtures on Exposed Conduit System:
  1. Ball Hanger: Appleton Electric Co.'s AL Series, or Crouse-Hinds Co.'s AL Series.
  2. Flexible Fixture Hanger: Appleton Electric Co.'s UNJ-50, UNJ-75, or Crouse-Hinds Co.'s UNJ115.
  3. Flexible (Hook Type) Fixture Hanger: Appleton Electric Co.'s FHMF, or Crouse-Hinds Co.'s UNH-1.
  4. Eyelet: Unistrut Corp.'s M2250.
  5. Eyelet with Stud: Kindorf's H262, or Unistrut Corp.'s M2350.
  6. Conduit Hook: Appleton Electric Co.'s FHSN, or Crouse-Hinds Co.'s UNH-13.
- F. Supporting Fasteners (Metal Stud Construction): Metal stud supports, clips and accessories as produced by Caddy/Erico Products Inc.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Where specific fasteners are not specified or indicated for securing items to in-place construction, provide appropriate type, size, and number of fasteners for a secure, rigid installation.
- B. Install anchoring devices and other fasteners in accordance with manufacturer's printed instructions.
- C. Make attachments to structural steel wherever possible.

### 3.2 FASTENER SCHEDULE

- A. Material:
  - 1. Use cadmium or zinc coated anchors and fasteners in dry locations.
  - 2. Use hot dipped galvanized or stainless-steel anchors and fasteners in damp and wet locations.
  - 3. For corrosive atmospheres or other extreme environmental conditions, use fasteners made of materials suitable for the conditions.
- B. Types and Use: Unless otherwise specified or indicated use:
  - 1. Cast-in-place concrete inserts in fresh concrete construction for direct pull-out loads such as shelf angles or fabricated metal items and supports attached to concrete slab ceilings.
  - 2. Anchoring devices to fasten items to solid masonry and concrete when the anchor is not subjected to pull out loads, or vibration in shear loads.
  - 3. Toggle bolts to fasten items to hollow masonry and stud partitions.
  - 4. TPR fasteners to fasten items to plywood backed gypsum board ceilings.
  - 5. Metallic fasteners installed with electrically operated or powder driven tools for approved applications, except:
    - a) Do not use powder driven drive pins or expansion nails.
    - b) Do not attach powder driven or welded studs to structural steel less than 3/16 inch thick.
    - c) Do not support a load, in excess of 250 lbs. from any single welded or powder driven stud.
    - d) Do not use powder driven fasteners in precast concrete.

### 3.3 ATTACHMENT SCHEDULE

- A. General: Make attachments to structural steel or steel bar joists wherever possible. Provide intermediate structural steel members where required by support spacing. Select steel members for use as intermediate supports based on a minimum safety factor of 5.
  - 1. Make attachments to steel bar joists at panel points of joists.
  - 2. Do not drill holes in main structural steel members.
  - 3. Use "C" beam clamps for attachment to steel beams.
- B. Where it is not possible to make attachments to structural steel or steel bar joists, use the following methods of attachment to suit type of construction unless otherwise specified or indicated on the drawings:
  - 1. Attachment to Steel Roof Decking (No Concrete Fill):
    - a) Decking with Hanger Tabs: Use deck clamps.
    - b) Decking Without Hanger Tabs:
      - (1) Before Roofing Has Been Applied: Use 3/8 inch threaded steel rod welded to a 4 x 4 x 1/4 inch steel plate and installed through 1/2 inch hole in roof deck.
      - (2) After Roofing Has Been Applied: Use welding studs, or self-drilling/tapping fasteners. Exercise extreme care when installing fasteners to avoid damage to roofing.
  - 2. Attachment to Concrete Filled Steel Decks (Total thickness, 2-1/2 inches or more):
    - a) Before Fill Has Been Placed:
      - (1) Use thru-bolts and fish plates.
      - (2) Use welded studs. Do not support a load in excess of 250 pounds from a single welded stud.
    - b) After Fill Has Been Placed: Use welded studs. Do not support a load in excess of 250 lbs from a single welded stud.
  - 3. Attachment to Cast-In-Place Concrete:
    - a) Fresh Concrete: Use cast-in-place concrete inserts.
    - b) Existing Concrete: Use anchoring devices.
  - 4. Attachment to Cored Precast Concrete Decks:
    - a) New Construction: Use thru-bolts and fish plates before Construction Work Contractor has placed concrete fill over decks.
  - 5. Attachment to Hollow Block or Tile Filled Concrete Deck:
    - a) New Construction: Use cast-in-place concrete inserts by having Construction Work Contractor omitting blocks and pouring solid blocks with insert where required.

6. Attachment to Waffle Type Concrete Decks:
  - a) New Construction:
    - (1) Use cast-in-place concrete inserts in fresh concrete.
    - (2) If concrete fill has been applied over deck, thru-bolts and fish plates may be used where additional concrete or roofing is to be placed over the deck.
7. Attachment to Precast Concrete Planks: Use anchoring devices, except do not make attachments to precast concrete planks less than 2-3/4 inches thick.
8. Attachment to Precast Concrete Tee Construction:
  - a) New Construction:
    - (1) Use tee hanger inserts between adjacent flanges.
    - (2) Use thru-bolts and fish plates, except at roof deck without concrete fill.
  - b) Existing Construction:
    - (1) Use anchoring devices installed in webs of tees. Install anchoring devices as high as possible in the webs.
  - c) Do not use powder driven fasteners.
  - d) Exercise extreme care in drilling holes to avoid damage to reinforcement.
9. Attachment to Wood Construction: Use side beam brackets fastened to the sides of wood members to make attachments for hangers.
  - a) Under 15 lbs. Load: Attach side beam brackets to wood members with 2 No. 18 x 1-1/2-inch-long wood screws, or 2 No. 16 x 1-1/2-inch-long drive screws.
  - b) Over 15 lbs. Load: Attach side beam brackets to wood members with bolts and nuts or lag bolts. Do not use lag bolts in wooden members having a nominal thickness (beam face) under 2 inches in size. Install bolts and nuts or lag bolts in the side of wood members at the mid-point or slightly above. Install plain washers under all nuts.

LOAD	LAG BOLT SIZE	BOLT DIA.
15 lbs. to 30 lbs.	3/8 x 1-3/4 inches	3/8 inch
31 lbs. to 50 lbs.	1/2 x 2 inches	1/2 inch
Over 50 lbs. to load limit of structure.	Use bolt & nut	5/8 inch

- (1) Bottom chord of wood trusses may be utilized as structural support, but method of attachment must be specifically approved.
- (2) Do not make attachments to the diagonal or vertical members of wood trusses.
- (3) Do not make attachments to the nailing strips on top of steel beams.

10. Attachment to Metal Stud Construction: Use supporting fasteners manufactured specifically for the attachment of raceways and boxes to metal stud construction.
  - a) Support and attach outlet boxes so that they cannot torque/twist. Either:
    - (1) Use bar hanger assembly, or:
    - (2) In addition to attachment to the stud, also provide far side box support.

### 3.4 CONDUIT SUPPORT SCHEDULE

- A. Provide number of supports as required by National Electrical Code. Exception: Maximum support spacing allowed is 4'-0" for conduit sizes 3 inches and larger supported from wood trusses.
- B. Use pipe straps and specified method of attachment where conduit is installed proximate to surface of wood or masonry construction.
  1. Use hangers secured to surface with specified method of attachment where conduit is suspended from the surface.
- C. Use "C" beam clamps and hangers where conduit is supported from steel beams.
- D. Use deck clamps and hangers where conduit is supported from steel decking having hanger tabs.
  1. Where conduit is supported from steel decking which does not have hanger tabs, use clamps and hangers secured to decking, utilizing specified method of attachment.
- E. Use channel support system supported from structural steel for multiple parallel conduit runs.
- F. Where conduits are installed above ceiling, do not rest conduit directly on runner bars, T-Bars, etc.
  1. Conduit Sizes 2-1/2 Inches and Smaller: Support conduit from ceiling supports or from construction above ceiling.
  2. Conduit Sizes Over 2-1/2 Inches: Support conduit from beams, joists, or trusses above ceiling.

### 3.5 LIGHTING FIXTURE SUPPORT SCHEDULE

- A. General: Do not support fixtures from ceilings or ceiling supports unless it is specified or indicated on the drawings to do so.
  1. Support fixtures with hanger rods attached to beams, joists, or trusses. Hanger rod diameter, largest standard size that will fit in mounting holes of fixture.
    - a) Where approved, channel supports may span and rest upon the lower chord of trusses and be utilized for the support of lighting fixtures.

- b) Where approved, channel supports may span and be attached to the underside of beams, joists, or trusses and be utilized for the support of lighting fixtures.
  - 2. Use 2 nuts and 2 washers on lower end of each hanger rod to hold and adjust fixture (one nut and washer above top of fixture housing, one nut and washer below top of fixture housing).
    - a) Where specified that an adequately supported outlet box is to support a fixture or be utilized as one point of support, support the box so that it may be adjusted to bring the face of the outlet box even with surface of ceiling.
- B. Number of Supports for Ceiling Mounted Lighting Fixtures: Provide at least the following number of supports. Provide additional supports when recommended by fixture manufacturer or shown on the drawings.
  - 1. Commercial and Industrial Fixtures:
    - a) Support individual fixtures less than 2 feet wide at 2 points.
    - b) Support continuous row fixtures less than 2 feet wide at points equal to the number of fixtures plus one. Uniformly distribute the points of support over the row of fixtures.
    - c) Support individual fixture 2 feet or wider at 4 corners.
    - d) Support continuous row of fixtures 2 feet or wider at points equal to twice the number of fixtures plus 2. Uniformly distribute the points of support over the row of fixtures.
    - e) An adequately supported outlet box may be utilized as one point of support for fixtures weighing less than 50 pounds.
- C. Number of Supports for Wall Mounted Lighting Fixtures: Provide at least the following number of supports. Provide additional supports when recommended by fixture manufacturer or shown on the drawings.
  - 1. Commercial and Industrial Fixtures:
    - a) Support individual fixtures 2 feet long or less at 2 points.
    - b) Support individual fixtures over 2 feet long at 3 points.
    - c) Support continuous row fluorescent fixtures at points equal to twice the number of fixtures. Uniformly distribute the points of support.
    - d) An adequately supported outlet box may be utilized as one point of support for fixtures weighing less than 50 pounds.

### 3.6 CHANNEL SUPPORT SYSTEM SCHEDULE

- A. Use channel support system where specified or indicated on the drawings.
- B. Channel supports may be used, as approved, to accommodate mounting of equipment.



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C. Material and Finish:

1. Dry Locations: Use 12 gage steel channel support system having any one of the specified finishes.
2. Damp Locations: Use 12 gage steel channel support system having any one of the specified finishes except green epoxy/enamel.
3. Wet Locations: Use 12 gage steel channel support system having hot dipped galvanized, or PVC finish.

END OF SECTION 260190

## SECTION 260195 - ELECTRICAL IDENTIFICATION

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract including the General and Supplementary Conditions of Division 1 of the Specification Sections, apply to the work of this section.

#### 1.2 SECTION INCLUDES

- A. Nameplates and labels
- B. Wire and cable markers
- C. Conduit markers

#### 1.3 REFERENCES

- A. Refer to Division 1.
- B. NFPA 70 - National Electrical Code.
- C. REGULATORY REQUIREMENTS
- D. Conform to requirements of NFPA 70.
- E. Products: Listed and classified by Underwriters Laboratories, Inc. as suitable for the purpose specified and indicated.

### PART 2 - PRODUCTS

#### 2.1 NAMEPLATES AND LABELS

- A. Nameplates: Engraved three-layer laminated plastic, black letters on white background
  - 1. Locations:
    - a) Outside of each electrical panel. Indicate panel name.
    - b) Control equipment enclosure. Indicate equipment name and branch circuit.
    - c) Disconnects Indicate equipment name and branch circuit.
    - d) Distribution panel breakers. Indicate load served.
  - 2. Letter Size: 1/8-inch letters.
- B. Labels: Circuit designation shall be indicated with clear adhesive tape, 3/16-inch black letters on clear background. Use only for identification of individual wall switches and receptacles and control device stations. Tape label shall be adhered to the faceplate of each device.
- C. Provide flash protection label per NEC 110.16 for equipment furnished under this Contract including switchboards, panelboards, industrial control panels and motor control centers. Seton #M0547; or equal.

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## 2.2 WIRE MARKERS

- A. Description: Tape type wire markers.
- B. Locations: Each conductor at panelboard gutters and each load connection.
- C. Legend: Branch circuit or feeder number indicated.

## 2.3 PANEL SCHEDULES

- A. Provide complete type written directory for each panelboard listing room number, function, etc., for each circuit breaker.
- B. Provide type written updated panelboard directories for existing panelboards affected by this work.
- C. Panel directory must also include the up-stream panel that services the panel. (i.e. "Fed from MDP Circuits 2,4,6")
- D. Include a Microsoft word or excel file with all panel schedules as part of the close out submittals.

## 2.4 DEVICES

- A. Provide a tape label on all receptacle and switch cover plates, power poles, etc. listing panel designation and circuit number. Tape shall be attached to outside of receptacle or switch cover plates.
- B. In permanent marker write the panel and circuit number on the wall behind receptacle cover plate or inside receptacle back box.

## 2.5 JUNCTION AND PULL BOXES

- A. Identify junction and pullboxes for particular service such as power, lighting, fire alarm, telephone, intercom, public address, nurse call, etc. using stencil lettering on cover.

## 2.6 CONDUIT

- A. Provide adhesive marking labels for raceway and metal-clad cable. The labels shall indicate voltage and service and be located above ceilings every 75 feet and on wall mounted conduit in mechanical and equipment rooms.

# PART 3 - EXECUTION

## 3.1 PREPARATION

- A. Degrease and clean surfaces to receive nameplates and labels.

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### 3.2 INSTALLATION

- A. Install nameplate and label parallel to equipment lines.
- B. Secure nameplate to equipment front using adhesive.
- C. Secure nameplate to inside surface of door on panelboard that is recessed in finished locations.

END OF SECTION 260195

## SECTION 260519 - WIRE AND CABLE (600 V AND BELOW)

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract including the General and Supplementary Conditions of Division 1 of the Specification Sections, apply to the work of this section.

#### 1.2 WORK INCLUDED

- A. Conductors.
- B. MC Cable.
- C. Terminations.

#### 1.3 SUBMITTALS

- A. Schedule of all wiring and cable usage.
- B. Product data sheets for all wire and cable types.

### PART 2 - PRODUCTS

#### 2.1 CONDUCTORS

- A. Feeder, branch circuit and control wiring:
  - 1. Annealed Copper, 98% conductivity.
  - 2. Annealed Copper, 98% conductivity for #8 AWG and below. Solid conductors: Uncoated copper per ASTM-B3. Stranded conductors: Uncoated copper per ASTM-B3, ASTM-B787.
  - 3. Minimum wire size:
    - a) #12 AWG for branch circuits
    - b) #14 AWG for control and signal circuits
  - 4. #8 AWG Wire and above shall be stranded.
  - 5. 600-volt insulation for all wiring above 50 volts.
  - 6. 300-volt insulation permitted for all wiring below 50 volts.
  - 7. Thermal plastic with PVC insulation with nylon jacket, suitable for wet or dry locations, THHN/THWN 90 degree Celsius.
  - 8. 90-degree C maximum operating temperature rating.

9. UL 83 Listed.
- B. Lighting fixture wire
  1. FREP/CPE coated stranded copper.
  2. Flame retardant EPR Insulation and CPE jacket.
  3. UL 44 listed.
- C. Flexible cords and cables shall be Type "SO" or "SJO".
- D. Color Coding:
  1. All circuits shall be color coded according to the following schedule:

Voltage	A PHASE NEUTRAL	B PHASE	C PHASE	
208Y/120V, 3 Phase	Black	Red	Blue	White
208/120V, 1 Phase	Black	Red		White

\*ALL GROUNDING CONDUCTORS SHALL BE GREEN
  2. #6 AWG and smaller shall have insulation continuously colored as called for above.
  3. #4 AWG and larger may be identified using a minimum 3" tape band.
  4. Color code all conductors at all pullboxes, enclosures, and terminations.
  5. Switched legs shall be identified with the same color insulation as the phase leg.
- E. Acceptable manufacturers:
  1. Cablec
  2. Southwire
  3. Okonite
  4. Rome Cable
  5. Pirelli

## 2.2 MC CABLE

- A. Construction:
  1. Stranded or solid copper conductors, each individually insulated, and enclosed in an armor of flexible metal tape.
  2. Suitable for wet or dry locations.
  3. Suitable for cable tray installations.

4. Do not install direct buried, in concrete, or in the presence of corrosive vapors.
5. Provide with separate integral grounding conductor.
6. Support every 6 feet.
7. Manufactured and installed in accordance with NEC Article 330.
8. Make: Acceptable manufacturers:
  - a) AFC
  - b) Southwire
  - c) United Copper Industries

## 2.4 LOW VOLTAGE CONNECTORS AND TERMINATIONS

### A. Straight Splices, #26 AWG to #10 AWG:

1. Nylon Insulated compression butt-splices.
2. 600 volt, 90 degree C rated.
3. Make: Burndy "Insulink", T&B "Sta-Kon", or approved equal.

### B. Straight Splices, #8 AWG and Larger:

1. Two-way, long barrel, compression type, copper.
2. Provide heat shrink tubing over splice.
3. 600 volt rated.
4. Make: Burndy "Hylink", T&N 54800 Series, or approved equal.

### C. Pigtail Splices, #26 AWG to #10 AWG:

1. Twist type pressure connector.
2. 600 volt rated, 105 degree C.
3. Size as required for number and size of conductors used.
4. Make: T&B Scotchlock, or approved equal.

### D. Three Way Splices, #8 AWG and Larger:

1. Three-way, long barrel, compression type, copper.
2. Provide tape or heat shrink tubing over splice.
3. 600 volt rated.
4. Make: Burndy "Hylink", T&B 54700 Series, or approved equal.

### E. Lug Terminations for Control and Signal Wiring:

1. Nylon insulated fork with compression termination of #26 AWG to #10 AWG.
2. Nylon insulated ring with compression termination for #8 AWG and larger.
3. 300 volt rated.
4. Make: Burndy "Insulug", T&B "Sta-Kon", or approved equal.



F. Lug Terminations for Power Wiring:

1. Long barrel, compression type, copper body, on hole for #8 AWG to #2/0 AWG.
2. Long barrel, compression type, copper body, two hole, for #3/0 AWG and larger.
3. 600 volt rated.
4. Make:
  - a) One-hole lug: Burndy "Hylug", T&B 54900 Series, or approved equal.
  - b) Two-hole lug: Burndy "Hylug", T&B 54800 Series, or approved equal.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Route wire and cable as required to meet Project Conditions.
- B. Install cable in accordance with the NECA "Standard of Installation."
- C. Use stranded conductors for control circuits.
- D. Use conductor not smaller than 12 AWG for power and lighting circuits.
- E. Use conductor not smaller than 16 AWG for control circuits.
- F. Use 10 AWG conductors for 20 ampere, 120 volt branch circuits longer than 100 feet.
- G. Identify and color code wire and cable under provisions of this section. Identify each conductor with its circuit number or other designation indicated.
- H. Install cables in raceway as called for after the entire raceway system has been completed.
- I. Install splices and connections in accessible outlet, pull, and junction boxes.
- J. Insulate all splices and connections with UL Labeled plastic tape, heat shrink tubing, or plastic molded caps.
- K. All wiring systems shall be properly grounded and continuously polarized throughout, following the color coding specified.
- L. Provide a green equipment ground with all feeders and all branch circuits' size per the NEC.
- M. Provide dedicated white insulated neutral conductor for each branch circuit. Shared neutrals are not allowed.
- N. Install a maximum of three phase conductors, three neutral conductors, and one grounding conductor in each home run. (Obtain approval for additional conductor fill where field conditions require. Adhere to NEC de-rating requirements.)

- O. Provide stranded wire to motors, transformers, equipment, and vibrating machinery.
- P. Feeder conductors shall be continuous from point of origin to load termination without splice. If this is not practical, contact the Owner's Representative and receive written approval for splicing prior to installation of feeder(s). Where feeder conductors pass through junction and pull boxes, bind and lace conductors of each feeder together. For parallel sets of conductors, match lengths of conductors.
- Q. Use pulling means including fish tape, cable, and rope and basket type grips which will not damage cables or raceways. Use approved mechanical pullers for feeders and branch circuits as required for #6 AWG cable and larger. Do not use mechanical means to pull conductors No. 8 or smaller.
- R. Branch circuit conductors installed in panelboards, and control conductors installed in control cabinets and panels shall be neatly bound together using "Ty-Raps" or equivalent.
- S. Reconnect branch circuit wiring at panelboards as required to obtain a balanced three phase load on the feeders.
- T. Properly splice and neatly coil extraneous wires in outlet boxes.
- U. Wiring in panelboards and equipment enclosures etc. shall be neatly trained and arranged so as not to preclude access to the space or equipment contained therein. Provide all additional cable supports and ties required to comply.
- V. The system shall be properly grounded and continuously polarized throughout, following the color coding specified.
- W. Wiring within panelboards, control cabinets, pull boxes, wiring troughs and annunciator and/or alarm panels shall be neatly bundled together with ties not requiring tools to install. Two, three and four wire circuits emerging from the bundle shall be trained and tied individually.
- X. Where multiple conductors are installed in a common raceway they shall be pulled simultaneously. Use of pulling compound or lubricant shall be avoided unless absolutely necessary. Where pulling lubricant is required, use UL approved compounds approved for cable type. Lubricant shall meet all OSHA and Toxic Control Act standards.

APPLICATION	CABLE TYPES	DESIGN MAKE
General purpose Construction & Maintenance	Rubber, Neoprene, Nylon, PVC, High Density XLP, Hypalon	Ideal - Yellow 77
High Temperature Construction & Maintenance	Rubber, Neoprene, Nylon, PVC, High Density XLP, Hypalon, Low Density Polyethylene,	Ideal - Yellow 190

#### Semiconducting Jacket

Utility construction & Maintenance	Rubber, Neoprene, Nylon, PVC, High Density XLP, Hypalon, Low Density Polyethylene, Semiconducting Jacket	Aqua-Gell II
Cold Weather Construction & Maintenance	Rubber, Neoprene, Nylon PVC, High Density XLP, Hypalon, Low Density Polyethylene, Semiconducting Jacket	Aqua-Gel CW

### 3.2 CIRCUITING

- A. The following takes precedence over the drawings:
1. General purpose receptacle and lighting branch circuits may be combined in single conduits in accordance with NEC requirements and restrictions.
  2. Conductors serving individual pieces of equipment or grouped equipment or isolated ground branch circuits shall not be combined.
  3. Provide dedicated Neutrals.

### 3.3 SPLICES

- A. Dry locations: For conductors #10 AWG and smaller use standard spring type pressure connectors or compression type connectors with insulating jackets.
- B. For conductors #8 AWG and larger use compression type connectors and insulate in accordance with manufacturer's recommendations.
- C. Damp locations: Use same type splices as indicated for dry locations and wrap with moisture sealing tape.
- D. Wire runs shall be continuous. All splicing shall be done only in accessible boxes.

### 3.4 LOW VOLTAGE CONTROL WIRING

- A. Low voltage control wiring shall not be run in same conduit system as power feeds. All low voltage control wiring in equipment shall be neatly bundled, identified and installed remote from any and all mechanical moving parts. All low voltage control wiring in walls shall be installed in conduit, the same as required for power wiring. All low voltage wiring above inaccessible ceilings shall be installed in conduit. All low voltage wiring exposed in finished spaces shall be installed in wiremold surface raceway. All low voltage wiring exposed in unfinished spaces shall be installed in conduit. All low

voltage control wiring above accessible ceilings shall be bundled, neatly run at right angles and/or parallel to building steel, tied to steel as high as possible with no more than 3" sags; wire may not be laid on ceiling framing or supported by ceiling framing. Low voltage wiring shall not be run between decking flutes or above structural members.

### 3.5 TYPE MC METAL CLAD CABLE

- A. MC Cable shall be permitted for up to 6' fixture whips from junction boxes above drop ceiling areas to recessed light fixtures.
- B. MC Cable shall be permissible for up to 10 ft drop from junction box to outlets in walls. MC Cable shall be permitted for horizontal cabling in drywall partitions.
- C. Type MC Cable shall not be used for feeders or branch circuit home runs to panelboards.
- D. Support cable at intervals not exceeding 6 feet.
- E. Bending radius shall comply with Article 330.24 of the NEC.
- F. Provide insulating bushing at all termination points between the metal sheath and outlet or junction box.
- G. Type MC Cable shall not be installed exposed with the exception of fixture drops in mechanical or equipment rooms. Secure the cable to fixture hangers using nylon or plastic ties.

END OF SECTION 260519

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## SECTION 260533 - CONDUIT

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract including the General and Supplementary Conditions of Division 1 of the Specification Sections, apply to the work of this section.

#### 1.2 WORK INCLUDED

- A. Metal conduit
- B. Liquid tight flexible metal conduit
- C. Electrical metallic tubing
- D. Electrical non-metallic tubing
- E. Flexible metal conduit
- F. Fittings and conduit bodies

#### 1.3 SUBMITTALS

- A. Submit for approval a list of each product and the manufacturer.

#### 1.4 REFERENCES

- A. ANSI-C80.2, 1983: Specification for Rigid Steel Conduit, Enameled.
- B. ANSI C80.3: Electrical Metallic Tubing, Zinc Coated.
- C. ANSI/NEMA FB 1: Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies.
- D. NECA "Standard of Installation."
- E. NEMA TC 2: Electrical Plastic Tubing (EPT) and Conduit (EPC-40 and EPC-80).
- F. NEMA TC 3: PVC Fittings for Use with Rigid PVC Conduit and Tubing.
- G. NEMA, RN1, 1986: PVC Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit.
- H. NEMA, TC 6, 1983: PVC and ABS Plastic Utilities Duct for Underground Installations.
- I. NEMA, TC 8, 1983: Extra strength PVC Plastic Utilities Duct for Underground Installations.
- J. NEMA, TC 9, 1983: Fittings for ABS and PVC Plastic Utilities Duct and Fittings for Underground Installation.

- K. NEMA, TC 10, 1983: PVC and ABS Plastic Communications Duct and Fittings for Underground Installation.
- L. The following U.L. Standards:
  - 1. UL 1, 1985: Flexible Metal Electrical Conduit.
  - 2. UL 3, 1984: Flexible Nonmetallic Tubing for Electric Wiring.
  - 3. UL 6, 1981: Rigid Metal Electrical Conduit.
  - 4. UL 360, 1986: Liquidtight Flexible Steel Conduit, Electrical.
  - 5. UL 514B, 1982: Fittings for Conduit and Outlet Boxes.
  - 6. UL 651, 1981: Schedule 40 and 80 PVC Conduit.
  - 7. UL 797, 1983: Electrical Metallic Tubing.
  - 8. UL 870, 1985: Electrical Wireways, Auxiliary Gutters and Associated Fittings.

## PART 2 - PRODUCTS

### 2.1 CONDUIT REQUIREMENTS

- A. Minimum Size: 3/4" unless otherwise specified.
- B. Underground Installations:
  - 1. Use thickwall non-metallic conduit.
  - 2. Under Slab on Grade: Use thickwall non-metallic conduit.
  - 3. Minimum Size: 1".
- C. Outdoor Locations, Above Grade: Use rigid steel conduit.
- D. In Slabs Above Grade:
  - 1. Use rigid steel conduit or intermediate metal conduit.
- E. Indoor:
  - 1. Concealed: Use electrical metallic tubing.
  - 2. Exposed: Use EMT unless otherwise called for.

### 2.2 RIGID GALVANIZED STEEL CONDUIT

- A. Steel, hot dipped galvanized on the outside and inside, UL categorized as Rigid Ferrous Metal Conduit (identified on UL Listing Mark as Rigid Metal Conduit - Steel or Rigid Steel Conduit).
- B. Acceptable manufacturers:
  - 1. LTV Steel
  - 2. Triangle
  - 3. Allied Tube

4. Steel Duct
5. Wheatland

## 2.3 ELECTRICAL METALLIC TUBING

- A. Steel, galvanized on the outside and enameled on the inside, UL categorized as Electrical Metallic Tubing (identified on UL Listing Mark as Electrical Metallic Tubing).
- B. Acceptable manufacturers:
  1. Triangle
  2. Wheatland
  3. Allied Tube
  4. Steel Duct
  5. LTV Steel

## 2.4 FLEXIBLE METAL CONDUIT

- A. Flexible Metal Conduit shall be constructed of one continuous length of spirally wound, interlocked, zinc coated strip steel. Interior surface shall be free from burrs or sharp edges. UL categorized as Flexible Metal Conduit (identified on UL Listing Mark as Flexible Steel Conduit or Flexible Steel Conduit Type RW).
- B. Acceptable manufacturers:
  1. Anaconda
  2. American Flexible Conduit Co.
  3. O-Z/Gedney
  4. Thomas and Betts

## 2.5 LIQUID TIGHT FLEXIBLE METAL CONDUIT

- A. Flexible Metal Conduit shall be constructed of one continuous length of spirally wound, interlocking zinc coated strip steel. Interior surfaces shall be free from burrs and sharp edges. Provide with a liquid-tight jacket of flexible polyvinyl chloride (PVC). UL categorized as liquid-tight flexible metal conduit (identified on UL Listing Mark as Liquid-Tight Flexible Metal Conduit, also specifically marked with temperature and environment application data).
- B. Acceptable manufacturers:
  1. Allied
  2. American Flexible Conduit
  3. Carlon
  4. Thomas and Betts



## 2.6 FITTINGS AND ACCESSORIES

- A. Rigid galvanized steel fittings shall be fully threaded and shall be of the same material as the respective raceway system.
- B. Fittings for electrical metallic tubing shall be single screw indenter fittings for conduits up to 2" and double screw indenter fittings for conduits 2" and larger.
- C. Fittings for flexible metal conduit shall be center stopped, insulated throat, U.L. E-11852 listed.
- D. Fittings for liquidtight flexible metal conduit shall have zinc plated steel ferrule, compression type with sealing ring.
- E. Fittings for rigid non-metallic conduit shall be solvent cemented in accordance with the manufacturer's instructions.
- F. Fittings for PVC coated rigid galvanized steel conduit shall be threaded, hot dipped galvanized, and coated inside and outside with a urethane coating.
- G. Connectors shall have insulated throat up to and including 1" size. For sizes 1-1/4" and larger, provide plastic insulating bushing.
- H. Die-cast or pressure cast fittings are not permitted.
- I. Provide conduit bodies' types, shapes and sizes as required to suit application and NEC requirements. Provide matching gasketed covers secured with corrosion-resistant screws.
- J. Insulated Bushings:
  - 1. Threaded, malleable iron/zinc electroplate with 105 degrees C minimum plastic insulated throat; Appleton Electric Co.'s BU50I Series, Cooper/Crouse-Hinds' 1031 Series, OZ/Gedney Co.'s IBC-50 Series, Raco Inc.'s 1132 Series, Steel City/T & B Corp.'s BI-901 Series, or Thomas & Betts Corp.'s 1222 Series.
  - 2. Threaded malleable iron with 150 degrees C plastic throat; Appleton Electric Co.'s BU50I Series, Cooper/Crouse-Hinds' H1031 Series, or OZ/Gedney Co.'s IBC-50 Series.
- K. Plastic Bushings for 1/2- and 3/4-Inch Conduit:
  - 1. 105 degrees C minimum temperature rating; Appleton Electric Co.'s BBU50, BBU75, Blackburn (T & B Corp.'s) 50 BB, 75 BB, Cooper/Crouse-Hinds' 931, 932, or OZ/Gedney Co.'s IB-50, IB-75, Raco Inc.'s 1402, 1403, Steel City/T & B Corp.'s BU-501, BU-502, or Thomas & Betts Corp.'s 222, 223.
  - 2. 150 degrees C temperature rating; Appleton Electric Co.'s BBU50H, BBU75H, Cooper/Crouse-Hinds' H-931, H-932, or OZ/Gedney Co.'s A-50, A-75.

L. Insulated Grounding Bushings:

1. Threaded, malleable iron/zinc electroplate with 105 degrees C minimum plastic insulated liner, and ground lug; Appleton Electric Co.'s GIB-50 Series, Cooper/Crouse-Hinds' GLL Series, OZ/Gedney Co.'s IBC-50L Series, Raco Inc.'s 1212 Series, Steel City/T & B Corp.'s BG-801 (1/2 to 2") Series, or Thomas & Betts Corp.'s 3870.
2. Threaded malleable iron/zinc electroplate with 150 degrees C plastic insulated liner, and ground lug; Appleton Electric Co.'s GIB Series, Cooper/Crouse-Hinds' HGLL Series, or OZ/Gedney Co.'s IBC-50L Series, or Thomas & Betts Corp.'s 3870.

M. Sealant for Raceways Exposed to Different Temperatures: Sealing compounds and accessories to suit installation; Appleton Electric Co.'s DUC, or Kwiko Sealing Compound with fiber filler, Cooper/Crouse-Hinds' Chico A Sealing Compound with Chico X fiber, Electrical Products Division 3M Scotch products, OZ Gedney Co.'s DUX or EYC sealing compound with EYF damming fiber, or Thomas & Betts Corp.'s Blackburn DX.

N. Vertical Conductor Supports: Kellems/Hubbell Inc.'s Conduit Riser Grips, or OZ/Gedney Co.'s Type M, Type R.

O. Pulling-In-Line for Installation in Spare and Empty Raceways: Polypropylene monofilament utility line; Greenlee Textron Inc.'s Poly Line 430, 431, or Ideal Industries Powr-Fish Pull-Line 31-340 Series.

P. Acceptable manufacturers:

1. O.Z. Gedney
2. Steel City
3. Thomas & Betts
4. Cooper Crouse-Hinds
5. Carlon
6. Raco

## 2.7 EXPANSION FITTINGS

A. Galvanized steel expansion joints for RGS or EMT conduit, PVC for PVC conduit. Minimum 4" movement in either direction.

B. Weatherproof for outdoor applications.

C. At expansion joints in concrete pours, provide Deflection/Expansion fittings capable of movement of 3/4" in all directions from the normal.

D. Design Make: O.Z./Gedney, Type "AX" (exposed), "DX" (Concrete Pour)

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E. Acceptable manufacturers:

1. O.Z./Gedney
2. Crouse-Hinds
3. Appleton

## 2.8 EXPANDABLE CONDUIT PLUGS

- A. Seal open underground telecommunications conduits entering the building with expandable conduit plugs with rope ties.
- B. Refer to drawings for underground entrance locations.
- C. Design Make: Osburn Associates or approved equal.

## PART 3 - EXECUTION

### 3.1 GENERAL

- A. Install conduit in accordance with NECA "Standard of Installation"
- B. PVC conduit is not permitted in any interior location within a school.
- C. All conduit penetrations through fire-rated construction must be sealed with UL listed fire stopping. Refer to architectural drawings for locations.
- D. Size raceways as indicated on the drawings. Where sizes are not indicated, raceways shall be sized as required by the National Electrical Code in accordance with the quantity, size, type and insulation of conductors to be installed.
- E. Minimum 1/2" trade size for branch circuit and fire alarm wiring.
- F. Minimum 3/4" trade size for voice/data outlets, television outlets, and branch circuit "Home Runs" to panelboards.
- G. Group related conduits; support using conduit rack. Construct rack using steel channel; provide space on each for 25% additional conduits.
- H. Provide a code compliant ground path between all outlets and the established electrical system ground.
- I. Coordinate all raceway runs with other trades.
- J. Do not install raceways adjacent to hot surfaces or in wet areas. Maintain 12" clearance between conduit and surfaces with temperatures exceeding 104° F (40° C).
- K. Provide expansion fittings with external grounding straps at building expansion joints.

- L. Arrange neatly to permit access to the raceway, outlet, pull, and junction boxes, and work installed by other trades.
- M. Provide conduit seals and explosion proof devices as indicated on the plans and as dictated by the National Electrical Code for all hazardous locations indicated on the drawings.
- N. Use conduit hubs or sealing locknuts to fasten conduit to sheet metal boxes in damp and wet locations.
- O. All exposed conduit mounted to a painted surface shall be painted to match that surface.
- P. No conduit shall be run in or through an Elevator Machine Room, hoistway or pit unless it contains circuitry specifically required for the elevator or elevator related equipment.
- Q. Avoid moisture traps; provide junction box with drain fitting at low points in conduit system.
- R. Provide at least one junction or pullbox for each 360 degrees of bends.
- S. Provide green ground wire in all EMT, flexible conduit, and non-metallic conduit.

### 3.2 INSTALLATION

- A. Install raceways parallel or perpendicular to building walls, floors and ceilings.
- B. Cut raceways square, ream ends to remove burrs, and bush where necessary.
- C. Route conduit in and under slab from point to point. Do not cross conduits in slab. Provide U.L. approved rain-tight and concrete tight couplings and connectors. All conduit in concrete floor slabs shall be rigid galvanized steel with concrete tight threaded fittings. Install conduit below the reinforcing mesh. Locate conduits to provide a minimum of 1" of concrete around conduit. Obtain approval from the Owner's Representative prior to installing conduit larger than 1" trade size in concrete slabs.
- D. Install with a minimum of bends and offsets. Bends shall not kink or destroying the interior cross section of the raceway. Factory made bends shall be used for raceways 1" trade size and larger.
- E. Support raceways from building construction. Do not support raceways from ductwork, piping, or equipment hangers. Arrange supports to prevent misalignment during wiring installation. Support conduit using coated steel or malleable iron straps, lay in adjustable hangers, clevis hangers, and split hangers. Do not attach conduit to ceiling support wires. Do not support conduit with wire or perforated pipe straps. Remove wire used for temporary supports.
- F. Plug the ends of each roughed-in raceway with an approved cap or disc to prevent the entrance of foreign materials during construction.

- G. Secure conduit within three feet of each outlet box, junction box, cabinet or fitting.
- H. Provide a #14 AWG fish wire in all "Spare" or "Empty" conduit runs to facilitate future installation of conductors.
- I. Provide expansion fittings where conduits cross building expansion joints.
- J. Wherever a cluster of (4) or more conduits rise out of floor exposed, provide neatly formed 4 in. high concrete envelope, with chamfered edges, around raceways.
- K. Provide 4 spare 3/4-in. raceways from each flush mounted panelboard or cabinet to an area above the nearest accessible ceiling space. Make 90° turn above the ceiling, arranged for further continuation of raceway, and cap.
- L. Join non-metallic conduit using cement as recommended by manufacturer. Wipe non-metallic conduit dry and clean before joining. Apply full even coat of cement to entire area inserted in fitting. Allow joint to cure for 20 minutes, minimum.
- M. Where conduits puncture roof, install pitch pockets as required in order that the roof warranty is maintained.
- N. If it is necessary to burn holes through webs of beams or girders, call such points to the attention of the Owner's Representative and receive written approval both as to location and size of hole before proceeding with work. All holes shall be burned no larger than absolutely necessary.
- O. Core drill, sleeve, and fire stop all penetrations through existing floors.
- P. In exterior or wet locations, provide minimum 1/4" air space between raceway and wall. Secure raceway within 3 ft. of each outlet box, junction box, cabinet or fitting.
- Q. Provide conduit supports based on the following table:

Conduit Trade Size	Type of Run	Horizontal Spacing in Feet	Vertical Spacing in Feet
1/2", 3/4"	Concealed	7	10
1", 1-1/4"	Concealed	8	10
1-1/2" & larger	Concealed	10	10
1/2", 3/4"	Exposed	5	7
1", 1-1/4"	Exposed	7	8
1-1/2" & larger	Exposed	10	10

- R. Conceal conduits in all locations except for mechanical and equipment rooms. Obtain owner's permission to run exposed conduits in other areas if existing conditions warrant exposed conduit.

### 3.3 REUSE OF EXISTING RACEWAYS

- A. Number of Raceways: Do not change number of raceways to less than the number indicated on the drawings except when appropriate for advantageous reuse of existing exposed and concealed raceways (the contract documents do not indicate location, number, size or condition of existing raceways). Existing raceways may be reused if the following conditions are met:
- B. The existing raceway must be of adequate size for the new conductors to be installed therein (NFPA 70 Chapter 9, Tables 1, 4, & 5; Appendix C, Tables C1-C12a). More circuits may be enclosed by existing raceways than the circuiting shown on the drawings provided conductor sizes are increased to compensate for derating (adjustment factors) and other considerations required by NFPA 70 Article 310-15.
- C. Remove existing conductors.
- D. Demonstrate to the Director's Representative that the existing raceway is clear of obstructions and in good condition.
- E. Check ground continuity. When ground continuity of existing raceway is inadequate install insulated grounding bushings, grounding wedges, bonding straps, grounding jumpers or equipment grounding conductors to establish effective path to ground.
- F. Install insulated bushings to replace damaged or missing bushings. Replace non-insulated bushings with insulated bushings on raceway sizes 1 inch and larger.
- G. Install vertical conductor supports to replace existing or missing vertical conductor supports.
- H. Install extension rings on existing boxes when the number of new conductors installed therein exceeds NFPA 70 requirements.
- I. Furnish the Owners' Representative with marked up drawings showing size and routing of existing raceways with number and size of new conductors installed therein. The drawings will be forwarded to the design engineer for verification of NFPA 70 compliance.

### 3.4 RACEWAYS FOR FUTURE USE (SPARE RACEWAYS AND EMPTY RACEWAYS)

- A. Draw fish tape through raceways in the presence of the Owners Representative to show that the raceway is clear of obstructions. Leave a pulling-in line in each spare and empty raceway.

### 3.5 RACEWAY SCHEDULE

- A. Rigid Ferrous Metal Conduit: Install in all locations unless otherwise specified or indicated on the drawings.

- B. Intermediate Ferrous Metal Conduit: May be installed in all dry and damp locations except:
  - 1. Hazardous areas.
  - 2. Where other type raceways are specified or indicated on the drawings.
- C. Electrical Metallic Tubing:
  - 1. May be installed concealed as branch circuit conduits above suspended ceilings where conduit does not support fixtures or other equipment.
  - 2. May be installed concealed as branch circuit conduits in hollow areas in dry locations, including:
    - a) Hollow concrete masonry units, except where cores are to be filled.
    - b) Drywall construction with sheet metal studs, except where studs are less than 3-1/2 inches deep.
  - 3. May be installed concealed as branch circuit conduits in drywall construction with sheet metal studs, except where studs are less than 3-1/2 inches deep.
- D. Liquid-tight Flexible Metal Conduit: Install equipment grounding conductor in liquid-tight flexible metal conduit and bond at each box or equipment to which conduit is connected:
  - 1. Use 1 to 3 feet of liquid-tight flexible metal conduit (UL listed and marked suitable for the installation's temperature and environmental conditions) for final conduit connection to:
    - a) Motors with weather-protected or totally enclosed housings.
    - b) Equipment subject to vibration (damp and wet locations).
    - c) Equipment requiring flexible connection for adjustment or alignment (damp and wet locations).
- E. Plastic Coated Rigid Metal Conduit: Use at locations indicated on drawings.

### 3.6 FITTINGS AND ACCESSORIES SCHEDULE

- A. General:
  - 1. Use fittings and accessories that have a temperature rating equal to, or higher than the temperature rating of the conductors to be installed within the raceway.
  - 2. Use zinc electroplate or hot dipped galvanized steel/malleable iron or cast iron alloy fittings and accessories in conjunction with ferrous raceways in dry and damp locations unless otherwise specified or indicated on the drawings.
  - 3. Use insulated grounding bushings or grounding wedges on ends of conduit for terminating and bonding equipment grounding conductors, when required, if cabinet or boxes are not equipped with grounding/bonding screws or lugs.



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4. Use caps or plugs to seal ends of conduits until wiring is installed to exclude foreign material.
  5. Use insulated grounding bushings on the ends of conduits that are not directly connected to the enclosure, such as stub-ups under equipment, etc., and bond between bushings and enclosure with equipment grounding conductor.
  6. Use expansion fittings where raceways cross expansion joints (exposed, concealed, buried).
  7. Use deflection fittings where raceways cross expansion joints that move in more than one plane.
  8. Use 2 locknuts and an insulated bushing on end of each conduit entering sheet metal cabinet or box in dry or damp locations.
  9. Plastic bushing may be used on 1/2- and 3/4-inch conduit in lieu of insulated bushing.
  10. Terminate conduit ends within cabinet/box at the same level.
- B. For Rigid and Intermediate Metal Conduit: Use threaded fittings and accessories. Use 3 piece conduit coupling where neither piece of conduit can be rotated.
- C. For Electrical Metallic Tubing: Use compression type connectors and couplings.
- D. For Flexible Metal Conduit: Use flexible metal conduit connectors.
- E. For Liquid-tight Flexible Metal Conduit: Use liquid-tight connectors.
- F. For Rigid Nonmetallic PVC Conduit: Use conduit manufacturer's standard fittings and accessories.
- G. For Plastic Coated Rigid Metal Conduit: Use conduit manufacturer's PVC coated fittings and accessories.

END OF SECTION 260533

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## SECTION 260534 - SURFACE RACEWAYS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract including the General and Supplementary Conditions of Division 1 of the Specification Sections, apply to the work of this section.

#### 1.2 SECTION INCLUDES

- A. Surface metal raceways.
- B. Wireways.

#### 1.3 REFERENCES

- A. NECA (National Electrical Contractors Association) Standard of Installation.
- B. NEMA WD 6 - Wiring Device Configurations.

#### 1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with NECA Standard of Installation.

#### 1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing Products specified in this Section with minimum (3) years' experience.

### PART 2 - PRODUCTS

#### 2.1 SURFACE METALLIC RACEWAY

- A. Single Branch Circuit
  - 1. One-piece raceway
  - 2. Color shall be Ivory
  - 3. Utilized for wall mounted phones and miscellaneous branch circuit power only.
  - 4. Provide internal and external 90-degree fittings with radius.
  - 5. Design Make: Mono Systems SMS700
  - 6. Acceptable Manufacturers:
    - a) Mono-Systems SMS700 Series.
    - b) Wiremold 700 Series.
- B. Provide miscellaneous boxes, extension rings, fittings and supports designed and manufactured by the raceway manufacturer as required making a complete job.

## 2.2 WIREWAY

- A. Manufacturers:
  - 1. Square D.
  - 2. Substitutions: Refer to Division 1.
- B. Description: General purpose, Oil-tight, dust-tight, and Rain-tight type wireway.
- C. Knockouts: Manufacturer's standard.
- D. Size: As indicated on Drawings.
- E. Cover: Hinged cover.
- F. Connector: Flanged.
- G. Fittings: Lay-in type with removable top, bottom, and side; captive screws.
- H. Finish: Rust inhibiting primer coating with gray enamel finish.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Support with expansion anchors, concrete inserts, masonry inserts or toggle bolts as field conditions require. Provide supports at five foot centers.
- B. Install a separate green ground conductor in raceway from the junction box where surface raceway begins to the ground terminal of the device, fixture or equipment being supplied.
- C. Provide all fittings, connectors, elbows, tees, boxes etc. as required for the installation.
- D. Submit factory drawings detailing the installation. Include a complete part list.
- E. Raceway shall be factory painted. Touch up raceway and outlet boxes as required upon completion of installation.
- F. Provide new covers and device brackets in areas where existing raceway is called for reuse. Paint raceway to match existing upon completion.
- G. Provide all required conduit entrance end fittings and elbows required for a complete installation.
- H. Raceway shown on plans is diagrammatical only. Route raceway around existing room features as required.

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- I. Where existing conduits, pipes and other obstacles interfere with the installation of new raceway at 90 degree angles, provide bridge fittings to traverse the obstacle without rerouting. If this is not possible reroute the surface raceway or the existing raceway as directed by owners' representative.
- J. Install Products in accordance with manufacturer's instructions.
- K. Use flat-head screws, clips, and straps to fasten raceway channel to surfaces. Mount plumb and level. This shall be done for WM400BAC as well, even though raceway comes with adhesive.
- L. Use suitable insulating bushings and inserts at connections to outlets and corner fittings.
- M. Wireway Supports: Provide steel channel as specified in section 260190.
- N. Close ends of wireway and unused conduit openings.
- O. Ground and bond under provisions of section 260526.

END OF SECTION 260534

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## SECTION 260540 - BOXES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract including the General and Supplementary Conditions of Division 1 of the Specification Sections, apply to the work of this section.

#### 1.2 WORK INCLUDES

- A. Outlet boxes.
- B. Pull and junction boxes.
- C. Terminal and Equipment Cabinets in Non Hazardous Locations.

#### 1.3 REFERENCES

- A. NECA - Standard of Installation.
- B. NEMA FB 1 - Fittings and Supports for Conduit and Cable Assemblies.
- C. NEMA OS 1 - Sheet-steel Outlet Boxes, Device Boxes, Covers, and Box Supports.
- D. NEMA OS 2 - Nonmetallic Outlet Boxes, Device Boxes, Covers and Box Supports.
- E. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
- F. NFPA 70 - National Electrical Code.

#### 1.4 REGULATORY REQUIREMENTS

- A. Conform to requirements of NFPA 70.
- B. Provide Products listed and classified by Underwriters Laboratories, Inc. as suitable for the purpose specified and indicated.

#### 1.5 SUBMITTALS FOR REVIEW

- A. Provide Product Data for the following:
  - 1. Outlet Boxes
  - 2. Pull and junction boxes
  - 3. Floor boxes.
  - 4. Terminal and Equipment Cabinets in Non Hazardous Locations.

## PART 2 - PRODUCTS

### 2.1 OUTLET BOXES

- A. Sheet Metal Outlet Boxes: NEMA OS 1, galvanized steel. Not less than 1-1/2" deep, 4" square or octagonal, with knockouts. Outlet boxes exposed to moisture, exterior, wet or damp locations shall be cadmium cast alloy complete with threaded hubs and gasketed screw fastened covers. Minimum box size shall be as indicated in Article 314 of the National Electrical Code for the conductors and devices installed. Boxes shall be approved for the environmental condition of the location where they will be installed.
- B. Luminaire and Equipment Supporting Boxes: Rated for weight of equipment supported; include 1/2" male fixture studs where required.
- C. Acceptable manufacturers:
  - 1. Steel City
  - 2. Raco
  - 3. Appleton
  - 4. Crouse Hinds

### 2.2 PULL AND JUNCTION BOXES

- A. Sheet Metal Boxes: NEMA OS 1, galvanized steel. Shall be constructed of not less than 14 gauge galvanized steel with trim for flush or surface mounting in accordance with the location to be installed. Provide screw-on type covers. Boxes installed in damp or wet locations shall be of raintight construction with gasketed cover and threaded conduit hubs. In no case shall boxes be sized smaller than as indicated in Article 314 of the National Electrical Code for conduit and conductor sizes installed. Boxes shall be approved for the environmental condition of the location where they will be installed.

### 2.3 TERMINAL AND EQUIPMENT CABINETS IN NON HAZARDOUS LOCATIONS

- A. Steel Equipment Cabinets shall be code gauge galvanized steel with removable end walls. Fronts shall be of code gauge steel, flush or surface type (as indicated) with concealed trim clamps, concealed hinges, flush lock, and grey baked enamel finish. Boxes and front shall be U.L. listed and shall be minimum 24"H x 24"W x 6"D or as called for on plans. Provide provisions for terminal board mounted on inside back wall of cabinet as required.
- B. Fiber glass equipment cabinets shall be Compression-molded fiberglass for chemical and temperature-resistance. Gasketed for water-tight and dust-tight seal. Polyester mounting brackets and stainless steel attachment screws, molded-in-place threaded brass inserts and plated steel screws for mounting optional panels and terminal block kits. Removable hinged cover attached to body with Type 316 stainless steel hinge pin or Screw-cover enclosure secured with two captivated Type 316 stainless steel slotted cover screws.

- C. Stainless Steel terminal and equipment cabinets shall have continuous hinge, seamless foam-in-place gasket and stainless steel screw-down clamps for a reliable seal that protects components from corrosive environments. 14 gauge Type 304 stainless steel with seams continuously welded and ground smooth, seamless foam-in-place gasket. Weldnuts for mounting optional panels and terminal block kits. Provide bonding provision on door and body.
- D. Poly carbonate boxes shall be non-glass-filled polyester material offers superior UV resistance. Chemical resistance to a broad range of solvents, alkalis and acids. Crack and impact resistant. Shall be recyclable.
- E. Provide following accessories and options where called for.
  - 1. Continuous hinged door (unless otherwise noted provide screw type covers).
  - 2. Scratch-resistant polycarbonate windows permanently bonded in place.
  - 3. Quick-release latches and corrosion-resistant polyester latches located in corners that provide unobstructed access to enclosure.
  - 4. Padlock provisions in latch.
- F. Provide the NEMA type listed below as required for the environment and use:
  - 1. Type 1: for indoor use to provide a degree of protection to personnel against access to hazardous parts and to provide a degree of protection of the equipment inside the enclosure against ingress of solid foreign objects (falling dirt).
  - 2. Type 3R: for either indoor or outdoor use to provide a degree of protection to personnel against access to hazardous parts; to provide a degree of protection of the equipment inside the enclosure against ingress of solid foreign objects (falling dirt); to provide a degree of protection with respect to harmful effects on the equipment due to the ingress of water (rain, sleet, snow); and that will be undamaged by the external formation of ice on the enclosure.
  - 3. Type 4X: for either indoor or outdoor use to provide a degree of protection to personnel against access to hazardous parts; to provide a degree of protection of the equipment inside the enclosure against ingress of solid foreign objects (windblown dust); to provide a degree of protection with respect to harmful effects on the equipment due to the ingress of water (rain, sleet, snow, splashing water, and hose directed water); that provides an additional level of protection against corrosion; and that will be undamaged by the external formation of ice on the enclosure.
  - 4. Type 12: for indoor use to provide a degree of protection to personnel against access to hazardous parts; to provide a degree of protection of the equipment inside the enclosure against ingress of solid foreign objects (falling dirt and circulating dust, lint, fibers, and flyings); and to provide a degree of protection with respect to harmful effects on the equipment due to the ingress of water (dripping and light splashing).



G. Acceptable Manufacturers:

1. Hoffman
2. Thomas & Betts
3. Wiegmann
4. Appleton

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify locations of boxes and outlets prior to rough in. Thoroughly examine the architectural elevations and millwork shop drawings.
- B. If outlets are not specifically shown on elevations and there is millwork or equipment associated with the outlets issue an RFI prior to rough in.

3.2 INSTALLATION

- A. Install boxes in accordance with NECA "Standard of Installation."
- B. Install in locations as shown on Drawings, and as required for splices, taps, wire pulling, equipment connections and compliance with regulatory requirements. Install junction and pull boxes in readily accessible locations. Access to boxes shall not be blocked by equipment, piping, ducts and the like. Provide all necessary junction or pull boxes required due to field conditions and size as required by the National Electrical Code.
- C. Consider location of outlets shown on drawings as approximate only. Study architectural, process piping, mechanical, plumbing, structural, roughing-in, etc., drawings and note surrounding areas in which each outlet is to be located. Locate outlet so that when fixtures, motors, cabinets, equipment, etc., are placed in position, outlet will serve its desired purpose. Where conflicts are noted between drawings, contact Owner's Representative for decision prior to installation. Comply with Article 314 of National Electrical Code relative to position of outlet boxes in finished ceilings and walls. Adjust box location up to 10 feet if required to accommodate intended purpose.
- D. Orient boxes to accommodate wiring devices oriented as specified in Section 262726.
- E. Maintain headroom and present neat mechanical appearance.
- F. Install pull boxes and junction boxes above accessible ceilings and in unfinished areas only.
- G. Install boxes to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Division 1.
- H. Coordinate mounting heights and locations of outlets mounted above counters, benches, and backsplashes.

- I. Locate outlet boxes to allow luminaires positioned as shown on reflected ceiling plan.
- J. Align adjacent wall mounted outlet boxes for switches, thermostats, and similar devices.
- K. Do not install flush mounting box back to back in walls; provide minimum 6" separation.
- L. Do not fasten boxes to ceiling support wires.
- M. Support boxes independently of conduit.
- N. Outlet boxes installed in plaster, gypsum board or wood paneled walls shall be installed with raised plaster covers or raised tile covers. Use gang box where more than one device is mounted together. Do not use sectional box.
- O. Use gang box with plaster ring for single device outlets.
- P. Use cast outlet box in exterior locations exposed to the weather and wet locations.
- Q. Outlet boxes shall be sized to accommodate the wiring device(s) to be installed.
- R. Outlet boxes installed in tile, brick or concrete block walls shall be installed with extra-deep type raised tile covers or shall be 3-1/2" deep boxes with square corners and dimensions to accommodate conductors installed.
- S. Surface ceiling mounted outlet boxes shall be minimum 4" square, 1-1/2" deep, galvanized sheet metal.
- T. Surface wall mounted outlet boxes shall be cast type boxes having threaded or compression type thread less hubs. Exterior boxes shall be cast type with threaded hubs and gasketed cover plates secured by non-ferrous screws.
- U. Floor outlet boxes shall be installed flush with finished floor, adjust level and tilt as required. Where finished floor is terrazzo, provide boxes specifically designed for installation in terrazzo. Where floors are to receive carpet, provide floor outlet with carpet flange.

### 3.3 INTERFACE WITH OTHER PRODUCTS

- A. Coordinate installation and location of outlet box for equipment with equipment supplier and other trades as applicable.
- B. Cut boxes in millwork using methods approve by manufacturer and architect.

### 3.4 ADJUSTING

- A. Adjust flush mounting outlets to make front flush with finished wall material.
- B. Adjust vertical and horizontal alignment of boxes as required.

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- C. Install knockout closures in unused box openings.

### 3.5 CLEANING

- A. Clean interior of boxes to remove dust, debris, and other material.
- B. Clean exposed surfaces and restore finish.

END OF SECTION 260549

## SECTION 262400 - POWER DISTRIBUTION

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract including the General and Supplementary Conditions of Division 1 of the Specification Sections, apply to the work of this section.

#### 1.2 SECTION INCLUDES

- A. Circuit Breakers
- B. Branch Circuit Panelboards
- C. Disconnects

#### 1.3 REFERENCES

- A. The equipment referenced herein are designed and manufactured according to the following appropriate specifications.
  - 1. ANSI/NFPA70 - National Electric Code (NEC).
  - 2. ANSI/IEEE C12.1 - Code for Electricity Metering.
  - 3. ANSI C39.1 - Electrical Analog Indicating Instruments.
  - 4. ANSI C57.13 - Instrument Transformers.
  - 5. NEMA AB 1 - Molded Case Circuit Breakers and Molded Case Switches.
  - 6. NEMA KS 1 - Enclosed Switches.
  - 7. NEMA PB 2 - Deadfront Distribution Switchboards, File E8681.
  - 8. NEMA PB 2.1 - Proper Handling, Installation, Operation & Maintenance of Deadfront Switchboards Rated 600V or Less.
  - 9. NEMA PB 2.2 - Application Guide for Ground Fault Protective Devices for Equipment.
  - 10. UL 50 - Cabinets and Boxes.
  - 11. UL 98 - Enclosed and Deadfront Switches.
  - 12. UL 489 - Molded Case Circuit Breakers.
  - 13. UL 891 - Dead Front Switchboards.
  - 14. UL 943 - Ground Fault Circuit Interrupters.
  - 15. UL 1053 - Ground Fault Sensing and Relaying Equipment.
  - 16. UL 977 - Fused Power Circuit Devices.
  - 17. CSA 22.2 No. 5 - M1986 Molded Case Circuit Breakers.
  - 18. Federal Specification W-C-375B/Gen - Circuit Breakers, Molded Case, Branch Circuit and Service.
  - 19. Federal Specification W-C-870 - Fuseholders (for plug and enclosed cartridge fuses).

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- 20. Federal Specification W-S-865 - Enclosed Knife Switch.
- 21. NECA Standard of Installation (published by the National Electrical Contractors Association).
- 22. NETA ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment (published by the International Electrical Testing Association).
- 23. NFPA 70 - National Electrical Code.

#### 1.4 SUBMITTAL FOR REVIEW

- A. Shop Drawings: Indicate outline and support point dimensions, voltage, main bus ampacity, integrated short circuit ampere rating, circuit breaker arrangement and sizes.

#### 1.5 SUBMITTALS FOR CLOSEOUT

- A. Maintenance Data: Include spare parts listing; source of replacement parts and supplies; and recommended maintenance procedures and intervals.

#### 1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum (10) years' experience.

#### 1.7 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store, protect and handle products in conformance with manufacturer's recommended practices as outline in applicable Installation and Maintenance Manuals.
- B. Each switchboard section shall be delivered in individual shipping splits for ease of handling. They shall be individually wrapped for protection and mounted on shipping skids.
- C. Inspect and report concealed damage to carrier within their required time period.
- D. Store in a clean, dry space. Maintain factory protection and/or provide an additional heavy canvas or heavy plastic cover to protect structure from dirt, water, construction debris, and traffic. Where applicable, provide adequate heating within enclosures to prevent condensation.
- E. Handle in accordance with NEMA PB 2.1 and manufacturer's written instructions. Lift only by lifting means provided for this express purpose. Handle carefully to avoid damage to switchboard internal components, enclosure, and finish.

## PART 2 - PRODUCTS

### 2.1 CIRCUIT BREAKERS

#### A. General:

1. Molded case circuit breakers shall be constructed of a glass reinforced insulating material. All current carrying components shall be completely insulated and isolated from the outside of the circuit breaker.
2. Provide an over-center, trip-free handle to provide quick-make, quick-break contact action.
3. Provide multi-pole breakers with common trip.
4. When the circuit breaker has tripped, the handle shall move to a position between the "on" and "off" positions. Provide a visual indication that the circuit breaker has tripped.
5. The ampere rating shall be clearly marked on the face of the circuit breaker.
6. Make provisions to add circuit breaker handle locks.
7. Circuit breakers shall have voltage, ampere, and interrupting ratings as called for on the Panelboard Schedule.

#### B. Thermal Magnetic Molded Case Branch Circuit Breakers:

1. Permanent trip unit containing individual thermal and magnetic trip elements.
2. Thermal trip unit shall be long time, non-adjustable, thermal overload trip.
3. Magnetic trip unit shall be instantaneous, electro-magnetic trip. Magnetic trip unit shall be adjustable for all frame sizes 225 amperes and larger.
4. Interchangeable rating plugs shall be provided for all frame sizes 400 amperes and larger.
5. 60°C terminal temperature rating for circuit breakers rated 125 amperes or below.
6. 75°C terminal temperature rating for circuit breakers rated above 125 amperes.
7. All 20 and 30 ampere, single pole circuit breakers shall be UL listed for switching duty.

8. Circuit breakers shall be plug-on [bolt-on]. I-Line type distribution circuit breakers are acceptable.
9. Circuit breakers rated 250 amperes and below shall be UL listed HACR type.
10. Where ground fault circuit breakers are required, provide a shunt trip circuit breaker with a zero-sequence sensing ground fault module.
11. Design Make: Square D QO, QOB (250 volt), EH, EHB (480 volt), I-Line style (600 volt).
12. Acceptable Manufacturers:
  - a) Square D.
  - b) General Electric.
  - c) Siemens ITE.

## 2.2 240 VOLT BRANCH CIRCUIT PANELBOARDS

- A. 240 Volt rated, maximum 400 amperes.
- B. 3 Phase, 4 wire or 1 phase, 3 Wire as called for on panel schedule.
- C. Copper bus bars with high dielectric thermoplastic insulators.
- D. Provide continuous current ratings, short circuit current ratings, branch circuit breakers, main circuit breaker or main lugs, and flush or surface trims as called for on the Panelboard schedule.
- E. Provide nameplate on each panelboard indicating voltage, current, phase, wire, and short circuit rating.
- F. 100 % rated neutral of the same material as the main bus.
- G. Provide ground bus of the same material as the main bus.
- H. Interior trim shall be dead front construction, with pre-formed metal twist-outs covering unused mounting space.
- I. Enclosures shall be nominal 20" wide by 6" deep, galvanized steel construction with removable endwalls and knockouts.
- J. Fronts:
  1. Surface or flush mounted as called for on the Panelboard Schedule.
  2. ANSI 49 gray electrodeposited enamel.



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PRJ 201 Oakside Elementary  
PRJ 202 Uriah Hill School  
PRJ 203 Woodside School  
PRJ 204 Middle School

The City School District of Peekskill  
SED 66-15-00-01-0-005-020  
SED 66-15-00-01-0-007-014  
SED 66-15-00-01-0-008-017  
SED 66-15-00-01-0-014-005

3. Fronts shall be one piece with door and hinged to the enclosure.
4. Provide cylindrical tumbler type lock with catch and spring-loaded stainless-steel door pull. All locks shall be keyed alike to match existing panelboards.
5. Provide a clear plastic directory card holder on the inside of the door.

K. Design Make: Square D "NQ".

L. Acceptable Manufacturers:

1. Square D "NQ".
2. General Electric "A" Series.
3. Siemens ITE "Sentron S1".

## 2.3 DISCONNECT SWITCHES

- A. Three pole, single throw, or as called for on the drawings.
- B. Quick-make, quick-break switch operating mechanism.
- C. Heavy-duty, current rating as called for on the drawings, voltage rating as required by the equipment served.
- D. All current carrying parts shall be plated to resist corrosion.
- E. Lugs shall be removable and rated for 75°C temperature rating.
- F. Switch blades shall be visible when the switch is in the open position and the door is open.
- G. Switch shall be padlockable in the OFF and ON positions.
- H. Provide fusible switches with rejection type fuse holders and fuses as indicated on the plans or as per fed equipment requirements.
- I. Provisions for a field installable electrical interlock.
- J. Provide external override mechanism to open the disconnect switch door without opening the disconnect switch.
- K. Enclosure shall be steel with gray baked enamel paint.
- L. Provide NEMA type enclosures as called for on the drawings.
- M. NEMA type 1 enclosures shall be equipped with knockouts.

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SED 66-15-00-01-0-014-005

- N. Design Make: Square D.
- O. Acceptable Manufacturers:
  - 1. Square D.
  - 2. General Electric.
  - 3. Siemens ITE.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. Install equipment to coordinate with installation details of other equipment associated with the power distribution system.
- B. Provide miscellaneous bolts, washers, nuts, clips, lockwashers, small hardware, etc., of durium or equal rust resistant material, to make a complete installation.
- C. Provide complete installation in strict accordance with the equipment manufacturer's instructions, drawings and recommendations and as called for.
- D. In the event of conflict, discrepancy or difference between manufacturer's instructions and Contract Documents, the more stringent requirements shall apply.
- E. Unload, move, handle, set in place, install, erect, assemble, connect, test, and operate, etc. all items of electrical equipment as required.
- F. Provide rigging to unload, move, transport, set in place, erect, etc. the switchboards.
- G. Provide grounding as called for.
- H. Provide minimum working clearance as described in NEC Article 110-26 and 110-34 for all electric equipment.
- I. Provide additional working or aisle clearance as called for.
- J. Verify cable/lug sizes for terminations. Where a feeder is sized larger than the lug, provide in-line splice to reduce conductor size to match equipment or breaker terminations.

#### 3.2 INSTALLATION OF PANELBOARDS

- A. Install panelboards in accordance with NEMA PB 1.1 and the NECA "Standard of Installation."

- B. Install panelboards plumb. Install recessed panelboards flush with wall finishes.
- C. Height: 6 feet to top of panelboard if possible. If required, install panelboard with the so that the center operating grip of the top breaker is not more than 6'-7" above the finish floor.
- D. Provide filler plates for unused spaces in panelboards.
- E. Provide typed circuit directory for each branch circuit panelboard. Revise directory to reflect circuiting changes required to balance phase loads.
- F. Provide engraved plastic nameplates under the provisions of section 260195.
- G. Provide spare conduits out of each recessed panelboard to an accessible location above ceiling. Minimum spare conduits: (5) 3/4". Identify each as SPARE.
- H. Ground and bond panelboard enclosure according to section 260526.
- I. Securely support all panelboard enclosures to walls. Install true and level.
- J. Provide four empty 3/4" conduits and one empty 1-1/2" conduit from each flush mounted panelboard backbox to the accessible ceiling space.
- K. Provide channel support between the wall and backbox for panelboards installed on outside walls.
- L. Tighten all bolt and lug connections using a torque wrench or screwdriver per the manufacturer's recommendations.
- M. Measure steady state load currents on each panelboard feeder. Rearrange branch circuits in the panelboard to balance the load within 20% of each other. Maintain proper phasing.
- N. For buildings with more than one nominal voltage system, provide permanently post label at each panelboard indicating the color coding of all phase, neutral, and grounding conductors.

### 3.3 FIELD QUALITY CONTROL

- A. Inspect and test in accordance with NETA ATS, except Section 4.
- B. Perform inspections and tests listed in NETA ATS, Section 7.4 for switches, and Section 7.5 for circuit breakers.

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### 3.4 ADJUSTING

- A. Measure steady state load currents at each panelboard feeder; rearrange circuits in the panelboard to balance the phase loads to within 20% of each other. Maintain proper phasing for multi-wire branch circuits.

END OF SECTION 262400