Volume 1 of 1

BID SET ISSUANCE : DECEMBER 15, 2022

PROJECT MANUAL

Nanuet Union Free School District

Nanuet Bond Projects Phase 2

103 Church Street, Nanuet, NY 10954

SED Control Numbers:
Nanuet HS School: 50-01-08-03-0-003-034
Barr Middle School: 50-01-08-03-0-004-019
G.W. Miller Elementary School: 50-01-08-03-0-001-023
Highview Elementary School: 50-01-08-03-0-002-019

Architect: KSQ Design dba KSQ Architects P.C. 215 West 40th Street, 15th Floor New York, NY 10018 T. 646.435.0660	**MEP Engineer**: Sage Engineering LLP 9 Columbia Circle Albany, NY 12203 T. 518.453.6091
Civil Engineer / Landscape Architect: LaBella Associates 4 British American Boulevard Latham, NY 12110 T. 518.266.7373	**Environmental Engineer**: Green Path Environmental, INC. 79 Grover Street, Suite 1 Staten Island, NY 10308 T. 347.276.2339
Structural Engineer: Clapper Structural Engineering 160 Partition Street Saugerties, NY 12477 T. 845.943.9601	**Construction Manager**: Jacobs One Penn Plaza 54th Floor, Suite 5420 New York, NY 10119 T. 646.908.6550
Owner: Nanuet Union Free School District 101 Church Street Nanuet, NY 10308 T. 845.343.1481	**Design conforms to applicable provisions of the New York State Uniform Fire Prevention and Building Code, New York State Energy Conservation Construction Code, and NY State Education Department Building Standards**

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DIVISION 3 – CONCRETE

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DIVISION 27 – COMMUNICATIONS

END OF SECTION 00 01 10

SECTION 00 0301 – REQUEST FOR CLARIFICATION

Project Name: **Nanuet UFSD**
Nanuet Bond Projects-Phase 2

Contractor Name: _____

Respond to: _____

Fax Number: _____

Address: _____

_____

Subject: _____

Drawing/Reference No.: _____

Request: _____

_____

_____

_____

Reply: _____

_____

_____

_____

_____

By: _____ Date: _____

Request to: **KSQ Design**
Attn: Ofe Clarke
Email: oclarke@ksq.design

END OF SECTION 00 0301

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SECTION 00 0300 - NOTICE TO BIDDERS

PART 1 - GENERAL

1.1 The Nanuet Union Free School District, Rockland County, NY, invites bid proposals for the following:

NUFSD Phase 2 Capital Projects:

A. Nanuet High School

1. Building Envelope Projects: (BE-01)
2. Site Work Projects: (SW-01)
3. Security Vestibule Addition Project: (GC-01, MC-01, EC-01)
4. Science Lab Renovation Project: (GC-01, MC-01, EC-01, PC-01)

B. Barr Middle School

1. Building Envelope Projects: (BE-01)
2. Site Work Projects: (SW-01)
3. Security Vestibule Project: (GC-02, MC-02, EC-01)
4. STEM Lab Renovation Project: (GC-02, MC-02, EC-01, PC-01)

C. Miller Elementary School

1. Site Work Projects: (SW-01)
2. Playground Project: (SW-01)
3. Switchgear Replacement Project: (EC-01)
4. Toilet Room Renovation Projects: (GC-03, MC-02, EC-01, PC-01)

D. Highview Elementary School

1. Site Work Projects: (SW-01)

1.2 CONTRACTS:

A. Separate Prime Contracts will be let for:

1. Site Work Construction – (SW-01)
2. Exterior Building Envelope Construction – (BE-01)
3. General Construction #1 – (GC-01)
4. General Construction #2 – (GC-02)
5. General Construction #3 – (GC-03)
6. Electrical Contract #1– (EC-01)
7. Mechanical Contract #1– (MC-01)
8. Mechanical Contract #2– (MC-02)
9. Plumbing Contract #1 – (PC-01)

1.3 SCHEDULE:

A. Bidding Documents Available:

1. At **12:00 p.m. on December 15, 2022** Bidding Documents for the proposed project will be on file and publicly exhibited online at **www.usinglesspaper.com**
2. Copies of said Bidding Documents can be obtained from **Rev Plans, 28 Church Street, Unit #7, Warwick, NY 10990** or **www.usinglesspaper.com**
3. Digital Download: Bid documents can be downloaded for **Forty Nine Dollars ($49.00).** Non-refundable fee payable by credit card from www.usinglesspaper.com .
4. Hard Copy Drawings: $ 100 refundable upon return of set in good condition. Make checks or Money Orders payable to Nanuet Union Free School District.
5. Any bidder requiring documents to be shipped shall make arrangements with the printer and pay for all packaging and shipping costs.
6. All bid addenda will be transmitted to registered plan holders via email and will be available at **www.usinglesspaper.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 the printer 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.

B. Pre-Bid Conference:

1. Date & Time: Wednesday, December 21, 2022 1:00 PM
2. Location: Nanuet Senior High School
3. Address: 103 Church street, Nanuet, NY 10954
4. Prospective bidders are strongly encouraged to attend.

C. Bid Due Date:

1. Sealed proposals will be received as indicated below, and at that time and place will be publicly opened and read aloud in the administrative conference room. All bidders shall comply with the General Municipal Law (103).
2. Date: Thursday, January 19, 2023
3. Time: 1:30 PM (local time)
4. Location: Nanuet Union Free School District Business office
5. Address: 101 Church Street, Nanuet, NY, 10954

D. Request for Information:

1. All pre-bid "Request For Information" (RFI) or Clarification must be submitted NO LATER THAN **Wednesday, January 11, 2023 by 12:00pm (noon)**

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 PROVISIONS:

A. Wages to workers, laborers and mechanics employed to work on this project, shall be paid in accordance with Section 220 of the Labor Law, and in accordance with the Prevailing Rate Schedules (PRC # found in the Project Manual) and proof of such payments will be required.

B. Each bid for <u>each</u> Contract must be identified, in typed format, on the outside of a sealed manila envelope, with the name and address of the bidder and designated as bid for the Project titled above and appropriate Contract number and name titled above. The Nanuet Union Free School District is not responsible for bids opened prior to the bid opening if bid contract number and opening date do not appear on the envelope. Bids opened prior to date and time indicated are invalid. The bidder assumes the risk of any delay in the mail, or in the handling of the mail by employees of the Nanuet Union Free School District, as well as improper hand delivery.

C. Each proposal must be accompanied by a certified check in the sum of five percent (5%) of the amount of the bid, drawn upon a National or State Bank or Trust Company, payable

to the order of the Nanuet Union Free School District, or a bond from a surety licensed to practice business in the State of New York with sufficient sureties in a penal sum equal to five percent (5%) of the bid, conditioned that if this bid is accepted, successful bidder will enter into a contract for the same and that he will execute such further security as may be required for the performance of the contract.

D. A separate Performance Bond, equal to one hundred percent (100%) of the contract amount will also be required of the successful bidders, and the bond shall be from a surety licensed to practice business in the State of New York, satisfactory to the School Board.

E. A separate Payment Bond, equal to one hundred percent (100%) of the contract sum will also be required of the successful bidders, and the bond shall be from a surety licensed to practice business in the State of New York, satisfactory to the School Board.

F. The bidders to whom the above referenced contracts may be awarded, shall within seven (7) days after the date of notification of the acceptance of their proposal, provide insurance and security as required by the above referenced contracts in a form acceptable by the Owner. In case of the bidders' failure to do so, or in case of the bidders' failure to give further security as herein prescribed, the bidders will be considered as having abandoned the same, and the certified check or other bid security accompanying the proposal shall be forfeited to the School District.

G. Each bidder shall agree to hold his/her bid price for forty -five (45) days after the formal bid opening

H. By Order of the Nanuet Union Free School District

1. Dated: December 15, 2023

2. Mr. Mario Spagnuolo, Attorney/Asst. Superintendent of Business

END OF SECTION 00 0300

AIA® Document A701™ – 2018

Instructions to Bidders

for the following Project:
(Name, location, and detailed description)

NANUET UNION FREE SCHOOL DISTRICT
NANUET BOND PROJECTS PHASE 2
Nanuet HS School: 50-01-08-03-0-003-034
Barr Middle School: 50-01-08-03-0-004-019
G.W. Miller Elementary School: 50-01-08-03-0-001-023
Highview Elementary School: 50-01-08-03-0-002-019

THE OWNER:
(Name, legal status, address, and other information)

Nanuet Union Free School District
101 Church Street
Nanuet, N.Y. 10954

THE ARCHITECT:
(Name, legal status, address, and other information)

KSQ Architects
215 W 40th Street
Floor 15
New York, NY 10018
T. 914.682.3700

TABLE OF ARTICLES

ADDITIONS AND DELETIONS:
The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

FEDERAL, STATE, AND LOCAL LAWS MAY IMPOSE REQUIREMENTS ON PUBLIC PROCUREMENT CONTRACTS. CONSULT LOCAL AUTHORITIES OR AN ATTORNEY TO VERIFY REQUIREMENTS APPLICABLE TO THIS PROCUREMENT BEFORE COMPLETING THIS FORM.

It is intended that AIA Document G612™–2017, Owner's Instructions to the Architect, Parts A and B will be completed prior to using this document.

ARTICLE 1 DEFINITIONS

§ 1.1 Bidding Documents include the Bidding Requirements and the Proposed Contract Documents. The Bidding Requirements consist of the advertisement or invitation to bid, Instructions to Bidders, supplementary instructions to bidders, the bid form, and any other bidding forms. The Proposed Contract Documents consist of the unexecuted form of Agreement between the Owner and Contractor and that Agreement's Exhibits, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, all Addenda, and all other documents enumerated in Article 8 of these Instructions.

§ 1.2 Definitions set forth in the General Conditions of the Contract for Construction, or in other Proposed Contract Documents apply to the Bidding Documents.

§ 1.3 Addenda are written or graphic instruments issued by the Architect, which, by additions, deletions, clarifications, or corrections, modify or interpret the Bidding Documents.

§ 1.4 A Bid is a complete and properly executed proposal to do the Work for the sums stipulated therein, submitted in accordance with the Bidding Documents.

§ 1.5 The Base Bid is the sum stated in the Bid for which the Bidder offers to perform the Work described in the Bidding Documents, to which Work may be added or deleted by sums stated in Alternate Bids.

§ 1.6 An Alternate Bid (or Alternate) is an amount stated in the Bid to be added to or deducted from, or that does not change, the Base Bid if the corresponding change in the Work, as described in the Bidding Documents, is accepted.

§ 1.7 A Unit Price is an amount stated in the Bid as a price per unit of measurement for materials, equipment, or services, or a portion of the Work, as described in the Bidding Documents.

§ 1.8 A Bidder is a person or entity who submits a Bid and who meets the requirements set forth in the Bidding Documents.

§ 1.9 A Sub-bidder is a person or entity who submits a bid to a Bidder for materials, equipment, or labor for a portion of the Work.

ARTICLE 2 BIDDER'S REPRESENTATIONS

§ 2.1 By submitting a Bid, the Bidder represents that:

- **.1** the Bidder has read and understands the Bidding Documents;
- **.2** the Bidder understands how the Bidding Documents relate to other portions of the Project, if any, being bid concurrently or presently under construction;
- **.3** the Bid complies with the Bidding Documents;
- **.4** the Bidder has visited the site, become familiar with local conditions under which the Work is to be performed, and has correlated the Bidder's observations with the requirements of the Proposed Contract Documents;
- **.5** the Bid is based upon the materials, equipment, and systems required by the Bidding Documents without exception; and
- **.6** the Bidder has read and understands the provisions for liquidated damages, if any, set forth in the form of Agreement between the Owner and Contractor.

ARTICLE 3 BIDDING DOCUMENTS

§ 3.1 Distribution

§ 3.1.1 Bidders shall obtain complete Bidding Documents, as indicated below, from the issuing office designated in the advertisement or invitation to bid, for the deposit sum, if any, stated therein.
(Indicate how, such as by email, website, host site/platform, paper copy, or other method Bidders shall obtain Bidding Documents.)

§ 3.1.2 Any required deposit shall be refunded to Bidders who submit a bona fide Bid and return the paper Bidding Documents in good condition within ten days after receipt of Bids. The cost to replace missing or damaged paper documents will be deducted from the deposit. A Bidder receiving a Contract award may retain the paper Bidding Documents, and the Bidder's deposit will be refunded.

§ 3.1.3 Bidding Documents will not be issued directly to Sub-bidders unless specifically offered in the advertisement or invitation to bid, or in supplementary instructions to bidders.

§ 3.1.4 Bidders shall use complete Bidding Documents in preparing Bids. Neither the Owner nor Architect assumes responsibility for errors or misinterpretations resulting from the use of incomplete Bidding Documents.

§ 3.1.5 The Bidding Documents will be available for the sole purpose of obtaining Bids on the Work. No license or grant of use is conferred by distribution of the Bidding Documents.

§ 3.2 Modification or Interpretation of Bidding Documents

§ 3.2.1 The Bidder shall carefully study the Bidding Documents, shall examine the site and local conditions, and shall notify the Architect of errors, inconsistencies, or ambiguities discovered and request clarification or interpretation pursuant to Section 3.2.2.

§ 3.2.2 Requests for clarification or interpretation of the Bidding Documents shall be submitted by the Bidder in writing and shall be received by the Architect at least seven days prior to the date for receipt of Bids.
(Indicate how, such as by email, website, host site/platform, paper copy, or other method Bidders shall submit requests for clarification and interpretation.)

§ 3.2.3 Modifications and interpretations of the Bidding Documents shall be made by Addendum. Modifications and interpretations of the Bidding Documents made in any other manner shall not be binding, and Bidders shall not rely upon them.

§ 3.3 Substitutions

§ 3.3.1 The materials, products, and equipment described in the Bidding Documents establish a standard of required function, dimension, appearance, and quality to be met by any proposed substitution.

§ 3.3.2 Substitution Process

§ 3.3.2.1 Written requests for substitutions shall be received by the Architect at least ten days prior to the date for receipt of Bids. Requests shall be submitted in the same manner as that established for submitting clarifications and interpretations in Section 3.2.2.

§ 3.3.2.2 Bidders shall submit substitution requests on a Substitution Request Form if one is provided in the Bidding Documents.

§ 3.3.2.3 If a Substitution Request Form is not provided, requests shall include (1) the name of the material or equipment specified in the Bidding Documents; (2) the reason for the requested substitution; (3) a complete description of the proposed substitution including the name of the material or equipment proposed as the substitute, performance and test data, and relevant drawings; and (4) any other information necessary for an evaluation. The request shall include a statement setting forth changes in other materials, equipment, or other portions of the Work, including changes in the work of other contracts or the impact on any Project Certifications (such as LEED), that will result from incorporation of the proposed substitution.

§ 3.3.3 The burden of proof of the merit of the proposed substitution is upon the proposer. The Architect's decision of approval or disapproval of a proposed substitution shall be final.

§ 3.3.4 If the Architect approves a proposed substitution prior to receipt of Bids, such approval shall be set forth in an Addendum. Approvals made in any other manner shall not be binding, and Bidders shall not rely upon them.

§ 3.3.5 No substitutions will be considered after the Contract award unless specifically provided for in the Contract Documents.

§ 3.4 Addenda

§ 3.4.1 Addenda will be transmitted to Bidders known by the issuing office to have received complete Bidding Documents.

(Indicate how, such as by email, website, host site/platform, paper copy, or other method Addenda will be transmitted.)

§ 3.4.2 Addenda will be available where Bidding Documents are on file.

§ 3.4.3 Addenda will be issued no later than four days prior to the date for receipt of Bids, except an Addendum withdrawing the request for Bids or one which includes postponement of the date for receipt of Bids.

§ 3.4.4 Prior to submitting a Bid, each Bidder shall ascertain that the Bidder has received all Addenda issued, and the Bidder shall acknowledge their receipt in the Bid.

ARTICLE 4 BIDDING PROCEDURES

§ 4.1 Preparation of Bids

§ 4.1.1 Bids shall be submitted on the forms included with or identified in the Bidding Documents.

§ 4.1.2 All blanks on the bid form shall be legibly executed. Paper bid forms shall be executed in a non-erasable medium.

§ 4.1.3 Sums shall be expressed in both words and numbers, unless noted otherwise on the bid form. In case of discrepancy, the amount entered in words shall govern.

§ 4.1.4 Make no erasures, cross-outs, whiteouts, write-overs, obliterations, or changes of any kind in the Bid Form phraseology, in the entry of unit prices, or anywhere on the Bid form. Fill in all blanks spaces legibly. An illegible entry may disqualify the bid in its entirety. If a mistake is made, use a new Bid Form. No post bid meetings will be afforded to any bidder to explain or clarify illegible or changed entries.

§ 4.1.5 All requested Alternates shall be bid. If no change in the Base Bid is required, enter "No Change" or as required by the bid form.

§ 4.1.6 Where two or more Bids for designated portions of the Work have been requested, the Bidder may, without forfeiture of the bid security, state the Bidder's refusal to accept award of less than the combination of Bids stipulated by the Bidder. The Bidder shall neither make additional stipulations on the bid form nor qualify the Bid in any other manner.

§ 4.1.7 Each copy of the Bid shall state the legal name and legal status of the Bidder. As part of the documentation submitted with the Bid, the Bidder shall provide evidence of its legal authority to perform the Work in the jurisdiction where the Project is located. Each copy of the Bid shall be signed by the person or persons legally authorized to bind the Bidder to a contract. A Bid by a corporation shall further name the state of incorporation and have the corporate seal affixed. A Bid submitted by an agent shall have a current power of attorney attached, certifying the agent's authority to bind the Bidder.

§ 4.1.8 A Bidder shall incur all costs associated with the preparation of its Bid.

§ 4.2 Bid Security

§ 4.2.1 Each Bid shall be accompanied by a bid security in the form and amount required if so stipulated in the Instructions to Bidders. The Bidder pledges to enter into a Contract with the Owner on the terms stated in the Bid and will, if required, furnish bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder. Should the Bidder refuse to enter into such Contract or fail to furnish such bonds if required, the amount of the bid security shall be forfeited to the Owner as liquidated damages, not as a penalty. Each Bid shall be accompanied by the following bid security:

(Insert the form and amount of bid security.)

Five Percent (5%) of the contract sum of work

§ 4.2.2 The Bidder pledges to enter into a Contract with the Owner on the terms stated in the Bid and shall, if required, furnish bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder. Should the Bidder refuse to enter into such Contract or fail to furnish such bonds if required, the amount of the bid security shall be forfeited to the Owner as liquidated damages, not as a penalty. In the event the Owner fails to comply with Section 6.2, the amount of the bid security shall not be forfeited to the Owner.

§ 4.2.3 If a surety bond is required as bid security, it shall be written on AIA Document A310™, Bid Bond, unless otherwise provided in the Bidding Documents. The attorney-in-fact who executes the bond on behalf of the surety shall affix to the bond a certified and current copy of an acceptable power of attorney. The Bidder shall provide surety bonds from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located.

§ 4.2.4 The Owner will have the right to retain the bid security of Bidders to whom an award is being considered until (a) the Contract has been executed and bonds, if required, have been furnished; (b) the specified time has elapsed so that Bids may be withdrawn; or (c) all Bids have been rejected. However, if no Contract has been awarded or a Bidder has not been notified of the acceptance of its Bid, a Bidder may, beginning days after the opening of Bids, withdraw its Bid and request the return of its bid security.

§ 4.3 Submission of Bids

§ 4.3.1 A Bidder shall submit its Bid as indicated below:
(Indicate how, such as by website, host site/platform, paper copy, or other method Bidders shall submit their Bid.)

Paper Copy

§ 4.3.2 Paper copies of the Bid, the bid security, and any other documents required to be submitted with the Bid shall be enclosed in a sealed opaque envelope. The envelope shall be addressed to the party receiving the Bids and shall be identified with the Project name, the Bidder's name and address, and, if applicable, the designated portion of the Work for which the Bid is submitted. If the Bid is sent by mail, the sealed envelope shall be enclosed in a separate mailing envelope with the notation "SEALED BID ENCLOSED" on the face thereof.

§ 4.3.3 Bids shall be submitted by the date and time and at the place indicated in the invitation to bid. Bids submitted after the date and time for receipt of Bids, or at an incorrect place, will not be accepted.

§ 4.3.4 The Bidder shall assume full responsibility for timely delivery at the location designated for receipt of Bids.

§ 4.3.5 A Bid submitted by any method other than as provided in this Section 4.3 will not be accepted.

§ 4.4 Modification or Withdrawal of Bid

§ 4.4.1 Prior to the date and time designated for receipt of Bids, a Bidder may submit a new Bid to replace a Bid previously submitted, or withdraw its Bid entirely, by notice to the party designated to receive the Bids. Such notice shall be received and duly recorded by the receiving party on or before the date and time set for receipt of Bids. The receiving party shall verify that replaced or withdrawn Bids are removed from the other submitted Bids and not considered. Notice of submission of a replacement Bid or withdrawal of a Bid shall be worded so as not to reveal the amount of the original Bid.

§ 4.4.2 Withdrawn Bids may be resubmitted up to the date and time designated for the receipt of Bids in the same format as that established in Section 4.3, provided they fully conform with these Instructions to Bidders. Bid security shall be in an amount sufficient for the Bid as resubmitted.

§ 4.4.3 After the date and time designated for receipt of Bids, a Bidder who discovers that it made a clerical error in its Bid shall notify the Architect of such error within two days, or pursuant to a timeframe specified by the law of the jurisdiction where the Project is located, requesting withdrawal of its Bid. Upon providing evidence of such error to the reasonable satisfaction of the Architect, the Bid shall be withdrawn and not resubmitted. If a Bid is withdrawn pursuant to this Section 4.4.3, the bid security will be attended to as follows:
(State the terms and conditions, such as Bid rank, for returning or retaining the bid security.)

ARTICLE 5 CONSIDERATION OF BIDS

§ 5.1 Opening of Bids

If stipulated in an advertisement or invitation to bid, or when otherwise required by law, Bids properly identified and received within the specified time limits will be publicly opened and read aloud. A summary of the Bids may be made available to Bidders.

§ 5.2 Rejection of Bids

Unless otherwise prohibited by law, the Owner shall have the right to reject any or all Bids.

§ 5.3 Acceptance of Bid (Award)

§ 5.3.1 It is the intent of the Owner to award a Contract to the lowest responsive and responsible Bidder, provided the Bid has been submitted in accordance with the requirements of the Bidding Documents. Unless otherwise prohibited by law, the Owner shall have the right to waive informalities and irregularities in a Bid received and to accept the Bid which, in the Owner's judgment, is in the Owner's best interests.

§ 5.3.2 Unless otherwise prohibited by law, the Owner shall have the right to accept Alternates in any order or combination, unless otherwise specifically provided in the Bidding Documents, and to determine the lowest responsive and responsible Bidder on the basis of the sum of the Base Bid and Alternates accepted.

§5.3.3 A tie-bid is defined as an instance where bids are received from two or more Bidders who are the low responsive Bidders, and their offers are identical. It is the policy of the District to settle the outcome of tie-bids by either drawing a name from a hat or flipping a coin within 24 hours of the bid opening. All affected firms will be notified of the tie, the time and place of the resolution of the tie and shall be invited to witness the outcome. Attendance is not mandatory. The drawing/flip will be held at the District Administration Office. Two impartial witnesses will be provided and shall be present. All attendees will acknowledge the results of the tie-breaker on the bid tabulation sheet. All firms affected by the bids will be notified of the results. The results pursuant to this provision shall be considered final.

ARTICLE 6 POST-BID INFORMATION

§ 6.1 Contractor's Qualification Statement

Bidders to whom award of a Contract is under consideration shall submit to the Architect, upon request and within the timeframe specified by the Architect, a properly executed AIA Document A305™, Contractor's Qualification Statement, unless such a Statement has been previously required and submitted for this Bid.

§ 6.2 The apparent low bidder must submit the required pre-award submittal package described below to the Owner and Architect within 48 hours after the bids are opened.

Nanuet Union Free School District
Rudy Villanyi, Director of School Facilities
Email: rvillanyi@nanuetsd.org

KSQ Design
Ofe Clarke
Email: oclarke@ksq.design
215 W 40th Street
15th Floor
New York, NY 10018

Submissions must be emailed and must include the Project Name of this contract in the Subject Line of the Pre-Award submission email.

(1) Pre-award Submittal Package
  (i) Fully execute AIA A305 Contractors Qualification Statement
  (ii) Most recent financial statement by CPM

(iii) Bid Addenda Acknowledgement
(iv) Schedule of Values
(v) Unit Prices
(vi) Substitution List
(vii) Subcontractor List
(viii) Corporate Resolutions
(ix) Bid Bond
(x) Non Collusive
(xi) Iran Divestment Act
(xii) Insurance Certification
(xiii) References and experience:

1. List of all past contracts with K12 Public School Districts
2. Provide three (3) references (Name, Title, and Phone Number) associated with three (3) different projects (public or private sector) of similar scope and size to the one identified in this contract. Additionally, include the names of two major suppliers used for each of these three (3) projects.

(2) Workforce and Work Plan – Provide a detailed written Work Plan which shall demonstrate the contractor's understanding of overall project scope and shall include, but not be limited, to the following:

(i) Sequential listing of specific project activities required to successfully complete the Work of the contract.

1. Include Critical Milestones,
2. Include phasing of the Work, if required.
3. Include listing of long lead items.
4. Impact of weather and restricted work period(s).
5. Statement that the project can be completed in established time.

(ii) Resumes for Contractor's proposed supervisory staff, including qualifications for specialized expertise or any certification(s) required to perform the Work.
(iii) Names of proposed major sub-contractors (more than 15% of the bid amount) and a listing of the related trade of work and value.
(iv) Any special coordination requirements with other trades.
(v) Any special storage and staging requirements for construction materials.
(vi) Any other special requirements.

(3) Detailed Cost Estimate:
(i) A copy of a Detailed Cost Estimate outlined in CSI format.

§ 6.3 Submittals

§ 6.3.1 After notification of selection for the award of the Contract, the Bidder shall, as soon as practicable or as stipulated in the Bidding Documents, submit in writing to the Owner through the Architect:

.1 a designation of the Work to be performed with the Bidder's own forces;
.2 names of the principal products and systems proposed for the Work and the manufacturers and suppliers of each; and
.3 names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for the principal portions of the Work.

§ 6.3.2 The Bidder will be required to establish to the satisfaction of the Architect and Owner the reliability and responsibility of the persons or entities proposed to furnish and perform the Work described in the Bidding Documents.

§ 6.3.3 Prior to the execution of the Contract, the Architect will notify the Bidder if either the Owner or Architect, after due investigation, has reasonable objection to a person or entity proposed by the Bidder. If the Owner or Architect has reasonable objection to a proposed person or entity, the Bidder may, at the Bidder's option, withdraw the Bid or submit an acceptable substitute person or entity. The Bidder may also submit any required adjustment in the Base Bid or Alternate Bid to account for the difference in cost occasioned by such substitution. The Owner may accept the adjusted bid price or disqualify the Bidder. In the event of either withdrawal or disqualification, bid security will not be forfeited.

§ 6.3.4 Persons and entities proposed by the Bidder and to whom the Owner and Architect have made no reasonable objection must be used on the Work for which they were proposed and shall not be changed except with the written consent of the Owner and Architect.

ARTICLE 7 PERFORMANCE BOND AND PAYMENT BOND

§ 7.1 Bond Requirements

§ 7.1.1 If stipulated in the Bidding Documents, the Bidder shall furnish bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder.

§ 7.1.2 If the furnishing of such bonds is stipulated in the Bidding Documents, the cost shall be included in the Bid. If the furnishing of such bonds is required after receipt of bids and before execution of the Contract, the cost of such bonds shall be added to the Bid in determining the Contract Sum.

§ 7.1.3 The Bidder shall provide surety bonds from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located.

§ 7.1.4 Unless otherwise indicated below, the Penal Sum of the Payment and Performance Bonds shall be the amount of the Contract Sum.
(If Payment or Performance Bonds are to be in an amount other than 100% of the Contract Sum, indicate the dollar amount or percentage of the Contract Sum.)

§ 7.2 Time of Delivery and Form of Bonds

§ 7.2.1 The Bidder shall deliver the required bonds to the Owner not later than three days following the date of execution of the Contract. If the Work is to commence sooner in response to a letter of intent, the Bidder shall, prior to commencement of the Work, submit evidence satisfactory to the Owner that such bonds will be furnished and delivered in accordance with this Section 7.2.1.

§ 7.2.2 Unless otherwise provided, the bonds shall be written on AIA Document A312, Performance Bond and Payment Bond.

§ 7.2.3 The bonds shall be dated on or after the date of the Contract.

§ 7.2.4 The Bidder shall require the attorney-in-fact who executes the required bonds on behalf of the surety to affix to the bond a certified and current copy of the power of attorney.

ARTICLE 8 ENUMERATION OF THE PROPOSED CONTRACT DOCUMENTS

§ 8.1 Copies of the proposed Contract Documents have been made available to the Bidder and consist of the following documents:

.1 AIA Document A101™–2017, Standard Form of Agreement Between Owner and Contractor, unless otherwise stated below.
(Insert the complete AIA Document number, including year, and Document title.)

.2 AIA Document A101™–2017, Exhibit A, Insurance and Bonds, unless otherwise stated below.
(Insert the complete AIA Document number, including year, and Document title.)

.3 AIA Document A201™–2007, General Conditions of the Contract for Construction, unless otherwise stated below.
(Insert the complete AIA Document number, including year, and Document title.)

.4 AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, dated as indicated below:
(Insert the date of the E203-2013.)

.5 Drawings

Number	Title	Date

.6 Specifications

Section	Title	Date	Pages

.7 Addenda:

Number	Date	Pages

.8 Other Exhibits:
(Check all boxes that apply and include appropriate information identifying the exhibit where required.)

[ ] AIA Document E204™–2017, Sustainable Projects Exhibit, dated as indicated below:
(Insert the date of the E204-2017.)

[ ] The Sustainability Plan:

Title	Date	Pages

[ ] Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages

.9 Other documents listed below:
(List here any additional documents that are intended to form part of the Proposed Contract Documents.)

ARTICLE 9 TAXES

§ 9.1 SALES TAX

§ 9.1.1 State and local sales tax on materials incorporated into the construction shall not be included in the Bid. Owner is a tax-exempt organization and will take title to materials used in the Project in order to permit tax exemption.

§ 9.1.2 Owner will furnish certificate with Owner's Tax Exemption Number to successful Bidder for use in purchasing tangible personal property required for Project.

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

ARTICLE 10 BONDS

§10.1 PERFORMANCE BOND AND PAYMENT BOND

§ 10.1.1 Successful Bidder shall furnish to Owner bonds covering faithful performance of Contract and payment obligations there under.

ARTICLE 11 EXAMINATION OF THE SITE

§11.1 PRIOR ARRANGEMENTS

§ 11.1.1 Bidders may visit the existing facilities by making prior arrangements with Mr. Rudy Villanyi, Director of Facilities, telephone 845-627-9852.

ARTICLE 12 SUBSTITUTIONS OF MATERIALS AND EQUIPMENT

§12.1 EQUIVALENCY CLAUSE

§ 12.1.1 Whenever a material, article, or piece of equipment is identified on the Drawings or in the Specifications by reference to manufacturers' or vendors' names, trade names, catalog numbers, or the like, it is so identified for the purpose of establishing a standard, and any material, article, or piece of equipment of other manufacturers or vendors which will perform adequately the duties imposed by the general design will be considered equally acceptable provided the material, article, or piece of equipment so proposed is, in the opinion of the Architect, of equal substance, appearance, and function. It shall not be purchased or installed by the Contractor without the Architect's written approval.

SECTION 00 3000 - GC BID FORM- GC-01
CONTRACT 1 – GENERAL CONSTRUCTION PROPOSAL (GC):

_____
Bidding Firm Name
To The Board of Education,
The undersigned hereby proposes to furnish all labor, materials, devices, appliances, supplies, equipment, services and other facilities necessary to complete all of the work of the above referenced Contract for the Nanuet Union Free School District, Nanuet, New York, as required by, and in accordance with, the provisions of the Instructions to Bidders, the Supplementary Instructions to Bidders, the Conditions of the Contract, the Drawings and Specifications, all as prepared by KSQ Design designated as Nanuet Union Free School District Phase 1A Projects, dated December 15, 2022 and that, if this Proposal is accepted, the Undersigned agrees to enter into an Agreement with the owner to perform this work for the lump sum of:

_____

_____Dollars & No Cents

($_____ .00)
herein referred to as the Base Bid.

ALLOWANCES:
The undersigned Contractor has included the Allowance(s) as specified in Section 01 2100 in their Base Bid.

UNIT PRICE:

A. Unit Price GC-#1: Abatement of ACM Floor Tile (VAT): $_____ Dollars $ No Cents

B. Unit Price GC- #2: Abatement of ACM Pipe Insulation (including elbows): $_____ Dollars $ No Cents

ALTERNATES: NONE

ADDENDA:
The undersigned acknowledges the receipt of the following addenda:

Addendum Number	Date	Addendum Number	Date
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

The Undersigned understands that the Owner reserves the right to accept or reject any or all proposals, but that if notice of the acceptance of the above Proposal is sent via United States Postal Service or any other overnight carrier, with signature required, to the Undersigned within sixty (60) days after the formal opening of Bids or anytime thereafter before this Proposal is withdrawn, the Undersigned will enter into, execute, and deliver a Contract within five (5) days after the date of said notification.

TIME OF COMPLETION:
The Undersigned agrees in the Base Bid to complete the work as per the Milestone Schedule provided in Specifications.

CLOSING: (signature)_____

DATE: _____

BY: _____

TITLE: _____

FIRM: _____

ADDRESS: _____

_____

TELEPHONE NUMBER: _____

FAX NUMBER: _____

CONTACT PERSON: _____

E-MAIL: _____

Submit Bid Form in duplicate.

END OF SECTION 00 3000

SECTION 00 3001 - GC BID FORM- GC-02

CONTRACT 2 – GENERAL CONSTRUCTION PROPOSAL (GC):

_____
Bidding Firm Name

To The Board of Education,

The undersigned hereby proposes to furnish all labor, materials, devices, appliances, supplies, equipment, services and other facilities necessary to complete all of the work of the above referenced Contract for the Nanuet Union Free School District, Nanuet, New York, as required by, and in accordance with, the provisions of the Instructions to Bidders, the Supplementary Instructions to Bidders, the Conditions of the Contract, the Drawings and Specifications, all as prepared by KSQ Design designated as Nanuet Union Free School District Phase 1A Projects, dated **December 15, 2022** and that, if this Proposal is accepted, the Undersigned agrees to enter into an Agreement with the owner to perform this work for the lump sum of:

_____

_____Dollars & No Cents

($_____ .00)
herein referred to as the Base Bid.

ALLOWANCES:
The undersigned Contractor has included the Allowance(s) as specified in Section 01 2100 in their Base Bid.

UNIT PRICE:

Unit Price GC-#1: Abatement of ACM Floor Tile (VAT): $_____ Dollars $ No Cents

Unit Price GC- #2: Abatement of ACM Pipe Insulation (including elbows):

$_____ Dollars $ No Cents

ALTERNATES: NONE

ADDENDA:

The undersigned acknowledges the receipt of the following addenda:

Addendum Number	Date	Addendum Number	Date
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

The Undersigned understands that the Owner reserves the right to accept or reject any or all proposals, but that if notice of the acceptance of the above Proposal is sent via United States Postal Service or any other overnight carrier, with signature required, to the Undersigned within sixty (60) days after the formal opening of Bids or anytime thereafter before this Proposal is withdrawn, the Undersigned will enter into, execute, and deliver a Contract within five (5) days after the date of said notification.

TIME OF COMPLETION:

The Undersigned agrees in the Base Bid to complete the work as per the Milestone Schedule provided in Specifications.

CLOSING: (signature)_____

DATE: _____

BY: _____

TITLE: _____

FIRM: _____

ADDRESS: _____

_____

TELEPHONE NUMBER: _____

FAX NUMBER: _____

CONTACT PERSON: _____

E-MAIL: _____

Submit Bid Form in duplicate.

END OF SECTION 00 3001

SECTION 00 3002 - GC BID FORM- GC-03
CONTRACT 3 – GENERAL CONSTRUCTION PROPOSAL (GC):

_____
Bidding Firm Name
To The Board of Education,
The undersigned hereby proposes to furnish all labor, materials, devices, appliances, supplies, equipment, services and other facilities necessary to complete all of the work of the above referenced Contract for the Nanuet Union Free School District, Nanuet, New York, as required by, and in accordance with, the provisions of the Instructions to Bidders, the Supplementary Instructions to Bidders, the Conditions of the Contract, the Drawings and Specifications, all as prepared by KSQ Design designated as Nanuet Union Free School District Phase 1A Projects, dated December 15, 2022 and that, if this Proposal is accepted, the Undersigned agrees to enter into an Agreement with the owner to perform this work for the lump sum of:

_____

_____Dollars & No Cents

($_____ .00)
herein referred to as the Base Bid.

ALLOWANCES:
The undersigned Contractor has included the Allowance(s) as specified in Section 01 2100 in their Base Bid.

UNIT PRICE:

A. Unit Price GC-#1: Abatement of ACM Floor Tile (VAT): $_____ Dollars $ No Cents

B. Unit Price GC- #2: Abatement of ACM Pipe Insulation (including elbows): $_____ Dollars $ No Cents

ALTERNATES: NONE

ADDENDA:
The undersigned acknowledges the receipt of the following addenda:

Addendum Number	Date	Addendum Number	Date
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

The Undersigned understands that the Owner reserves the right to accept or reject any or all proposals, but that if notice of the acceptance of the above Proposal is sent via United States Postal Service or any other overnight carrier, with signature required, to the Undersigned within sixty (60) days after the formal opening of Bids or anytime thereafter before this Proposal is withdrawn, the Undersigned will enter into, execute, and deliver a Contract within five (5) days after the date of said notification.

TIME OF COMPLETION:
The Undersigned agrees in the Base Bid to complete the work as per the Milestone Schedule provided in Specifications.

CLOSING: (signature)_____

DATE: _____

BY: _____

TITLE: _____

FIRM: _____

ADDRESS: _____

_____

TELEPHONE NUMBER: _____

FAX NUMBER: _____

CONTACT PERSON: _____

E-MAIL: _____

Submit Bid Form in duplicate.

END OF SECTION 00 3002

SECTION 00 3003 - EC BID FORM
CONTRACT 1 – ELECTRICAL CONSTRUCTION PROPOSAL (EC-01):

_____
Bidding Firm Name
To The Board of Education,
The undersigned hereby proposes to furnish all labor, materials, devices, appliances, supplies, equipment, services and other facilities necessary to complete all of the work of the above referenced Contract for the Nanuet Union Free School District, Nanuet, New York, as required by, and in accordance with, the provisions of the Instructions to Bidders, the Supplementary Instructions to Bidders, the Conditions of the Contract, the Drawings and Specifications, all as prepared by KSQ Design designated as Nanuet Union Free School District Phase 1A Projects, dated December 15, 2022 and that, if this Proposal is accepted, the Undersigned agrees to enter into an Agreement with the owner to perform this work for the lump sum of:

_____

_____Dollars & No Cents

($_____ .00)
herein referred to as the Base Bid.

ALLOWANCES:
The undersigned Contractor has included the Allowance(s) as specified in Section 01 21 00 in their Base Bid.

UNIT PRICE:

A. Unit Price GC-#1: Abatement of ACM wire insulation $_____ Dollars $ No Cents

ALTERNATES: NONE NOTED

ADDENDA:
The undersigned acknowledges the receipt of the following addenda:

Addendum Number	Date	Addendum Number	Date
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

The Undersigned understands that the Owner reserves the right to accept or reject any or all proposals, but that if notice of the acceptance of the above Proposal is sent via United States Postal Service or any other overnight carrier, with signature required, to the Undersigned within sixty (60) days after the formal opening of Bids or anytime thereafter before this Proposal is withdrawn, the Undersigned will enter into, execute, and deliver a Contract within five (5) days after the date of said notification.

TIME OF COMPLETION:
The Undersigned agrees in the Base Bid to complete the work as per the Milestone Schedule provided in Specifications.

CLOSING: (signature)_____

DATE: _____

BY: _____

TITLE: _____

FIRM: _____

ADDRESS: _____

_____

TELEPHONE NUMBER: _____

FAX NUMBER: _____

CONTACT PERSON: _____

E-MAIL: _____

Submit Bid Form in duplicate.

END OF SECTION 00 3003

SECTION 00 3004 - MC BID FORM
CONTRACT 1 – MECHANICAL CONSTRUCTION PROPOSAL (MC-01):

_____
Bidding Firm Name

To The Board of Education,

The undersigned hereby proposes to furnish all labor, materials, devices, appliances, supplies, equipment, services and other facilities necessary to complete all of the work of the above referenced Contract for the Nanuet Union Free School District, Nanuet, New York, as required by, and in accordance with, the provisions of the Instructions to Bidders, the Supplementary Instructions to Bidders, the Conditions of the Contract, the Drawings and Specifications, all as prepared by KSQ Design designated as Nanuet Union Free School District Phase 1A Projects, dated December 15, 2022 and that, if this Proposal is accepted, the Undersigned agrees to enter into an Agreement with the owner to perform this work for the lump sum of:

_____

_____Dollars & No Cents

($_____ .00)
herein referred to as the Base Bid.

ALLOWANCES:
The undersigned Contractor has included the Allowance(s) as specified in Section 01 21 00 in their Base Bid.

UNIT PRICE: NONE NOTED

ALTERNATES: NONE NOTED

ADDENDA:
The undersigned acknowledges the receipt of the following addenda:

Addendum Number	Date	Addendum Number	Date
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

The Undersigned understands that the Owner reserves the right to accept or reject any or all proposals, but that if notice of the acceptance of the above Proposal is sent via United States Postal Service or any other overnight carrier, with signature required, to the Undersigned within sixty (60) days after the formal opening of Bids or anytime thereafter before this Proposal is withdrawn, the Undersigned will enter into, execute, and deliver a Contract within five (5) days after the date of said notification.

TIME OF COMPLETION:
The Undersigned agrees in the Base Bid to complete the work as per the Milestone Schedule provided in Specifications.

CLOSING: (signature)_____

DATE: _____

BY: _____

TITLE: _____

FIRM: _____

ADDRESS: _____

_____

TELEPHONE NUMBER: _____

FAX NUMBER: _____

CONTACT PERSON: _____

E-MAIL: _____

Submit Bid Form in duplicate.

END OF SECTION 00 3004

SECTION 00 3005 - MC BID FORM
CONTRACT 2 – MECHANICAL CONSTRUCTION PROPOSAL (MC-02):

_____
Bidding Firm Name
To The Board of Education,
The undersigned hereby proposes to furnish all labor, materials, devices, appliances, supplies, equipment, services and other facilities necessary to complete all of the work of the above referenced Contract for the Nanuet Union Free School District, Nanuet, New York, as required by, and in accordance with, the provisions of the Instructions to Bidders, the Supplementary Instructions to Bidders, the Conditions of the Contract, the Drawings and Specifications, all as prepared by KSQ Design designated as Nanuet Union Free School District Phase 1A Projects, dated December 15, 2022 and that, if this Proposal is accepted, the Undersigned agrees to enter into an Agreement with the owner to perform this work for the lump sum of:

_____

_____Dollars & No Cents

($_____ .00)
herein referred to as the Base Bid.

ALLOWANCES:
The undersigned Contractor has included the Allowance(s) as specified in Section 01 21 00 in their Base Bid.

UNIT PRICE: NONE NOTED

ALTERNATES: NONE NOTED

ADDENDA:
The undersigned acknowledges the receipt of the following addenda:

Addendum Number	Date	Addendum Number	Date
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

The Undersigned understands that the Owner reserves the right to accept or reject any or all proposals, but that if notice of the acceptance of the above Proposal is sent via United States Postal Service or any other overnight carrier, with signature required, to the Undersigned within sixty (60) days after the formal opening of Bids or anytime thereafter before this Proposal is withdrawn, the Undersigned will enter into, execute, and deliver a Contract within five (5) days after the date of said notification.

TIME OF COMPLETION:
The Undersigned agrees in the Base Bid to complete the work as per the Milestone Schedule provided in Specifications.

CLOSING: (signature)_____

DATE: _____

BY: _____

TITLE: _____

FIRM: _____

ADDRESS: _____

_____

TELEPHONE NUMBER: _____

FAX NUMBER: _____

CONTACT PERSON: _____

E-MAIL: _____

Submit Bid Form in duplicate.

END OF SECTION 00 3005

SECTION 00 30 06 - PC BID FORM
CONTRACT 1 – PLUMBING CONSTRUCTION PROPOSAL (PC-01):

_____
Bidding Firm Name
To The Board of Education,
The undersigned hereby proposes to furnish all labor, materials, devices, appliances, supplies, equipment, services and other facilities necessary to complete all of the work of the above referenced Contract for the Nanuet Union Free School District, Nanuet, New York, as required by, and in accordance with, the provisions of the Instructions to Bidders, the Supplementary Instructions to Bidders, the Conditions of the Contract, the Drawings and Specifications, all as prepared by KSQ Design designated as Nanuet Union Free School District Phase 1A Projects, dated December 15, 2022 and that, if this Proposal is accepted, the Undersigned agrees to enter into an Agreement with the owner to perform this work for the lump sum of:

_____

_____Dollars & No Cents

($_____ .00)
herein referred to as the Base Bid.

ALLOWANCES:
The undersigned Contractor has included the Allowance(s) as specified in Section 01 2100 in their Base Bid.

UNIT PRICE: NONE NOTED

ALTERNATES: NONE NOTED

ADDENDA:
The undersigned acknowledges the receipt of the following addenda:

Addendum Number	Date	Addendum Number	Date
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

The Undersigned understands that the Owner reserves the right to accept or reject any or all proposals, but that if notice of the acceptance of the above Proposal is sent via United States Postal Service or any other overnight carrier, with signature required, to the Undersigned within sixty (60) days after the formal opening of Bids or anytime thereafter before this Proposal is withdrawn, the Undersigned will enter into, execute, and deliver a Contract within five (5) days after the date of said notification.

TIME OF COMPLETION:
The Undersigned agrees in the Base Bid to complete the work as per the Milestone Schedule provided in Specifications.

CLOSING: (signature)_____

DATE: _____

BY: _____

TITLE: _____

FIRM: _____

ADDRESS: _____

_____

TELEPHONE NUMBER: _____

FAX NUMBER: _____

CONTACT PERSON: _____

E-MAIL: _____

Submit Bid Form in duplicate.

END OF SECTION 00 3000

SECTION 00 3007 - SW BID FORM
CONTRACT 1 – SITE WORK CONSTRUCTION PROPOSAL (SW-01):

_____
Bidding Firm Name
To The Board of Education,
The undersigned hereby proposes to furnish all labor, materials, devices, appliances, supplies, equipment, services and other facilities necessary to complete all of the work of the above referenced Contract for the Nanuet Union Free School District, Nanuet, New York, as required by, and in accordance with, the provisions of the Instructions to Bidders, the Supplementary Instructions to Bidders, the Conditions of the Contract, the Drawings and Specifications, all as prepared by KSQ Design designated as Nanuet Union Free School District Phase 1A Projects, dated December 15, 2022 and that, if this Proposal is accepted, the Undersigned agrees to enter into an Agreement with the owner to perform this work for the lump sum of:

_____

_____Dollars & No Cents

($_____ .00)
herein referred to as the Base Bid.

ALLOWANCES:
The undersigned Contractor has included the Allowance(s) as specified in Section 01 2100 in their Base Bid.

UNIT PRICE:

Unit Price SW-01 #1: Unsuitable Soil Removal $_____ Dollars $ No Cents

Unit Price SW-01 #2: Trench Rock Removal $_____ Dollars $ No Cents

Unit Price SW-01 #3: Concrete Sidewalks $_____ Dollars $ No Cents

Unit Price SW-01 #4: Concrete Curb $_____ Dollars $ No Cents

ALTERNATES: NONE

ADDENDA:
The undersigned acknowledges the receipt of the following addenda:

Addendum Number	Date	Addendum Number	Date
_____	_____	_____	_____
_____	_____	_____	_____

_____ _____ _____ _____

The Undersigned understands that the Owner reserves the right to accept or reject any or all proposals, but that if notice of the acceptance of the above Proposal is sent via United States Postal Service or any other overnight carrier, with signature required, to the Undersigned within sixty (60) days after the formal opening of Bids or anytime thereafter before this Proposal is withdrawn, the Undersigned will enter into, execute, and deliver a Contract within five (5) days after the date of said notification.

TIME OF COMPLETION:
The Undersigned agrees in the Base Bid to complete the work as per the Milestone Schedule provided in Specifications.

CLOSING: (signature)_____

DATE: _____

BY: _____

TITLE: _____

FIRM: _____

ADDRESS: _____

_____

TELEPHONE NUMBER: _____

FAX NUMBER: _____

CONTACT PERSON: _____

E-MAIL: _____

Submit Bid Form in duplicate.

END OF SECTION 00 3000

SECTION 00 30 08 – BE BID FORM
CONTRACT 1 – BUILDING ENVELOPE CONSTRUCTION PROPOSAL (BE-01):

_____
Bidding Firm Name
To The Board of Education,
The undersigned hereby proposes to furnish all labor, materials, devices, appliances, supplies, equipment, services and other facilities necessary to complete all of the work of the above referenced Contract for the Nanuet Union Free School District, Nanuet, New York, as required by, and in accordance with, the provisions of the Instructions to Bidders, the Supplementary Instructions to Bidders, the Conditions of the Contract, the Drawings and Specifications, all as prepared by KSQ Design designated as Nanuet Union Free School District Phase 1A Projects, dated December 15, 2022 and that, if this Proposal is accepted, the Undersigned agrees to enter into an Agreement with the owner to perform this work for the lump sum of:

_____

_____Dollars & No Cents

($_____ .00)
herein referred to as the Base Bid.

ALLOWANCES:
The undersigned Contractor has included the Allowance(s) as specified in Section 01 2100 in their Base Bid.

UNIT PRICE:

Unit Price BE-01 #1: Masonry Repointing $_____ Dollars $ No Cents

Unit Price BE-01 #2: Masonry Cleaning $_____ Dollars $ No Cents

Unit Price BE-01 #3: New Brick Furnish & Install $_____ Dollars $ No Cents

Unit Price BE-01 #4: Scrape and Paint Steel Lintels $_____ Dollars $ No Cents

Unit Price BE-01 #5: Window Caulking & Backer Rod $_____ Dollars $ No Cents

ALTERNATES: NONE

ADDENDA:
The undersigned acknowledges the receipt of the following addenda:

Addendum Number	Date	Addendum Number	Date
_____	_____	_____	_____
_____	_____	_____	_____

_____ _____ _____ _____

The Undersigned understands that the Owner reserves the right to accept or reject any or all proposals, but that if notice of the acceptance of the above Proposal is sent via United States Postal Service or any other overnight carrier, with signature required, to the Undersigned within sixty (60) days after the formal opening of Bids or anytime thereafter before this Proposal is withdrawn, the Undersigned will enter into, execute, and deliver a Contract within five (5) days after the date of said notification.

TIME OF COMPLETION:
The Undersigned agrees in the Base Bid to complete the work as per the Milestone Schedule provided in Specifications.

CLOSING: (signature)_____

DATE: _____

BY: _____

TITLE: _____

FIRM: _____

ADDRESS: _____

_____

TELEPHONE NUMBER: _____

FAX NUMBER: _____

CONTACT PERSON: _____

E-MAIL: _____

Submit Bid Form in duplicate.

END OF SECTION 00 3008

DRAFT

AIA® Document A305™ – 2020

Contractor's Qualification Statement

THE PARTIES SHOULD EXECUTE A SEPARATE CONFIDENTIALITY AGREEMENT IF THEY INTEND FOR ANY OF THE INFORMATION IN THIS A305-2020 TO BE HELD CONFIDENTIAL.

SUBMITTED BY:
(Organization name and address.)
« »

SUBMITTED TO:
(Organization name and address.)
« »

TYPE OF WORK TYPICALLY PERFORMED
(Indicate the type of work your organization typically performs, such as general contracting, construction manager as constructor services, HVAC contracting, electrical contracting, plumbing contracting, or other.)
« »

THIS CONTRACTOR'S QUALIFICATION STATEMENT INCLUDES THE FOLLOWING:
(Check all that apply.)

[« »] Exhibit A – General Information
[« »] Exhibit B – Financial and Performance Information
[« »] Exhibit C – Project-Specific Information
[« »] Exhibit D – Past Project Experience
[« »] Exhibit E – Past Project Experience (Continued)

CONTRACTOR CERTIFICATION
The undersigned certifies under oath that the information provided in this Contractor's Qualification Statement is true and sufficiently complete so as not to be misleading.

_____ « »
Organization's Authorized Representative Signature **Date**

« »
_____
Printed Name and Title

NOTARY
State of: « »
County of: « »
Signed and sworn to before me this « » day of « » « »

_____
Notary Signature

My commission expires: « »

ADDITIONS AND DELETIONS: The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

ELECTRONIC COPYING of any portion of this AIA® Document to another electronic file is prohibited and constitutes a violation of copyright laws as set forth in the footer of this document.

DRAFT AIA® Document A305™ – 2020 Exhibit A

General Information

This Exhibit is part of the Contractor's Qualification Statement, submitted by « » and dated the « » day of « » in the year « »
(In words, indicate day, month and year.)

§ A.1 ORGANIZATION
§ A.1.1 Name and Location
§ A.1.1.1 Identify the full legal name of your organization.

« »

§ A.1.1.2 List all other names under which your organization currently does business and, for each name, identify jurisdictions in which it is registered to do business under that trade name.

« »

§ A.1.1.3 List all prior names under which your organization has operated and, for each name, indicate the date range and jurisdiction in which it was used.

« »

§ A.1.1.4 Identify the address of your organization's principal place of business and list all office locations out of which your organization conducts business. If your organization has multiple offices, you may attach an exhibit or refer to a website.

« »

§ A.1.2 Legal Status
§ A.1.2.1 Identify the legal status under which your organization does business, such as sole proprietorship, partnership, corporation, limited liability corporation, joint venture, or other.

« »

.1 If your organization is a corporation, identify the state in which it is incorporated, the date of incorporation, and its four highest-ranking corporate officers and their titles, as applicable.

« »

.2 If your organization is a partnership, identify its partners and its date of organization.

« »

.3 If your organization is individually owned, identify its owner and date of organization.

« »

ADDITIONS AND DELETIONS: The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

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.4 If the form of your organization is other than those listed above, describe it and identify its individual leaders:

« »

§ A.1.2.2 Does your organization own, in whole or in part, any other construction-related businesses? If so, identify and describe those businesses and specify percentage of ownership.

« »

§ A.1.3 Other Information

§ A.1.3.1 How many years has your organization been in business?

« »

§ A.1.3.2 How many full-time employees work for your organization?

« »

§ A.1.3.3 List your North American Industry Classification System (NAICS) codes and titles. Specify which is your primary NAICS code.

« »

§ A.1.3.4 Indicate whether your organization is certified as a governmentally recognized special business class, such as a minority business enterprise, woman business enterprise, service disabled veteran owned small business, woman owned small business, small business in a HUBZone, or a small disadvantaged business in the 8(a) Business Development Program. For each, identify the certifying authority and indicate jurisdictions to which such certification applies.

« »

§ A.2 EXPERIENCE

§ A.2.1 Complete Exhibit D to describe up to four projects, either completed or in progress, that are representative of your organization's experience and capabilities.

§ A.2.2 State your organization's total dollar value of work currently under contract.

« »

§ A.2.3 Of the amount stated in Section A.2.2, state the dollar value of work that remains to be completed:

« »

§ A.2.4 State your organization's average annual dollar value of construction work performed during the last five years.

« »

§ A.3 CAPABILITIES

§ A.3.1 List the categories of work that your organization typically self-performs.

« »

§ A.3.2 Identify qualities, accreditations, services, skills, or personnel that you believe differentiate your organization from others.

« »

§ A.3.3 Does your organization provide design collaboration or pre-construction services? If so, describe those services.

« »

§ A.3.4 Does your organization use building information modeling (BIM)? If so, describe how your organization uses BIM and identify BIM software that your organization regularly uses.

« »

§ A.3.5 Does your organization use a project management information system? If so, identify that system.

« »

§ A.4 REFERENCES

§ A.4.1 Identify three client references:
(Insert name, organization, and contact information)

« »

§ A.4.2 Identify three architect references:
(Insert name, organization, and contact information)

« »

§ A.4.3 Identify one bank reference:
(Insert name, organization, and contact information)

« »

§ A.4.4 Identify three subcontractor or other trade references:
(Insert name, organization, and contact information)

« »

DRAFT AIA® Document A305™ – 2020 Exhibit B

Financial and Performance Information

This Exhibit is part of the Contractor's Qualification Statement, submitted by « » and dated the « » day of « » in the year « »
(In words, indicate day, month and year.)

§ B.1 FINANCIAL
§ B.1.1 Federal tax identification number:

« »

§ B.1.2 Attach financial statements for the last three years prepared in accordance with Generally Accepted Accounting Principles, including your organization's latest balance sheet and income statement. Also, indicate the name and contact information of the firm that prepared each financial statement.

« »

§ B.1.3 Has your organization, its parent, or a subsidiary, affiliate, or other entity having common ownership or management, been the subject of any bankruptcy proceeding within the last ten years?

« »

§ B.1.4 Identify your organization's preferred credit rating agency and identification information.
(Identify rating agency, such as Dun and Bradstreet or Equifax, and insert your organization's identification number or other method of searching your organization's credit rating with such agency.)

« »

§ B.2 DISPUTES AND DISCIPLINARY ACTIONS
§ B.2.1 Are there any pending or outstanding judgments, arbitration proceedings, bond claims, or lawsuits against your organization, its parent, or a subsidiary, affiliate, or other entity having common ownership or management, or any of the individuals listed in Exhibit A, Section 1.2, in which the amount in dispute is more than $75,000?
(If the answer is yes, provide an explanation.)

« »

§ B.2.2 In the last five years has your organization, its parent, or a subsidiary, affiliate, or other entity having common ownership or management:
(If the answer to any of the questions below is yes, provide an explanation.)

.1 failed to complete work awarded to it?

« »

.2 been terminated for any reason except for an owners' convenience?

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« »

.3 had any judgments, settlements, or awards pertaining to a construction project in which your organization was responsible for more than $75,000?

« »

.4 filed any lawsuits or requested arbitration regarding a construction project?

« »

§ B.2.3 In the last five years, has your organization, its parent, or a subsidiary, affiliate, or other entity having common ownership or management; or any of the individuals listed in Exhibit A Section 1.2:
(If the answer to any of the questions below is yes, provide an explanation.)

.1 been convicted of, or indicted for, a business-related crime?

« »

.2 had any business or professional license subjected to disciplinary action?

« »

.3 been penalized or fined by a state or federal environmental agency?

« »

DRAFT AIA® Document A305™ – 2020 Exhibit C

Project Specific Information

This Exhibit is part of the Contractor's Qualification Statement, submitted by « » and dated the « » day of « » in the year « »
(In words, indicate day, month and year.)

PROJECT:
(Name and location or address.)

« »
« »

CONTRACTOR'S PROJECT OFFICE:
(Identify the office out of which the contractor proposes to perform the work for the Project.)

« »

TYPE OF WORK SOUGHT
(Indicate the type of work you are seeking for this Project, such as general contracting, construction manager as constructor, design-build, HVAC subcontracting, electrical subcontracting, plumbing subcontracting, etc.)

« »

CONFLICT OF INTEREST
Describe any conflict of interest your organization, its parent, or a subsidiary, affiliate, or other entity having common ownership or management, or any of the individuals listed in Exhibit A Section 1.2, may have regarding this Project.

« »

§ C.1 PERFORMANCE OF THE WORK
§ C.1.1 When was the Contractor's Project Office established?

« »

§ C.1.2 How many full-time field and office staff are respectively employed at the Contractor's Project Office?

« »

§ C.1.3 List the business license and contractor license or registration numbers for the Contractor's Project Office that pertain to the Project.

« »

§ C.1.4 Identify key personnel from your organization who will be meaningfully involved with work on this Project and indicate (1) their position on the Project team, (2) their office location, (3) their expertise and experience, and (4) projects similar to the Project on which they have worked.

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« »

§ C.1.5 Identify portions of work that you intend to self-perform on this Project.

« »

§ C.1.6 To the extent known, list the subcontractors you intend to use for major portions of work on the Project.

« »

§ C.2 EXPERIENCE RELATED TO THE PROJECT

§ C.2.1 Complete Exhibit D to describe up to four projects performed by the Contractor's Project Office, either completed or in progress, that are relevant to this Project, such as projects in a similar geographic area or of similar project type. If you have already completed Exhibit D, but want to provide further examples of projects that are relevant to this Project, you may complete Exhibit E.

§ C.2.2 State the total dollar value of work currently under contract at the Contractor's Project Office:

« »

§ C.2.3 Of the amount stated in Section C.2.2, state the dollar value of work that remains to be completed:

« »

§ C.2.4 State the average annual dollar value of construction work performed by the Contractor's Project Office during the last five years.

« »

§ C.2.5 List the total number of projects the Contractor's Project Office has completed in the last five years and state the dollar value of the largest contract the Contractor's Project Office has completed during that time.

« »

§ C.3 SAFETY PROGRAM AND RECORD

§ C.3.1 Does the Contractor's Project Office have a written safety program?

« »

§ C.3.2 List all safety-related citations and penalties the Contractor's Project Office has received in the last three years.

« »

§ C.3.3 Attach the Contractor's Project Office's OSHA 300a Summary of Work-Related Injuries and Illnesses form for the last three years.

§ C.3.4 Attach a copy of your insurance agent's verification letter for your organization's current workers' compensation experience modification rate and rates for the last three years.

§ C.4 INSURANCE

§ C.4.1 Attach current certificates of insurance for your commercial general liability policy, umbrella insurance policy, and professional liability insurance policy, if any. Identify deductibles or self-insured retentions for your commercial general liability policy.

§ C.4.2 If requested, will your organization be able to provide property insurance for the Project written on a builder's risk "all-risks" completed value or equivalent policy form and sufficient to cover the total value of the entire Project on a replacement cost basis?

« »

§ C.4.3 Does your commercial general liability policy contain any exclusions or restrictions of coverage that are prohibited in AIA Document A101-2017, Exhibit A, Insurance A.3.2.2.2? If so, identify.

« »

§ C.5 SURETY

§ C.5.1 If requested, will your organization be able to provide a performance and payment bond for this Project?

« »

§ C.5.2 Surety company name:

« »

§ C.5.3 Surety agent name and contact information:

« »

§ C.5.4 Total bonding capacity:

« »

§ C.5.5 Available bonding capacity as of the date of this qualification statement:

« »

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AIA® Document A305™ – 2020
Exhibit D

Contractor's Past Project Experience

	1	2	3	4
PROJECT NAME				
PROJECT LOCATION				
PROJECT TYPE				
OWNER				
ARCHITECT				
CONTRACTOR'S PROJECT EXECUTIVE				
KEY PERSONNEL (include titles)				
PROJECT DETAILS	Contract Amount Completion Date % Self-Performed Work	Contract Amount Completion Date % Self-Performed Work	Contract Amount Completion Date % Self-Performed Work	Contract Amount Completion Date % Self-Performed Work
PROJECT DELIVERY METHOD	☐ Design-bid-build ☐ Design-build ☐ CM constructor ☐ CM advisor ☐ Other:	☐ Design-bid-build ☐ Design-build ☐ CM constructor ☐ CM advisor ☐ Other:	☐ Design-bid-build ☐ Design-build ☐ CM constructor ☐ CM advisor ☐ Other:	☐ Design-bid-build ☐ Design-build ☐ CM constructor ☐ CM advisor ☐ Other:
SUSTAINABILITY CERTIFICATIONS				

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AIA® Document A305™ – 2020
Exhibit E

Contractor's Past Project Experience, Continued

	1	2	3	4
PROJECT NAME				
PROJECT LOCATION				
PROJECT TYPE				
OWNER				
ARCHITECT				
CONTRACTOR'S PROJECT EXECUTIVE				
KEY PERSONNEL (include titles)				
PROJECT DETAILS	Contract Amount Completion Date % Self-Performed Work	Contract Amount Completion Date % Self-Performed Work	Contract Amount Completion Date % Self-Performed Work	Contract Amount Completion Date % Self-Performed Work
PROJECT DELIVERY METHOD	☐ Design-bid-build ☐ Design-build ☐ CM constructor ☐ CM advisor ☐ Other:	☐ Design-bid-build ☐ Design-build ☐ CM constructor ☐ CM advisor ☐ Other:	☐ Design-bid-build ☐ Design-build ☐ CM constructor ☐ CM advisor ☐ Other:	☐ Design-bid-build ☐ Design-build ☐ CM constructor ☐ CM advisor ☐ Other:
SUSTAINABILITY CERTIFICATIONS				

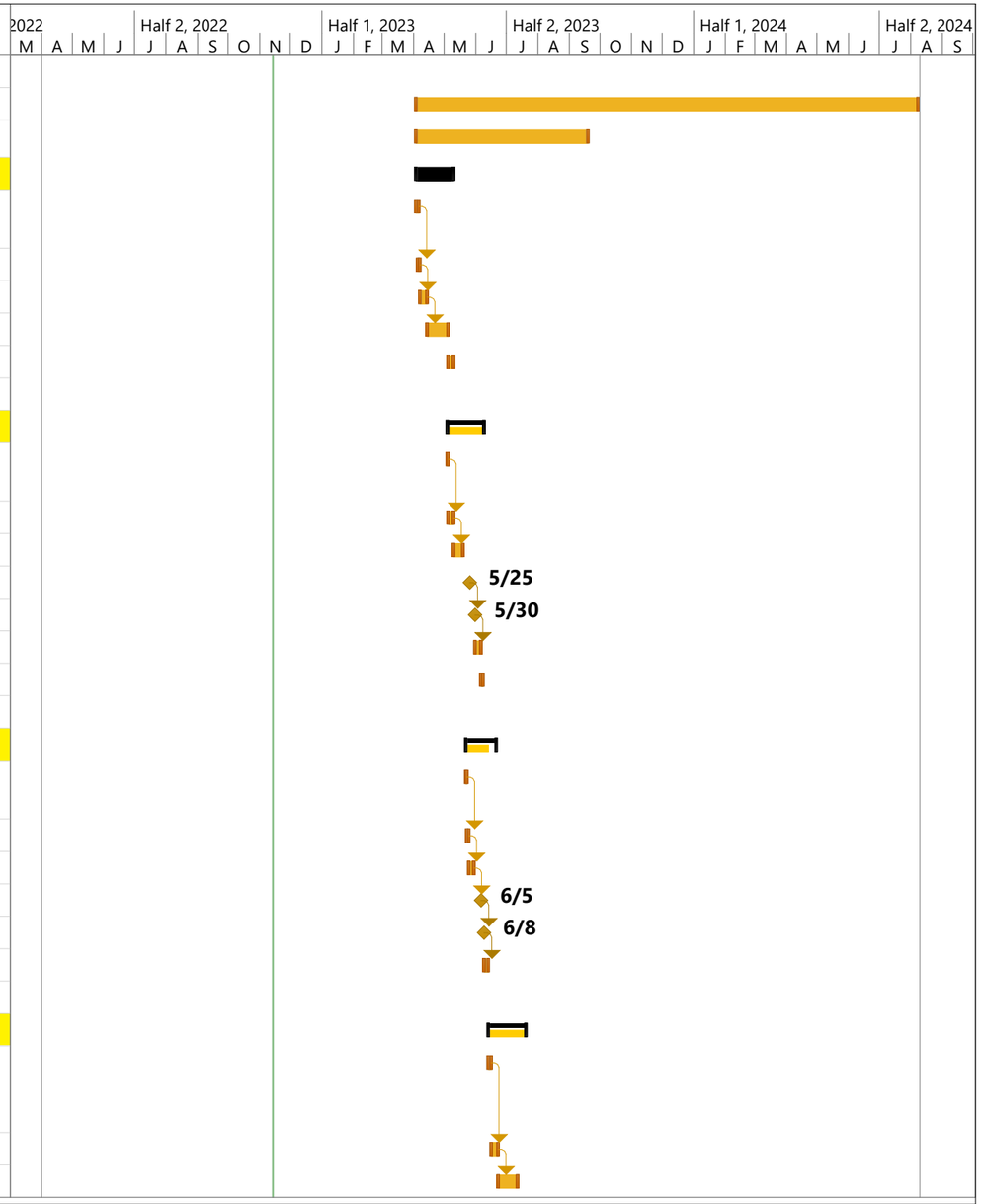
SECTION 00 31 13 - PRELIMINARY SCHEDULES

1.1 PROJECT SCHEDULE

A. This Document is part of the Procurement and Contracting Requirements for the Project. They provide Owner's information for Bidders' convenience and are intended to supplement rather than serve in lieu of Bidders' own investigations. They are made available for Bidders' convenience and information, but do not affect Contract Time requirements. This Document and its attachments are not part of the Contract Documents. The contractor is responsible to provide their own schedule and meet the substantial completion dates outlined on the contract documents.

END OF DOCUMENT 00 31 13

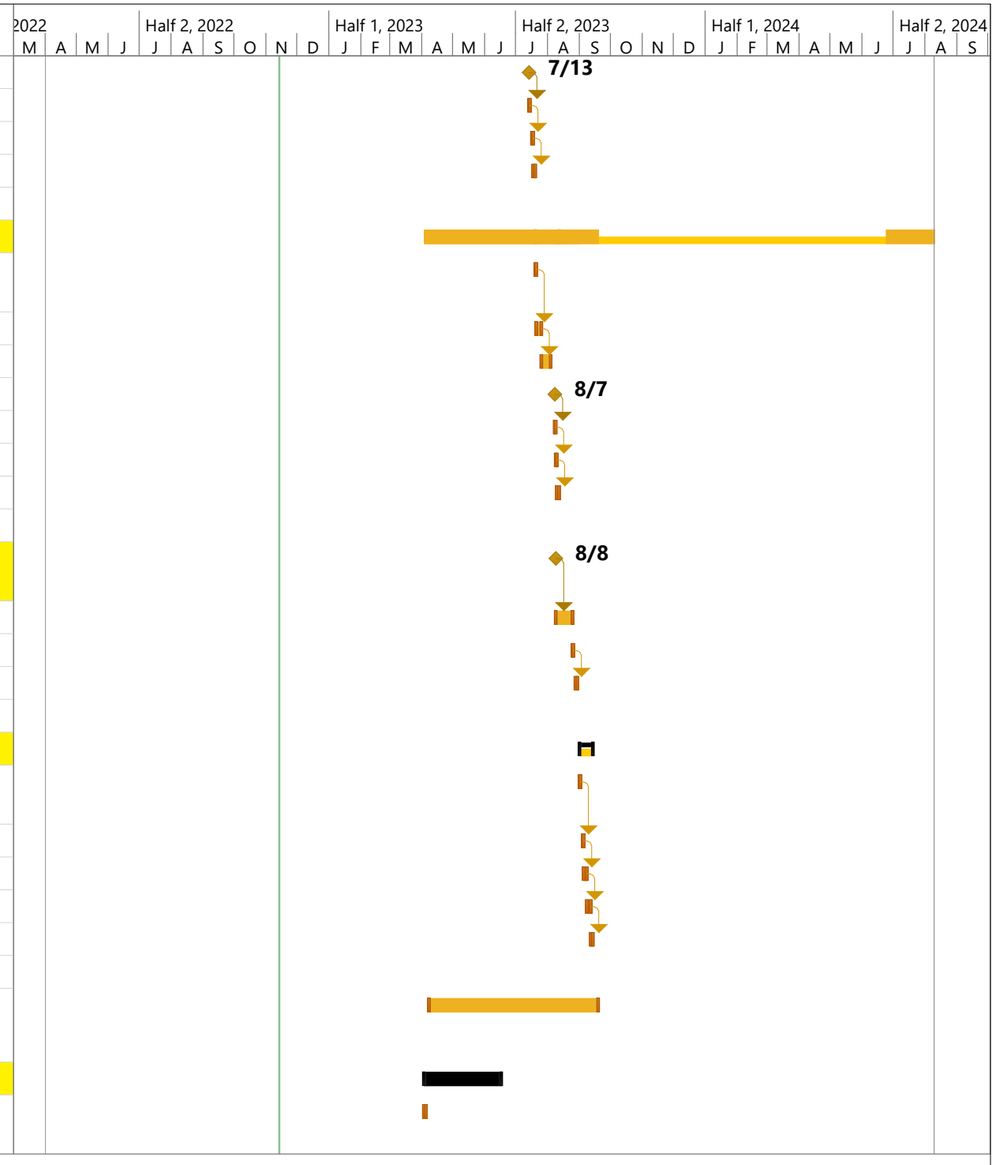
ID	Task Name	Duration	Start	Finish	Notes
1					
2	PHASE 2 CONSTRUCTION PHASE	353 days	Mon 4/3/23	Wed 8/7/24	
3	**SW-01 - Miller, Barr, HS, Highview**	121 days	Mon 4/3/23	Mon 9/18/23	
4	**Miller School - Site Circulation**	**27 days**	**Mon 4/3/23**	**Tue 5/9/23**	
5	Mobilization - Install temp Fencing & Gates, erosion control	3 days	Mon 4/3/23	Wed 4/5/23	
6	Establish Traffic Control	2 days	Wed 4/5/23	Thu 4/6/23	
7	Demolition	5 days	Fri 4/7/23	Thu 4/13/23	
8	New Construction	15 days	Fri 4/14/23	Thu 5/4/23	
9	Demobilize Area, Cleanup & Seeding	3 days	Fri 5/5/23	Tue 5/9/23	
10					
11	**Miller School - Front Playground**	**26 days**	**Thu 5/4/23**	**Thu 6/8/23**	
12	Mobilization - Install temp Fencing & Gates, erosion control	1 day	Thu 5/4/23	Thu 5/4/23	
13	Demolition	3 days	Fri 5/5/23	Tue 5/9/23	
14	New Construction	7 days	Wed 5/10/23	Thu 5/18/23	
15	Install Play Equipment - MILESTONE	5 days	Fri 5/19/23	Thu 5/25/23	By State Contract Vendor
16	Install Play Surfacing - MILESTONE	3 days	Fri 5/26/23	Tue 5/30/23	By State Contract Vendor
17	Install New Fencing	4 days	Wed 5/31/23	Mon 6/5/23	
18	Demobilize Area, Cleanup, Plantings, Seed	2 days	Tue 6/6/23	Wed 6/7/23	
19					
20	**Miller School - Rear Playground**	**22 days**	**Mon 5/22/23**	**Tue 6/20/23**	
21	Mobilization - Install temp Fencing & Gates, erosion control	1 day	Mon 5/22/23	Mon 5/22/23	
22	Demolition	2 days	Tue 5/23/23	Wed 5/24/23	
23	New Construction	3 days	Thu 5/25/23	Mon 5/29/23	
24	Install Play Equipment - MILESTONE	5 days	Tue 5/30/23	Mon 6/5/23	By State Contract Vendor
25	Install Play Surfacing - MILESTONE	3 days	Tue 6/6/23	Thu 6/8/23	By State Contract Vendor
26	Demobilize Area, Cleanup, & Seeding	2 days	Fri 6/9/23	Mon 6/12/23	
27					
28	**Barr School - Site Circulation**	**27 days**	**Tue 6/13/23**	**Wed 7/19/23**	
29	Mobilization - Install temp Fencing & Gates, erosion control, provide temp sidewalk	3 days	Tue 6/13/23	Thu 6/15/23	Temp sidewalk needed for continuted circulation
30	Demolition	5 days	Fri 6/16/23	Thu 6/22/23	
31	New Construction	13 days	Fri 6/23/23	Tue 7/11/23	



NUFSD Phase 2
Milestone Schedule

Task	Inactive Summary	External Tasks	Path Driving Predecessor Summary Task
Split	Manual Task	External Milestone	Path Driving Predecessor Normal Task
Milestone	Duration-only	Deadline	Critical
Summary	Manual Summary Rollup	Path Predecessor Milestone Task	Critical Split
Project Summary	Manual Summary	Path Predecessor Summary Task	Progress
Inactive Task	Start-only	Path Predecessor Normal Task	Manual Progress
Inactive Milestone	Finish-only	Path Driving Predecessor Milestone Task	

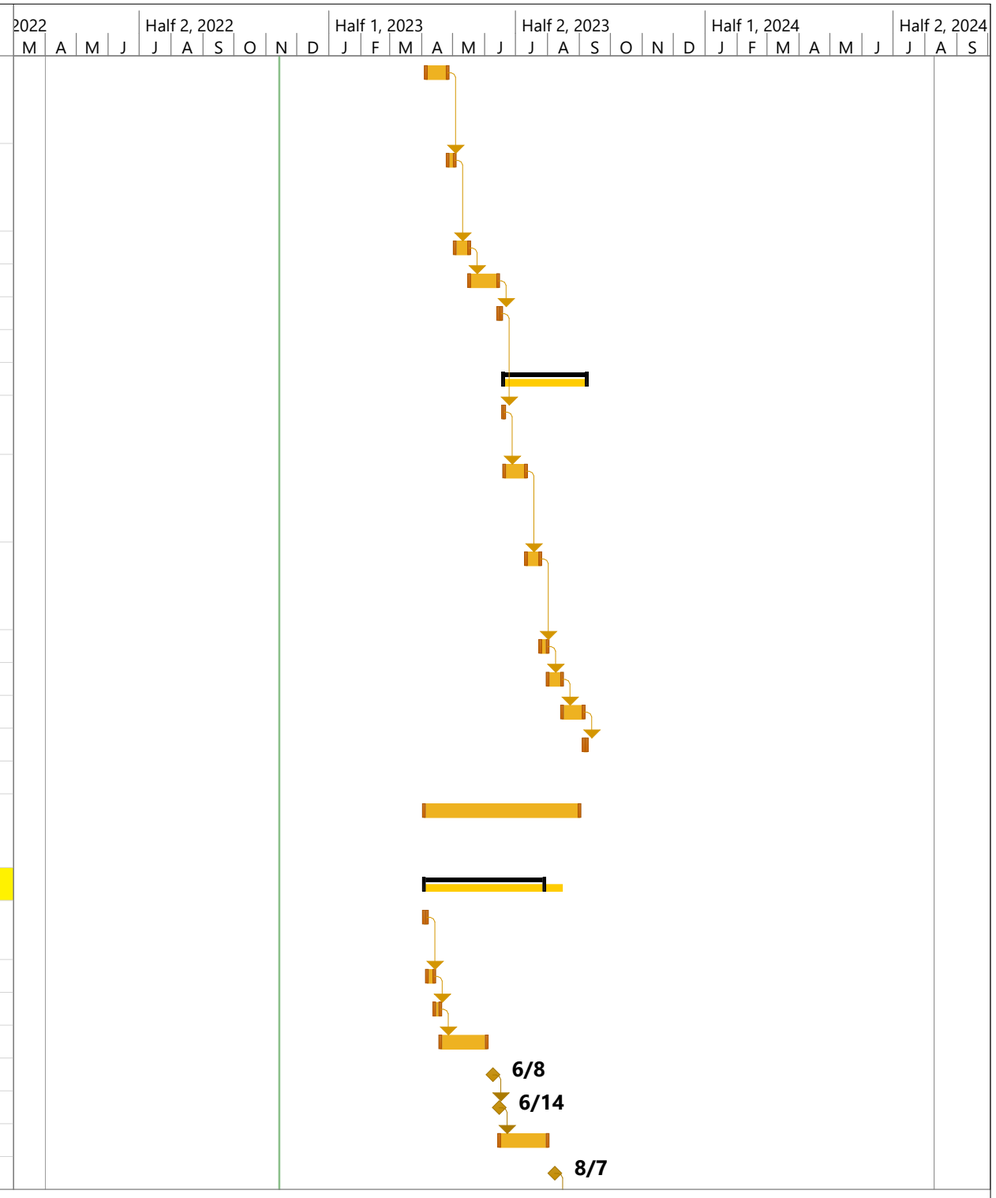
ID	Task Name	Duration	Start	Finish	Notes
32	Paving - MILESTONE	2 days	Wed 7/12/23	Thu 7/13/23	
33	Traffic signage	1 day	Fri 7/14/23	Fri 7/14/23	
34	Striping	1 day	Mon 7/17/23	Mon 7/17/23	
35	Demobilize Area, Cleanup, & Seeding	2 days	Tue 7/18/23	Wed 7/19/23	
36					
37	**High school - Site Circulation**	**17 days?**	**Thu 7/20/23**	**Fri 8/11/23**	
38	Mobilization (Upper Parking) - Install temp Fencing & Gates, erosion control	1 day	Thu 7/20/23	Thu 7/20/23	Notify O&R for overheard power line blankets
39	Demolition	3 days	Fri 7/21/23	Tue 7/25/23	
40	New Construction	7 days	Wed 7/26/23	Thu 8/3/23	
41	Paving & speed bump - MILESTONE	2 days	Fri 8/4/23	Mon 8/7/23	
42	Traffic signage	1 day	Tue 8/8/23	Tue 8/8/23	
43	Striping	1 day	Wed 8/9/23	Wed 8/9/23	
44	Demobilize Area, Cleanup, & Seeding	2 days	Thu 8/10/23	Fri 8/11/23	
45					
46	**Mobilization (security vestibule) - Install temp Fencing & Gates, erosion control**	**3 days**	**Fri 8/4/23**	**Tue 8/8/23**	
47	New Construction	12 days	Wed 8/9/23	Thu 8/24/23	
48	Demobilize Area and Cleanup	1 day	Fri 8/25/23	Fri 8/25/23	
49	Plantings & Seeding	2 days	Mon 8/28/23	Tue 8/29/23	
50					
51	**Highview - Site Circulation**	**9 days**	**Fri 9/1/23**	**Wed 9/13/23**	
52	Mobilization - Install temp Fencing & Gates, erosion control	1 day	Fri 9/1/23	Fri 9/1/23	
53	Demolition	1 day	Mon 9/4/23	Mon 9/4/23	
54	New Construction	3 days	Tue 9/5/23	Thu 9/7/23	
55	Paving	2 days	Fri 9/8/23	Mon 9/11/23	Second shift after school
56	Demobilize Area, Cleanup, seeding	2 days	Tue 9/12/23	Wed 9/13/23	
57					
58	**BE-01 - EXTERIOR MASONRY HS & BARR**	117 days	Sat 4/8/23	Mon 9/18/23	
59	**Highschool Masonry & Lintils**	**55 days**	**Mon 4/3/23**	**Fri 6/16/23**	
60	Mobilization -Lull's & Yodock Barriers & Materials	2 days	Mon 4/3/23	Tue 4/4/23	



NUFSD Phase 2
Milestone Schedule

Task	Inactive Summary	External Tasks	Path Driving Predecessor Summary Task
Split	Manual Task	External Milestone	Path Driving Predecessor Normal Task
Milestone	Duration-only	Deadline	Critical
Summary	Manual Summary Rollup	Path Predecessor Milestone Task	Critical Split
Project Summary	Manual Summary	Path Predecessor Summary Task	Progress
Inactive Task	Start-only	Path Predecessor Normal Task	Manual Progress
Inactive Milestone	Finish-only	Path Driving Predecessor Milestone Task	

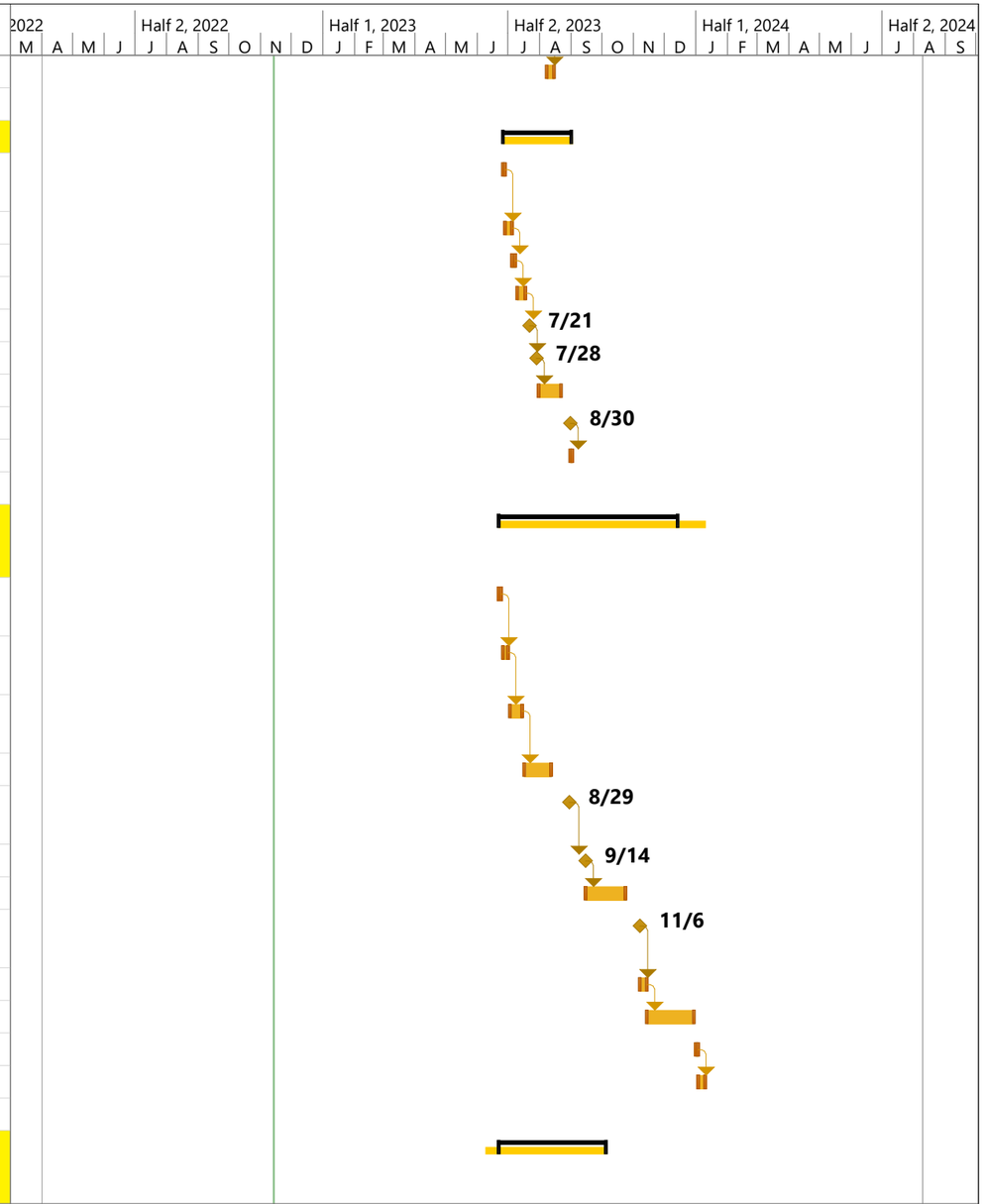
ID	Task Name	Duration	Start	Finish	Notes
61	Removal of Masonry for new Lintils	15 days	Wed 4/5/23	Tue 4/25/23	Second shift work must be scheduled by contractor except for holidays
62	Abatement waterproofing on lintils & window Caulk	5 days	Wed 4/26/23	Tue 5/2/23	Second shift or weekend work must be scheduled by contractor except for holidays
63	Install of new Lintils	10 days	Wed 5/3/23	Tue 5/16/23	
64	Repointing	20 days	Wed 5/17/23	Tue 6/13/23	
65	Cleanup/Demobilize	3 days	Wed 6/14/23	Fri 6/16/23	
66					
67	**BARR MS - Masonry, Lintils, & Sun Shade**	**59 days**	**Mon 6/19/23**	**Thu 9/7/23**	
68	Mobilization -Lull's & Yodock Barriers & Materials	1 day	Mon 6/19/23	Mon 6/19/23	
69	Removal of Masonry for new Lintils	15 days	Tue 6/20/23	Mon 7/10/23	regular shift - summer
70	Abatement waterproofing on lintils & window Caulk	10 days	Tue 7/11/23	Mon 7/24/23	regular shift - summer
71	Removal of Sunshades	5 days	Tue 7/25/23	Mon 7/31/23	
72	Install of new Lintils	10 days	Tue 8/1/23	Mon 8/14/23	
73	Repointing	15 days	Tue 8/15/23	Mon 9/4/23	
74	Cleanup/Demobilize	3 days	Tue 9/5/23	Thu 9/7/23	
75					
76	**GC-01, MC-01,EC-01 - Security Vestibules HS & Barr MS**	109 days	**Mon 4/3/23**	**Thu 8/31/23**	
77	**Highschool Vestibule**	**85 days**	**Mon 4/3/23**	**Fri 7/28/23**	
78	Mobilization - Install temp Fencing, signage, & Gates	3 days	Mon 4/3/23	Wed 4/5/23	
79	Abatement	5 days	Thu 4/6/23	Wed 4/12/23	Weekend/second shift work
80	Demolition	4 days	Thu 4/13/23	Tue 4/18/23	
81	New Construction	33 days	Wed 4/19/23	Fri 6/2/23	
82	Mechanical Roughin - MILESTONE	4 days	Mon 6/5/23	Thu 6/8/23	
83	Electrical /security Roughin - MILESTON	4 days	Fri 6/9/23	Wed 6/14/23	
84	New Construction	33 days	Thu 6/15/23	Mon 7/31/23	
85	Finishes - MILESTONE	5 days	Tue 8/1/23	Mon 8/7/23	



NUFSD Phase 2
Milestone Schedule

Task	Inactive Summary	External Tasks	Path Driving Predecessor Summary Task
Split	Manual Task	External Milestone	Path Driving Predecessor Normal Task
Milestone	Duration-only	Deadline	Critical
Summary	Manual Summary Rollup	Path Predecessor Milestone Task	Critical Split
Project Summary	Manual Summary	Path Predecessor Summary Task	Progress
Inactive Task	Start-only	Path Predecessor Normal Task	Manual Progress
Inactive Milestone	Finish-only	Path Driving Predecessor Milestone Task	

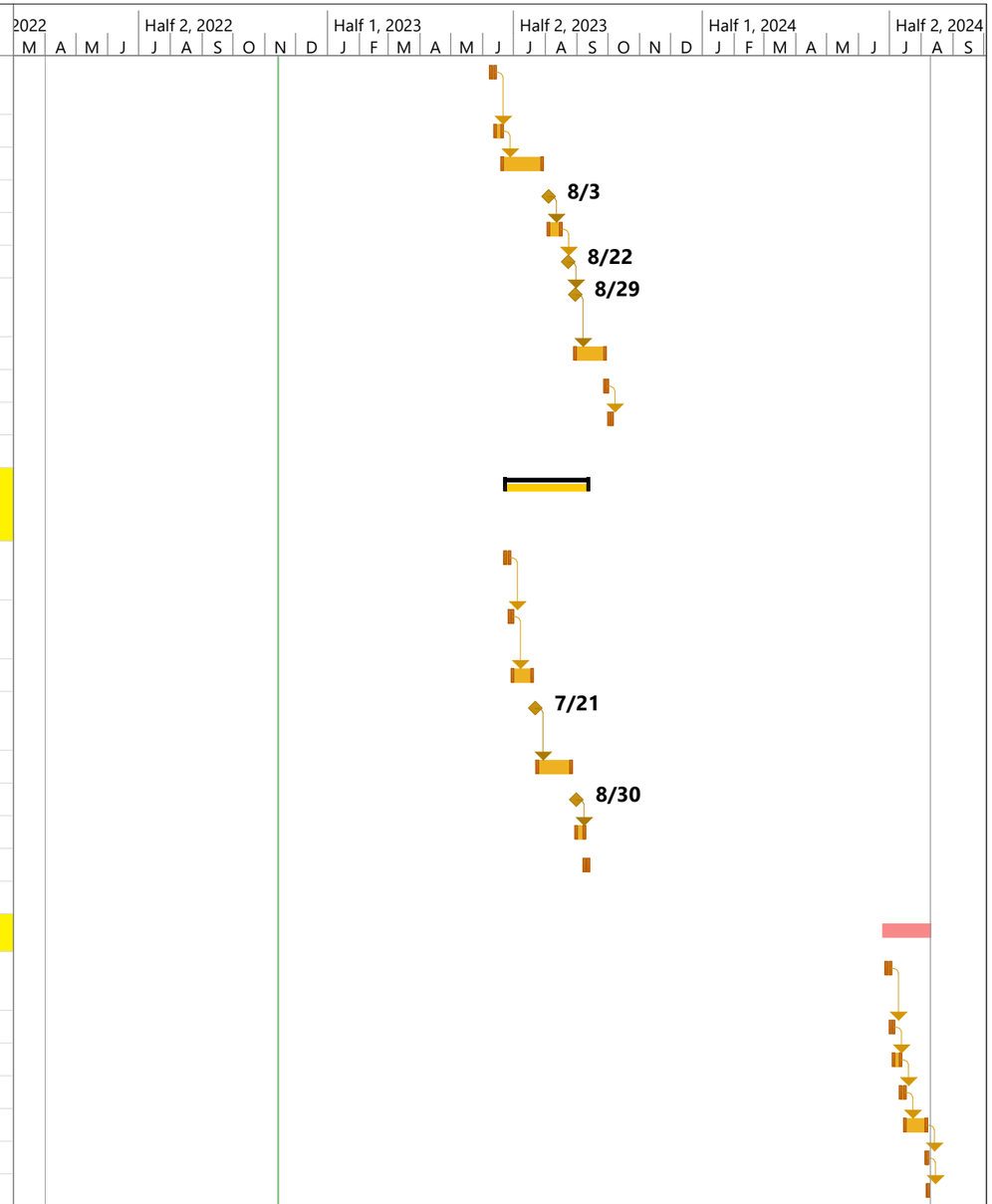
ID	Task Name	Duration	Start	Finish	Notes
86	Cleanup/Demobilize	5 days	Tue 8/8/23	Mon 8/14/23	
87					
88	**Barr Vestibule**	**49 days**	**Mon 6/26/23**	**Thu 8/31/23**	
89	Mobilization - Install temp Fencing, signage, & Gates	2 days	Mon 6/26/23	Tue 6/27/23	
90	Abatement	5 days	Wed 6/28/23	Tue 7/4/23	
91	Demolition	3 days	Wed 7/5/23	Fri 7/7/23	
92	New Construction	6 days	Mon 7/10/23	Mon 7/17/23	
93	Mechanical Roughin - MILESTONE	4 days	Tue 7/18/23	Fri 7/21/23	
94	Electrical /security Roughin - MILESTON	5 days	Mon 7/24/23	Fri 7/28/23	
95	New Construction	16 days	Mon 7/31/23	Mon 8/21/23	
96	Finishes - MILESTONE	7 days	Tue 8/22/23	Wed 8/30/23	
97	Cleanup/Demobilize	2 days	Thu 8/31/23	Fri 9/1/23	
98					
99	**GC-01,MC-01,EC-01,PC-01 - HS Science Labs**	**125 days**	**Thu 6/22/23**	**Wed 12/13/23**	
100	Mobilization, temp partitions, temp protections, dumpster & fencing	2 days	Thu 6/22/23	Fri 6/23/23	
101	Abatement	5 days	Mon 6/26/23	Fri 6/30/23	Weekend work Required to maintain schedule
102	Demolition All Trades	10 days	Mon 7/3/23	Fri 7/14/23	Weekend work Required to maintain schedule
103	New Construction	20 days	Mon 7/17/23	Fri 8/11/23	
104	Hvac Equipment - MILESTONE	12 days	Mon 8/14/23	Tue 8/29/23	RTU Supplied by NUFSD installed by Contractor
105	Electrical/Data roughin - MILESTONE	12 days	Wed 8/30/23	Thu 9/14/23	
106	New Construction	27 days	Fri 9/15/23	Mon 10/23/23	
107	Casework - MILESTONE	10 days	Tue 10/24/23	Mon 11/6/23	By state contract vendor - GC to coordiante
108	Electrical fixtures	5 days	Tue 11/7/23	Mon 11/13/23	
109	New Construction	34 days	Tue 11/14/23	Fri 12/29/23	
110	Cleanup/Demobilize	2 days	Mon 1/1/24	Tue 1/2/24	
111	FF&E	5 days	Wed 1/3/24	Tue 1/9/24	
112					
113	**GC-02, MC-02, EC-01, PC-01 - Barr STEM Labs**	**75 days**	**Thu 6/22/23**	**Wed 10/4/23**	



NUFSD Phase 2
Milestone Schedule

Task	Inactive Summary	External Tasks	Path Driving Predecessor Summary Task
Split	Manual Task	External Milestone	Path Driving Predecessor Normal Task
Milestone	Duration-only	Deadline	Critical
Summary	Manual Summary Rollup	Path Predecessor Milestone Task	Critical Split
Project Summary	Manual Summary	Path Predecessor Summary Task	Progress
Inactive Task	Start-only	Path Predecessor Normal Task	Manual Progress
Inactive Milestone	Finish-only	Path Driving Predecessor Milestone Task	

ID	Task Name	Duration	Start	Finish	Notes
114	Mobilization, temp partitions, temp protections, dumpster & fencing	2 days	Fri 6/9/23	Mon 6/12/23	
115	Demolition All Trades	5 days	Tue 6/13/23	Mon 6/19/23	
116	New Construction	29 days	Tue 6/20/23	Fri 7/28/23	
117	Sitework & Pad - MILESTONE	4 days	Mon 7/31/23	Thu 8/3/23	
118	Hard ceilings and grid	8 days	Fri 8/4/23	Tue 8/15/23	
119	Casework - MILESTONE	5 days	Wed 8/16/23	Tue 8/22/23	
120	HVAC Equipment & Electrical fixtures - MILESTONE	5 days	Wed 8/23/23	Tue 8/29/23	
121	New Construction	21 days	Wed 8/30/23	Wed 9/27/23	
122	Cleanup/Demobilize	2 days	Thu 9/28/23	Fri 9/29/23	
123	FF&E	3 days	Mon 10/2/23	Wed 10/4/23	
124					
125	**GC-02, MC-02, EC-01, PC-01 - Miller Toilet Rooms**	**57 days**	**Fri 6/23/23**	**Mon 9/11/23**	
126	Mobilization, temp protections, dumpster & fencing	2 days	Fri 6/23/23	Mon 6/26/23	
127	Demolition All Trades	3 days	Tue 6/27/23	Thu 6/29/23	Weekend/double shift work required
128	New Construction	13 days	Fri 6/30/23	Tue 7/18/23	Weekend/double shift work required
129	Hvac roughin/plumbing & Equipment - MILESTONE	3 days	Wed 7/19/23	Fri 7/21/23	Weekend/double shift work required
130	New Construction	25 days	Mon 7/24/23	Fri 8/25/23	Weekend/double shift work required
131	Plumbing Fixtures - MILESTONE	3 days	Mon 8/28/23	Wed 8/30/23	
132	New Construction	6 days	Thu 8/31/23	Thu 9/7/23	All Toilet Rooms Operational 9/7
133	Cleanup/Demobilize	2 days	Fri 9/8/23	Mon 9/11/23	
134					
135	**EC-01 Miller Switchgear**	**35 days**	**Mon 6/24/24**	**Fri 8/9/24**	
136	Mobilization, temp protections, dumpster & fencing	2 days	Fri 6/28/24	Mon 7/1/24	
137	Abatement	3 days	Tue 7/2/24	Thu 7/4/24	
138	Electrical Equipment Remvoals	5 days	Fri 7/5/24	Thu 7/11/24	
139	Tap in temp generator	2 days	Fri 7/12/24	Mon 7/15/24	
140	Install new Equipment	15 days	Tue 7/16/24	Mon 8/5/24	
141	Testing	1 day	Tue 8/6/24	Tue 8/6/24	
142	Cleaning/demobilize	1 day	Wed 8/7/24	Wed 8/7/24	



NUFSD Phase 2
Milestone Schedule

Task	Inactive Summary	External Tasks	Path Driving Predecessor Summary Task
Split	Manual Task	External Milestone	Path Driving Predecessor Normal Task
Milestone	Duration-only	Deadline	Critical
Summary	Manual Summary Rollup	Path Predecessor Milestone Task	Critical Split
Project Summary	Manual Summary	Path Predecessor Summary Task	Progress
Inactive Task	Start-only	Path Predecessor Normal Task	Manual Progress
Inactive Milestone	Finish-only	Path Driving Predecessor Milestone Task	

AIA® Document A310™ – 2010

Bid Bond

CONTRACTOR:
(Name, legal status and address)

SURETY:
(Name, legal status and principal place of business)

OWNER:
(Name, legal status and address)
Nanuet Union Free School District
101 Church Street
Nanuet, N.Y. 10954

BOND AMOUNT: $

PROJECT:
(Name, location or address, and Project number, if any)
NANUET UNION FREE SCHOOL DISTRICT
NANUET BOND PROJECTS PHASE 2
LIST PROJECT NUMBERS BELOW:
Nanuet HS School: 50-01-08-03-0-003-034
Barr Middle School: 50-01-08-03-0-004-019
G.W. Miller Elementary School: 50-01-08-03-0-001-023
Highview Elementary School: 50-01-08-03-0-002-019

The Contractor and Surety are bound to the Owner in the amount set forth above, for the payment of which the Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, as provided herein. The conditions of this Bond are such that if the Owner accepts the bid of the Contractor within the time specified in the bid documents, or within such time period as may be agreed to by the Owner and Contractor, and the Contractor either (1) enters into a contract with the Owner in accordance with the terms of such bid, and gives such bond or bonds as may be specified in the bidding or Contract Documents, with a surety admitted in the jurisdiction of the Project and otherwise acceptable to the Owner, for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof; or (2) pays to the Owner the difference, not to exceed the amount of this Bond, between the amount specified in said bid and such larger amount for which the Owner may in good faith contract with another party to perform the work covered by said bid, then this obligation shall be null and void, otherwise to remain in full force and effect. The Surety hereby waives any notice of an agreement between the Owner and Contractor to extend the time in which the Owner may accept the bid. Waiver of notice by the Surety shall not apply to any extension exceeding sixty (60) days in the aggregate beyond the time for acceptance of bids specified in the bid documents, and the Owner and Contractor shall obtain the Surety's consent for an extension beyond sixty (60) days.

If this Bond is issued in connection with a subcontractor's bid to a Contractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

When this Bond has been furnished to comply with a statutory or other legal requirement in the location of the Project, any provision in this Bond conflicting with said statutory or

ADDITIONS AND DELETIONS:
The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

Init.
/

legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

Signed and sealed this day of ,

	(Contractor as Principal) *(Seal)*
(Witness)	*(Title)*
	(Surety) *(Seal)*
(Witness)	*(Title)*

Additions and Deletions Report for

AIA® Document A310™ – 2010

This Additions and Deletions Report, as defined on page 1 of the associated document, reproduces below all text the author has added to the standard form AIA document in order to complete it, as well as any text the author may have added to or deleted from the original AIA text. Added text is shown underlined. Deleted text is indicated with a horizontal line through the original AIA text.

Note: This Additions and Deletions Report is provided for information purposes only and is not incorporated into or constitute any part of the associated AIA document. This Additions and Deletions Report and its associated document were generated simultaneously by AIA software at 12:20:41 ET on 12/13/2022.

PAGE 1

Nanuet Union Free School District
101 Church Street
Nanuet, N.Y. 10954

...

NANUET UNION FREE SCHOOL DISTRICT
NANUET BOND PROJECTS PHASE 2
LIST PROJECT NUMBERS BELOW:
Nanuet HS School: 50-01-08-03-0-003-034
Barr Middle School: 50-01-08-03-0-004-019
G.W. Miller Elementary School: 50-01-08-03-0-001-023
Highview Elementary School: 50-01-08-03-0-002-019

Certification of Document's Authenticity

AIA® Document D401™ – 2003

I, David Short, hereby certify, to the best of my knowledge, information and belief, that I created the attached final document simultaneously with its associated Additions and Deletions Report and this certification at 12:20:41 ET on 12/13/2022 under Order No. 2114341191 from AIA Contract Documents software and that in preparing the attached final document I made no changes to the original text of AIA® Document A310™ – 2010, Bid Bond, as published by the AIA in its software, other than those additions and deletions shown in the associated Additions and Deletions Report.

_____

(Signed)

_____

(Title)

_____

(Dated)

SECTION 00 43 25 - SUBSTITUTION REQUEST FORM

Should any part or portion of the Work be planned for substitute products, list all substitutes that are proposed for products that have been specified by one or more manufacturers in the specifications. Please print in ink or type in the spaces provided. Attach additional sheets if necessary.

This identification of substitutions is required of Bidder(s) as part of the Supplementary Bid Forms and is in partial fulfillment of requirements of the Instructions to Bidders. Substitutions may affect Owner's acceptance of the Bid and decision to award Contract. Additional data on substitutions may be requested from selected Bidder(s) after the Bid Opening in accordance with Division 01 Section "Product Requirements."

CONTRACTOR NAME _____

CONTRACT NAME/# _____

SPECIFICATION SECTION	SPECIFIED ITEM	SUBSTITUTION

END OF SECTION 004325

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SECTION 00 43 36 - PROPOSED SUBCONTRACTORS FORM

Should any part or portion of the Work be planned for subcontracting, list the name and address of all Subcontractors that Bidder(s) proposes to use on Prime Contract and the assigned Work to each. Please print in ink or type in the spaces provided. Attach additional sheets if necessary.

This identification of subcontractors is required of Bidder(s) as part of the Supplementary Bid Forms and is in partial fulfillment of requirements of the Instructions to Bidders. Additional data on proposed Subcontractors may be requested from selected Bidders after the Bid Opening in accordance with the Instructions to Bidders.

CONTRACTOR NAME _____

CONTRACT NAME/# _____

SUBCONTRACTOR	ADDRESS	ASSIGNED WORK

END OF SECTION 00 43 36

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 00 45 22 - SEXUALHARASSMENT 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: _____

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SECTION 004543 - CORPORATE RESOLUTIONS

INCLUDE WITH BID FORM(S) IF BIDDER IS AN INDIVIDUAL:

By:_____
(Signature)

_____
(Print or type individual's name and title)

_____
(Business Address)

_____
Business Phone Facsimile

INCLUDE WITH BID FORM(S) IF BIDDER IS A PARTNERSHIP:

_____
(Print or type name of firm)

BY:_____
(Signature of general partner)

_____
(Print or type general partner's name and title)

_____
(Business Address)

_____
Business Phone Facsimile

INCLUDE WITH BID FORM(S) IF BIDDER IS A CORPORATION:

_____
(Print or type name of corporation)

_____
(State of incorporation)

BY:_____
(Signature of president or vice-president)

_____
(Print or type individual's name and title)

_____
(Business Address)

_____
Business Phone Facsimile

ATTEST:

_____
(By corporate secretary or assistant secretary)

_____
(Print name and title)

Corporate Seal

END OF SECTION 004543

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SECTION 00 48 00 - NON-COLLUSIVE CERTIFICATION

PART 1 - GENERAL

1.1 The following provisions of the New York State General Municipal Law form a part of the Bidding Requirements:

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 his or her 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 so furnish with the Bid, a signed statement which sets forth in detail the reasons therefore. 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.

C. The fact that a bidder:

1. has published price lists, rates, or tariffs covering items being procured
2. has informed prospective customers of proposed or pending publication of new or revised price lists for such items, or
3. 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 (A) (1), (2) and

D. 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 certification referred to in subdivision one 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 the corporation.

E. 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 to the person signing in his behalf.

CLOSING: (SIGNATURE)_____ (PRINT NAME) _____

TITLE: _____ DATE _____

COMPANY NAME: _____

ADDRESS: _____

ADDRESS: _____

TELEPHONE NUMBER: _____

FAX NUMBER: _____

CONTACT PERSON: _____

E-MAIL: _____
:

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 00 48 00

SECTION 004801 – GENERAL MUNICIPAL LAW "IRANIAN ENERGY SECTOR DIVESTMENT"

The below signed bidder affirms the following as true under penalties of perjury:

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 that each bidder is not on the list created pursuant to paragraph (b) of subdivision 3 of Section 165-a of the state finance law.

Corporate or Company Name

BY: _____
Signature

_____
Title

Sworn to before me this

_____ day of _____, 20____

_____
Notary Public

END OF SECTION 004801

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SECTION 00 48 01.1 – DECLARATION OF BIDDER'S INABILITY TO PROVIDE CERTIFICATION OF COMPLIANCE WITH THE IRAN DIVESTMENT ACT

Bidders shall complete this form if they cannot certify that the bidder/contractor or any proposed subcontractor is not identified on the Prohibited Entities List. The District reserves the right to undertake any investigation into the information provided herein or to request additional information from the bidder.

Name of the Bidder: _____

Address of Bidder: _____

Has bidder been involved in investment activities in Iran? _____
Describe the type of activities including but not limited to the amounts and the nature of the investments (e.g. banking, energy, real estate)

_____

_____

_____

If so, when did the first investment activity occur? _____

Have the investment activities ended? _____
If so, what was the date of the last investment activity? _____
If not, have the investment activities increased or expanded since April 12, 2012? _____

Has the bidder adopted, publicized, or implemented a formal plan to cease the investment activities in Iran and to refrain from engaging in any new investments in Iran? _____
If so, provide the date of the adoption of the plan by the bidder and proof of the adopted resolution, if any, and a copy of the formal plan. _____

In detail, state the reasons why the bidder cannot provide the Certification of Compliance with the Iran Divestment Act below (additional pages may be attached):

_____

_____

_____

I,_____, being duly sworn, deposes and says that he/she is the _____of the_____Corporation and the foregoing is true and accurate.

_____

SIGNED

SWORN to before me this
_____day of _____20_____

Notary Public: _____

DECLARATION OF BIDDER INABILITY TO COMPLY WITH IRAN DIVESTMENT 00 48 06.1

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SECTION 00 48 06 - WAGE DETERMINATION SCHEDULE

PART 1 - GENERAL

1.1 NEW YORK STATE DEPARTMENT OF EDUCATION INSTRUCTIONS

A. Per instructions from the New York State Education Department in "Office of Facilities Planning Newsletter #106 – May 2011" the PRC number can be used by all prospective bidders to see the appropriate wage rates for the Project by following the website link:

Nanuet Bond Projects Phase 2

https://apps.labor.ny.gov/wpp/publicViewProject.do?method=showIt&id=1534060 or

or PRC# 2022006863

Click on the "Wage Schedule" link near the top of the page.

B. This process may be used for SED approval and for the actual bidding process.

C. Prospective bidders must go to the DOL website with the PRC number provided and make certain their bid price is reflective of the actual wage rates for the particular project.

D. Once the district has identified a low bidder, DOL states that the contract must include the actual wage rates for the project.

E. (Facilities Planning Newsletters can be found online at: http://www.p12.nysed.gov/facplan/NewsLetters.htm)

END OF SECTION 00 48 06

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AIA® Document A132™ – 2019

Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition

AGREEMENT made as of the day of in the year 2023
(In words, indicate day, month and year.)

BETWEEN the Owner:
(Name, legal status, address and other information)

Nanuet School District
101 Church Street
Nanuet, NY 10954
T. 845.343.1481
and the Contractor:
(Name, legal status, address and other information)

for the following Project:
(Name, location and detailed description)
NANUET BOND PROJECTS PHASE 2
Nanuet HS School: 50-01-08-03-0-003-034
Barr Middle School: 50-01-08-03-0-004-019
G.W. Miller Elementary School: 50-01-08-03-0-001-023
Highview Elementary School: 50-01-08-03-0-002-019

The Construction Manager:
(Name, legal status, address and other information)
Jacobs
500 7th Ave, 17th Floor
New York, NY 12601
T. 646.908.6550

The Architect:
(Name, legal status, address and other information)

KSQ Architects, PC (dba KSQ Design)
215 West 40th Street, 15th Floor
New York, NY 10018
T. 914.628.3700

The Owner and Contractor agree as follows.

ADDITIONS AND DELETIONS:
The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

This document is intended to be used in conjunction with AIA Documents A232™–2019, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition; B132™–2019, Standard Form of Agreement Between Owner and Architect, Construction Manager as Adviser Edition; and C132™–2019, Standard Form of Agreement Between Owner and Construction Manager as Adviser. AIA Document A232™–2019 is adopted in this document by reference. Do not use with other general conditions unless this document is modified.

TABLE OF ARTICLES

(Paragraphs deleted)

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, the Bidding Documents, other documents listed in this Agreement, and Modifications issued after execution of this Agreement, all of which form the Contract, and are as fully 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. The Contractor represents that it has fully reviewed the Contract Documents and agrees that the Contract Documents describe, to the best of the Contractor's knowledge, the Work necessary to furnish and provide (and that the Contractor shall furnish and provide) a fully functioning Project consistent with the Contract Documents.

ARTICLE 2 THE WORK OF THIS CONTRACT

The Contractor shall fully execute the Work described in the Contract Documents, except as specifically indicated in the Contract Documents to be the responsibility of others. It is the intent of the parties to include within the Work any and all labor, materials, equipment and services that, although not expressly indicated in the Contract Documents, are reasonably inferable therefrom to construct complete and workable systems for the satisfactory performance, execution, final completion and use of the Work and Project.

ARTICLE 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

§ 3.1 The date of commencement of the Work shall

(Paragraphs deleted)

be the date of this Agreement unless a different date is stated below or provision is made for the date to be fixed in a notice to proceed issued by the Owner.

(Insert the date of commencement, if it differs from the date of this Agreement or, if applicable, state that the date will be fixed in a notice to proceed.)

If, prior to the commencement of the Work, the Owner requires time to file mortgages, mechanics' liens and other security interests, the Owner's time requirement shall be as follows:

§ 3.2 The Contract Time shall be measured from the date of commencement of the Work. The provisions of this Contract relating to the time for performance and completion of the Work are of the essence of this Contract. Accordingly, time is of the essence respecting the Contract Documents and all obligations thereunder.

§ 3.3 The Contractor shall achieve Substantial Completion of the entire Work not later than ( ) days from the date of commencement, or as follows:
(Insert number of calendar days. Alternatively, a calendar date may be used when coordinated with the date of commencement. If appropriate, insert requirements for earlier Substantial Completion of certain portions of the Work.)

As per Milestone Schedule Section 011100

Portion of the Work	Substantial Completion Date

, subject to adjustments of this Contract Time as provided in the Contract Documents.
(Insert provisions, if any, for liquidated damages relating to failure to achieve Substantial Completion on time or for bonus payments for early completion of the Work.)

A fine of $1,000 per calendar day past the date of substantial completion if at no fault of the architect or owner

(Table deleted)
(Paragraphs deleted)
§ 3.4 Time is of the essence in the performance of the Contract Documents, including, without limitation, the Substantial Completion dates established herein. The Contractor shall proceed expeditiously with adequate forces and shall use its best efforts to keep its Work and the Project on schedule, and the Contractor shall achieve the completion times established within the Contract Documents. Milestone dates set forth in the Construction Schedule are dates critical to the Owner's operations that establish when the Work or a part thereof is to commence and be complete. All milestone dates are of the essence.

(Paragraph deleted)
(Table deleted)
(Paragraphs deleted)
ARTICLE 4 CONTRACT SUM
§ 4.1 The Owner shall pay the Contractor the Contract Sum in current funds for the Contractor's performance of the Contract. The Contract Sum shall be one of the following:
(Check the appropriate box.)

[X] Stipulated Sum, in accordance with Section 4.2 below

[ ] Cost of the Work plus the Contractor's Fee, in accordance with Section 4.3 below

[ ] Cost of the Work plus the Contractor's Fee with a Guaranteed Maximum Price, in accordance with Section 4.4 below

(Based on the selection above, complete Section 4.2, 4.3 or 4.4 below.)

§ 4.2 Stipulated Sum
§ 4.2.1 The Contract Sum shall be ($), subject to additions and deductions as provided in the Contract Documents.

§ 4.2.1.1 The Stipulated Sum shall not be adjusted for increased labor or material costs, whether foreseen or unforeseen, which may occur between the date of this Agreement and the Commencement Date, or which may occur between the Commencement Date and the Substantial Completion Date or Dates set forth in this Agreement.

§ 4.2.2 Alternates
§ 4.2.2.1 Alternates, if any, included in the Contract Sum:

Item	Price

§ 4.2.2.2 Subject to the conditions noted below, the following alternates may be accepted by the Owner following execution of this Agreement. Upon acceptance, the Owner shall issue a Modification to this Agreement.
(Insert below each alternate and the conditions that must be met for the Owner to accept the alternate.)

Item	Price	Conditions for Acceptance

§ 4.2.3 Allowances, if any, included in the Contract Sum:
(Identify each allowance.)

Item	Price
Contingency Allowance Contract BE-01	$40,000
Contingency Allowance Contract SW-01	$50,000
Contingency Allowance Contract GC-01	$75,000
Contingency Allowance Contract GC-02	$40,000
Contingency Allowance Contract GC-03	$25,000
Contingency Allowance Contract EC-01	$64,000
Contingency Allowance Contract MC-01	$94,000
Contingency Allowance Contract MC-02	$24,000
Contingency Allowance Contract PC-01	$58,000

§ 4.2.4 Unit prices, if any:
(Identify the item and state the unit price, and quantity limitations, if any, to which the unit price will be applicable.)

Item	Units and Limitations	Price per Unit ($0.00)
As per Specification 01 22 00		

(Paragraphs deleted)
(Table deleted)
(Paragraphs deleted)
(Table deleted)
(Paragraphs deleted)
(Table deleted)
(Paragraphs deleted)
(Table deleted)
(Paragraphs deleted)
(Table deleted)
(Paragraphs deleted)

ARTICLE 5 PAYMENTS

§ 5.1 Progress Payments

§ 5.1.1 Based upon Applications for Payment submitted to the Construction Manager by the Contractor, and upon certification of the Project Application and Project Certificate for Payment or Application for Payment and Certificate for Payment by the Construction Manager and Architect and issuance 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.

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

.

§ 5.1.3 Provided that an Application for Payment is received by the Construction Manager not later than the 7th day of a month, absent any defaults of the Contractor under the Contract Documents, the Owner shall make payment of the certified amount in the Application for Payment to the Contractor not later than the 7th day of the following month. If an Application for Payment is received by the Construction Manager after the application date fixed above, absent any defaults of the Contractor under the Contract Documents, payment shall be made by the Owner not later than thirty (30) days after issuance of a Certificate for Payment.

§ 5.1.4 Progress Payments Where the Contract Sum is Based on a Stipulated Sum

§ 5.1.4.1 Each Application for Payment shall be based on the most recent schedule of values submitted by the Contractor in accordance with the Contract Documents. The schedule of values shall allocate the entire Contract Sum among the various portions of the Work and be prepared in such form and supported by such data to substantiate its accuracy as the Construction Manager and Architect may require. This schedule, unless objected to by the Construction Manager or Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 5.1.4.2 Applications for Payment shall show the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment. 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.

§ 5.1.4.3 In accordance with AIA Document A232™–2019, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition, as modified, and subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

§ 5.1.4.3.1 The amount of each progress payment shall first include:

.1 That portion of the Contract Sum properly allocable to completed Work;

.2 That portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction, or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing; and

.3 That portion of Construction Change Directives that the Architect determines, in the Architect's professional judgment, to be reasonably justified.

§ 5.1.4.3.2 The amount of each progress payment shall then be reduced by:

.1 The aggregate of any amounts previously paid by the Owner;

.2 The amount, if any, for Work that remains uncorrected and for which the Architect has previously withheld a Certificate for Payment as provided in Article 9 of AIA Document A232–2019, as modified;

.3 Any amount for which the Contractor does not intend to pay a Subcontractor or material supplier, unless the Work has been performed by others the Contractor intends to pay;

.4 For Work performed or defects discovered since the last payment application, any amount for which the Owner, Construction Manager or Architect may withhold payment, or nullify a Certificate of Payment in whole or in part, as provided in Article 9 of AIA Document A232–2019, as modified; and

.5 Retainage withheld pursuant to Section 5.1.7.

(Paragraphs deleted)

§ 5.1.7 Retainage

§ 5.1.7.1 For each progress payment made prior to when the Work of this Contract is substantially complete, the Owner may withhold the following amount, as retainage, from the payment otherwise due:
(Insert a percentage or amount to be withheld as retainage from each Application for Payment. The amount of retainage may be limited by governing law.)

Five percent (5%)

§ 5.1.7.1.1 The following items are not subject to retainage:
(Insert any items not subject to the withholding of retainage, such as general conditions, insurance, etc.)

None.

§ 5.1.7.2 Reduction or limitation of retainage, if any, shall be as follows:

(If the retainage established in Section 5.1.7.1 is to be modified prior to when the entire Work of this Contract is substantially complete, including modifications for completion of portions of the Work as provided in Section 3.4.2, insert provisions for such modifications.)

No retainage reduction prior to Substantial Completion of the entire Work and all closeout paperwork received and approved.

§ 5.1.7.3 Except as set forth in this Section 5.1.7.3, when the Work of this Contract is substantially complete, the Contractor may submit an Application for Payment that includes the retainage withheld from prior Applications for Payment pursuant to this Section 5.1.7. The Application for Payment submitted when the Work of this Contract is substantially complete shall not include retainage as follows:
(Insert any other conditions for release of retainage when the Work of this Contract is substantially complete, or upon Substantial Completion of the Work of all Contractors on the Project or portions thereof.)

Upon Substantial Completion of the Work, the payment shall be less two times the value of any remaining Work to be completed as the Construction Manager recommends and the Architect determines for incomplete Work and an amount necessary to satisfy any claims, liens or judgments against the Contractor that have not been suitably discharged.

§ 5.2 Final Payment

§ 5.2.1 Final payment, constituting the entire unpaid balance of the Contract Sum, shall be made by the Owner to the Contractor when

.1 the Contractor has fully performed the Contract except for the Contractor's responsibility to correct Work as provided in Section 12.2 of AIA Document A232–2019, and to satisfy other requirements, if any, which extend beyond final payment;

.2 the Contractor has submitted a final accounting for the Cost of the Work, pursuant to the Table of Contents CSI Format, Determination of the Cost of the Work when payment is on the basis of the Cost of the Work, with or without a Guaranteed Maximum payment; and

.3 a final Certificate for Payment or Project 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 final Certificate for Payment or Project Certificate for Payment, or as follows:

.4 all closeout paperwork per checklist

Refer to Specification Section 01 7701 – Checklist for Project Closeout and Processing of Final Payment.

(Paragraphs deleted)

§ 5.2.2 In addition to other required items, including but not limited to those set forth in Section 5.2.1 above and those required under Section 9.10 of the General Conditions, the final Application for Payment must be accompanied by the following, all in form and substance satisfactory to the Owner and in compliance with applicable law:

.1 permanent certificate(s) of occupancy or use issued by the appropriate governmental authority;

.2 all maintenance and operating manuals;

.3 marked sets of field drawings and specifications reflecting "as-built" conditions;

.4 reproducible Mylar drawings reflecting the location of any concealed utilities, mechanical and electrical systems, and their components;

.5 assignments of all guarantees and warranties to the Contractor from Subcontractors, materialmen, vendors, or manufacturers, together with a list of their names, addresses, telephone numbers, and corresponding guarantees and warranties from each; and

.6 all other information and materials required to comply with the requirements of the Contract Documents or reasonably requested by the Owner, Architect, or Construction Manager.

(Paragraphs deleted)

§ 5.2.3 The Owner's final payment to the Contractor shall be made no later than 30 days after the issuance of the final Certificate for Payment or Project Certificate for Payment.

§ 5.3 Payments due and unpaid under the Contract shall bear interest from the date payment is due

(Paragraphs deleted)
in accordance with Section 106-b(1)(b) of the New York State General Municipal Law.

ARTICLE 6 DISPUTE RESOLUTION

§ 6.1 Initial Decision Maker

The Architect will serve as Initial Decision Maker pursuant to Article 15 of AIA Document A232–2019,
(Paragraphs deleted)
as modified.

§ 6.2 Binding Dispute Resolution

For any Claim, dispute or other matter in controversy arising out of or related to the Contract, the method of binding dispute resolution shall be as follows:
(Check the appropriate box.)

[ ] Arbitration pursuant to Article 15 of AIA Document A232–2019.

[X] Litigation in a court of competent jurisdiction located in Rockland County.

[ ] Other: *(Specify)*

(Paragraphs deleted)

ARTICLE 7 TERMINATION OR SUSPENSION

§ 7.1 Where the Contract Sum is a Stipulated Sum

§ 7.1.1 The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A232–2019, as modified.

(Paragraphs deleted)

§ 7.1.2 The Work may be suspended by the Owner as provided in Article 14 of AIA Document A232–2019, as modified.

(Paragraphs deleted)

ARTICLE 8 MISCELLANEOUS PROVISIONS

§ 8.1 Where reference is made in this Agreement to a provision of AIA Document A232–2019, as modified, or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.

§ 8.2 The Owner's representative:
(Name, address, email address, and other information)

Mario Spagnuolo, Attorney/ Assistant Superintendent for Business
Rudy Villanyi, Director of Facilities
101 Church Street
Nanuet, N.Y. 10954

§ 8.3 The Contractor's representative:
(Name, address, email address, and other information)

TBD

§ 8.4 Neither the Owner's nor the Contractor's representative shall be changed without ten days' prior notice to the other party.

§ 8.5 Insurance and Bonds

§ 8.5.1 The Contractor shall purchase and maintain insurance as set forth in Article 11 of AIA Document A232–2009, as modified.

§ 8.5.2 The Contractor shall provide bonds as set forth in Article 11 of AIA Document A232–2009, as modified.

§ 8.6 Notice in electronic format, pursuant to Article 1 of AIA Document A232–2019, as modified, may be given in accordance with AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, if completed, or as otherwise set forth below:

(If other than in accordance with AIA Document E203–2013, insert requirements for delivering notice in electronic format such as name, title, and email address of the recipient and whether and how the system will be required to generate a read receipt for the transmission.)

If the parties intend to transmit Instruments of Service or any other information or documentation in digital form, they will endeavor to establish necessary protocols governing such transmissions, unless otherwise already provided in the Agreement or the Contract Documents.

§ 8.7 Intentionally omitted.

§ 8.8 Other provisions:

§ 8.8.1 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 Contact Documents; and

.6 that it possesses a high level of experience and expertise in the business administration, construction, construction management and superintendence or 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 Section 8.8.1, 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 9 ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 The Contract Documents, except for Modifications issued after execution of this Agreement, are enumerated in the sections below.

§ 9.1.1 The Agreement is this executed AIA Document A132–2009, Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition.

§ 9.1.2 The General Conditions are, AIA Document A232–2009, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition.

§ 9.1.3 The Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages

§ 9.1.4 The Specifications:
(Either list the Specifications here or refer to an exhibit attached to this Agreement.)
Exhibit A – Specifications table of contents

Section	Title	Date	Pages
Refer to Specification Exhibit, Section 00 0110 for complete list of specifications	Table of Contents	December 15, 2022	

§ 9.1.5 The Drawings:
(Either list the Drawings here or refer to an exhibit attached to this Agreement.)
Exhibit B – List of Drawings

Number	Title	Date
Refer to Drawing Exhibit (TS) Drawing List	Title Sheet	December 15, 2022

(Paragraphs deleted)
§ 9.1.6 The Addenda, if any:

Number	Date	Pages
TBD		

Portions of Addenda relating to bidding requirements are not part of the Contract Documents unless the bidding requirements are also enumerated in this Article 9.

§ 9.1.7 Additional documents, if any, forming part of the Contract Documents are:
(Paragraph deleted)
.1 AIA Document A132™–2009, Exhibit A, Determination of the Cost of the Work, if applicable.
(Paragraph deleted)
.2 AIA Document E201™–2007, Digital Data Protocol Exhibit, if completed, or the following:

(Paragraph deleted)
.3 AIA Document E202™–2008, Building Information Modeling Protocol Exhibit, if completed, or the following:
(Table deleted)

(Table deleted)
.4 Other documents, if any, listed below:
(List here any additional documents which are intended to form part of the Contract Documents. AIA Document A232–2019 provides that bidding requirements such as advertisement or invitation to bid, Instructions to Bidders, sample forms and the Contractor's bid are not part of the Contract Documents unless enumerated in this Agreement. They should be listed here only if intended to be part of the Contract Documents.)

Exhibit B - Bidding Documents: Specification and Drawings

This Agreement is entered into as of the day and year first written above.

OWNER *(Signature)*	**CONTRACTOR** *(Signature)*
Ed Dingman Board President	
(Printed name and title)	*(Printed name and title)*

AIA® Document A232™ – 2019

General Conditions of the Contract for Construction, Construction Manager as Adviser Edition

for the following PROJECT:
(Name, and location or address)

NANUET BOND PROJECTS PHASE 2
Nanuet HS School: 50-01-08-03-0-003-034
Barr Middle School: 50-01-08-03-0-004-019
G.W. Miller Elementary School: 50-01-08-03-0-001-023
Highview Elementary School: 50-01-08-03-0-002-019

THE CONSTRUCTION MANAGER:
(Name, legal status and address)

Jacobs
500 7th Ave, 17th Floor
New York, NY 12601
T. 646.908.6550

THE OWNER:
(Name, legal status and address)

Nanuet School District
101 Church Street
Nanuet, NY 10954
T. 845.343.1481

THE ARCHITECT:
(Name, legal status and address)

KSQ Architects, PC (dba KSQ Design)
215 West 40th Street, 15th Floor
New York, NY 10018
T. 914.628.3700

ADDITIONS AND DELETIONS:
The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

This document is intended to be used in conjunction with AIA Documents A132™–2019, Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition; B132™–2019, Standard Form of Agreement Between Owner and Architect, Construction Manager as Adviser Edition; and C132™–2019, Standard Form of Agreement Between Owner and Construction Manager as Adviser.

Init.
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TABLE OF ARTICLES

ARTICLE 1 GENERAL PROVISIONS

§ 1.1 Basic Definitions

§ 1.1.1 The Contract Documents. The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter, the "Agreement"), and consist of the Bidding Documents (including, but not limited to, Invitations to Bid, Instructions to Bidders, sample forms, the Contractor's bid or portions of the addenda relating to bidding requirements), the Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents listed in the Agreement and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive or (4) a written order for a minor change in the Work issued by the Architect.

§ 1.1.2 The Contract. The Contract Documents form the Contract for Construction (hereinafter, the "Contract"). The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Contractor and the Architect or the Architect's consultants, (2) between the Owner and the Construction Manager or the Construction Manager's consultants, (3) between the Owner and the Architect or the Architect's consultants, (4) between the Contractor and the Construction Manager or the Construction Manager's consultants, (5) between the Owner and a Subcontractor or Sub-subcontractor (6) between the Construction Manager and the Architect, or (7) between any persons or entities other than the Owner and Contractor. The Construction Manager and Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of their duties.

§ 1.1.2.1 Where the term "Agreement," "Contract" or "Prime Contract" is used in these General Conditions, and other Contract Documents, it shall mean the separate Owner-Contractor Agreement between the Owner and each Prime Contractor identified in Conditions of the Contract (General, Supplementary and other conditions).

§ 1.1.2.2 The Contractor acknowledges and warrants that it has closely examined all the Contract Documents, that they are suitable and sufficient to enable the Contractor to complete the Work in a timely manner for the Contract Sum, and that they include all work, whether or not shown or described, which reasonably may be inferred to be required or useful for the completion of the Work in full compliance with all applicable statutes, codes, laws, ordinances and regulations.

§ 1.1.3 The Work. The term "Work" means the construction and services required by the Contract Documents, or as reasonably inferable therefrom, whether completed or partially completed, and includes all other labor, materials, equipment, and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project. The Work includes all of the Contractor's responsibilities as to all labor, parts, supplies, equipment, skill, supervision, transportation services, storage requirements, and other facilities and things necessary, proper or incidental to the carrying out and completion of the terms of the Contract Documents and all other items of cost or value needed to produce, construct, and fully complete the Contractor's Work identified by the Contract Documents.

§ 1.1.4 The Project. The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by other Contractors, and by the Owner's own forces and Separate Contractors.

§ 1.1.5 Contractors. Contractors are persons or entities, other than the Contractor or Separate Contractors, who perform Work under contracts with the Owner that are administered by the Architect and Construction Manager.

§ 1.1.6 Separate Contractors. Separate Contractors are persons or entities who perform construction under separate contracts with the Owner not administered by the Architect and Construction Manager.

§ 1.1.7 The Drawings. The Drawings are the graphic and pictorial portions of the Contract Documents showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules, and diagrams.

§ 1.1.8 The Specifications. The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards and workmanship for the Work, and performance of related services and general requirements for the Project.

§ 1.1.9 Instruments of Service. Instruments of Service are representations, in any medium of expression now known or later developed, of the tangible and intangible creative work performed by the Architect and the Architect's consultants under their respective professional services agreements. Instruments of Service may include, without limitation, studies, surveys, models, sketches, drawings, specifications, and other similar materials including those in electronic form.

§ 1.1.10 Initial Decision Maker. The Initial Decision Maker is the person identified in the Agreement to render initial decisions on Claims in accordance with Section 15.2. The Initial Decision Maker shall not show partiality to the Owner or Contractor and shall not be liable for results of interpretations or decisions rendered in good faith.

§ 1.1.11 Miscellaneous Definitions

§ 1.1.11.1 The terms "knowledge," "recognize" and "discover," their respective derivatives and similar terms in the Contract Documents, as used in reference to the Contractor, shall be interpreted to mean that which the Contractor knows (or should know), recognizes (or should recognize) and discovers (or should discover) in exercising the care, skill, and diligence required by the Contract Documents. The expression "reasonably inferable" and similar terms in the Contract Documents shall be interpreted to mean reasonably inferable by a contractor familiar with the Project and exercising care, skill, and diligence required of the Contractor by the Contract Documents.

§ 1.1.11.2 The term "any" in the Contract Documents shall be interpreted as "any and all" whenever one or more than one item would be applicable for completion of the Work.

§ 1.1.11.3 Except as otherwise explicitly provided, the words "approved" or "approval" shall mean the written approval of the Architect or the Construction Manager, or both.

§ 1.1.11.4 "Accepted," "directed," "permitted," "requested," "required," and "selected" are used herein as term connections and unless specifically noted otherwise are to mean "accepted by the Architect," "directed by the Architect," "permitted by the Architect," "requested by the Architect," "required by the Architect," and "selected by the Architect." However, no such implied meaning will be interpreted to extend the Architect's responsibility into the Contractor's areas of construction supervision.

§ 1.1.11.5 The term "as indicated" or "as shown" shall mean "as indicated in the Contract Documents."

§ 1.1.11.6 The term "include" in any form other than "inclusive" is non-limiting and not intended to mean "all inclusive."

§ 1.1.11.7 The terms "furnish" and "furnish all materials," unless specifically noted otherwise, mean "pay for, supply and deliver to the job site all new materials, systems, equipment, product, and/or other items so specified."

§ 1.1.11.8 The terms "install" and "furnish all labor," unless specifically noted otherwise, mean "pay for, perform all operations connected with installation of Work including unloading new product to be installed, supplying all necessary equipment and rigs to do the Work, test, place in operation and service, and remove all packing material."

§ 1.1.11.9 The term "product" includes materials, systems, equipment, and other items to be incorporated into the Work.

§ 1.1.11.10 The term "provide," unless specifically noted otherwise, means "furnish new, install, connect up, complete, test and place in operation and service."

§ 1.1.11.11 The term "replace" or similar term shall mean "restore," "renew," "make good," "reconstruct," or "as applicable using new product."

§ 1.1.11.12 The term "concealed" as used herein shall mean items hidden from sight in such locations as trenches, chases, shafts, furred spaces, walls, slabs, above ceilings and where in sight in crawl spaces or service tunnels.

§1.1.11.13 The term "exposed" as used herein shall mean not "concealed" as defined herein and the spaces behind normally closed doors such as interiors of cabinets.

§ 1.1.11.14 The terms "manufacturer" or "supplier" mean any person or entity which contracts to furnish materials to a Contractor, Subcontractor, or any Sub-subcontractor for use at the site of the Project.

§ 1.1.11.15 "Wiring" shall be understood to mean wires or cables with conduit, fittings, boxes, etc., installed complete.

§ 1.1.11.16 "Piping" shall be understood to mean all pipes, fittings, nipples, valves and all accessories connected thereto.

§ 1.1.11.17 The Contract Time is the period of time specified in Article 3 of the Agreement for completion of the Work.

§ 1.1.11.18 Terms not otherwise defined herein shall have the meanings set forth elsewhere in the Contract Documents.

§ 1.2 Correlation and Intent of the Contract Documents

§ 1.2.1 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results. It is intended that all plumbing, mechanical, electrical, and other systems will be complete and in proper operation, and that all construction components, whether part of such systems or otherwise, will be complete and in compliance with accepted construction practice upon completion of the Work. Even if items are missing from the Drawings or Specifications, but are normally required for proper operation of plumbing, mechanical, electrical, and other systems, or to complete otherwise incomplete construction, or to meet governing code requirements, they shall be included by the Contractor, unless he sought and received contradictory interpretation or clarification from the Architect.

§ 1.2.1.1 The invalidity of any provision of the Contract Documents shall not invalidate the Contract or its remaining provisions. If it is determined that any provision of the Contract violates any law, or is otherwise invalid or unenforceable, then that provision shall be revised to the extent necessary to make that provision legal and enforceable. In such case the Contract shall be construed, to the fullest extent permitted by law, to give effect to the parties' intentions and purposes in executing the Contract.

§ 1.2.1.2 The Contractor and its Subcontractors shall evaluate and satisfy themselves as to the conditions and limitations under which the Work is to be performed, including without limitation (1) location, layout, and nature of the Project site and surrounding areas, (2) generally prevailing climatic conditions, (3) anticipated labor supply and costs, (4) availability and cost of materials, tools, equipment, (5) Owner occupancy requirements and constraints, (6) site safety logistics plan and any phased construction plan and (7) other similar issues. The Owner assumes no responsibility or liability for the physical condition or safety of the Project site or any improvements located on the Project site. The Contractor shall be solely responsible for providing a safe place for the performance of the Work. No adjustments will be made in either the Contract Sum or Contract Time for any failure by the Contractor or any Subcontractor to comply with the requirements of this Section 1.2.1.2.

§ 1.2.2 Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade. Instructions and other information furnished in the Specifications including, without limitation, items in connection with prefabricated or prefinished items, are not intended to supersede work agreements between employers and employees. Should the Specifications conflict with such work agreements, the work agreements shall be followed, provided such items are provided and finished as specified in the Contract Documents. If necessary, such work shall be performed on the Project site, instead of at the shop, by appropriate labor and in accordance with the requirements of the Drawings and Specifications.

§ 1.2.3 Unless otherwise stated in the Contract Documents, words that have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

§ 1.2.4 In the event of inconsistencies within or between parts of the Contract Documents or between the Contract Documents and applicable standards, codes and ordinances, the Contractor shall (1) provide the better quality or greater quantity of work or (2) comply with the more stringent requirements; either or both in accordance with the Architect's interpretation. Where the Contractor perceives a conflict, it shall inform the Architect and Owner thereof and request a decision from the Architect, which shall be promptly communicated by the Architect to the Contractor so as not to cause any delay in the performance of the Work. Any Work performed after perceiving the conflict and prior to resolution by the Architect shall be at the Contractor's risk. The terms and provisions of this Section 1.2.4, however, shall not relieve the Contractor of any of the obligations set forth elsewhere herein.

.1 The Contractor shall not scale Drawings. Dimensions on large scale drawings take precedence over dimensions on small scale drawings. The Contractor shall notify the Architect if additional dimensions are needed. The Contractor shall field verify all dimensions.

.2 Before ordering any materials or doing any work, the Contractor and each Subcontractor shall verify measurements at the Project Site and shall be responsible for the correctness of such measurements. The Contractor shall confirm all dimensions by field measuring. No extra charge or compensation will be allowed on account of differences between actual dimensions and the dimensions indicated on the Drawings. Any difference that may be found shall be submitted to the Architect for resolution before proceeding with the Work.

.3 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.

.4 Certain portions of the Specifications are written in condensed outline form and omitted words are to be supplied by inference. Naming of an article or operations shall have the effect of stating "Contractor shall furnish, install and complete" said operation or article unless it is further qualified in the context in which it appears.

.5 When reference is made to specifications of a manufacturer, trade association, governmental agency, reference standard or similar source (such as ASTM, ASA, AISC, ACI, etc.) such is made part of these Specifications, having the force and effect as though reproduced herein, and upon entering into the Contract the Contractor acknowledges his familiarity with those pertaining to his work. The date of the reference standard shall be the latest edition at the time of signing the Contract except as specifically indicated otherwise.

.6 The Contract Drawings are intended to show the general arrangement, design, and extent of the Work and are partly diagrammatic. They are not intended to be scaled for any purpose, or to serve as shop drawings. The Contractor and its Subcontractors will cooperate with all other contractors and their respective subcontractors in determining the construction of systems, running of pipe, and locating equipment. The Contractor agrees that the failure to repeat typical details, figures, or notes on all Contract Drawings or other Contract Documents will not be a basis for claims for additional cost or time.

.7 Any necessary variations in routing or installation shall be made to conform to the intent of the Contract Documents without additional costs. Where there are intersections or obstructions involving ducts, piping, or any other equipment requiring offset of materials, the Contractor acknowledges that it gave particular consideration to clearances in advance of submitting its bid, and that no additional costs for these issues will be considered by the Owner.

.8 If conflicting conditions or interferences develop, the Contractor and its Subcontractors will confer with the other contractors and their respective subcontractors whose work is affected to determine a solution acceptable to all interested parties. The suggested solution shall be submitted to the Architect for comment and, if necessary, written approval.

.9 The Contract Documents intend a first class finished product of such character and quality as described in and reasonably inferred from the Contract Documents. The Contractor will perform its Work to be complete and operable, fitting with the work of other contractors and the Owner, and in compliance with best construction practices and the ordinances, codes, and regulations of all bodies or persons having governmental or regulatory authority over the Contractor and its Work.

§ 1.2.5 Execution of the Contract by the Contractor is a representation that the Contractor has carefully examined the Contract Documents and the Project site, and represents that the Contractor is thoroughly familiar with the nature and location of the Work, the Project site, the specific conditions under which the Work is to be performed, and all matters which may in any way affect the Work or its performance. The Contractor further represents that as a result of such examinations and investigations, the Contractor thoroughly understands the Contract Documents and their intent and purpose, and is familiar with all applicable codes, ordinances, laws, regulations, and rules as they apply to the Work, and that the Contractor will abide by same. Claims for additional time or additional compensation as a result of the Contractor's failure to follow the foregoing procedure and to familiarize itself with all conditions and the Contract Documents will not be permitted.

§ 1.2.5.1 The 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 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.

§ 1.3 Capitalization

Terms capitalized in these General Conditions include those that are (1) specifically defined, (2) the titles of numbered articles, or (3) the titles of other documents published by the American Institute of Architects.

§ 1.4 Interpretation

In the interest of brevity the Contract Documents frequently omit modifying words such as "all" and "any" and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

§ 1.5 Ownership and Use of Drawings, Specifications, and Other Instruments of Service

§ 1.5.1 The Architect and the Architect's consultants shall be deemed the authors and owners of their respective Instruments of Service, including the Drawings and Specifications, and retain all common law, statutory, and other reserved rights in their Instruments of Service, including copyrights. The Contractor, Subcontractors, sub-subcontractors, and suppliers do not own and cannot claim a copyright in the Instruments of Service. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with the Project is not to be construed as publication in derogation of the Architect's or Architect's consultants' reserved rights.

§ 1.5.2 The Contractor, Subcontractors, Sub-subcontractors, and suppliers are authorized to use and reproduce the Instruments of Service provided to them, subject to any protocols established pursuant to Sections 1.7 and 1.8, solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and suppliers may not use the Instruments of Service on other projects or for additions to the Project outside the scope of the Work without the specific written consent of the Owner, Architect, and the Architect's consultants.

§ 1.5.3 The Contractor may not reproduce the Contract Documents in whole or in part for use as shop drawing backgrounds without the prior written consent of the Architect. If consent is given, the Architect shall determine the extent that the Contract Documents may be used in the preparation of shop drawings, as well as the fee that the Architect will be paid, if any and in the Architect's sole discretion, by the Contractor for such use of copyrighted documents.

§ 1.6 Notice

§ 1.6.1 Except as otherwise provided in Section 1.6.2, where the Contract Documents require one party to notify or give notice to the other party, such notice shall be provided in writing to the designated representative of the party to whom the notice is addressed and shall be deemed to have been duly served if delivered in person, by mail, by courier, or by electronic transmission if a method for electronic transmission is set forth in the Agreement.

§ 1.6.2 Notice of Claims as provided in Section 15.1.3 shall be provided in writing and shall be deemed to have been duly served only if delivered to the designated representative of the party to whom the notice is addressed by certified or registered mail, or by courier providing proof of delivery.

§ 1.7 Digital Data Use and Transmission

The parties shall agree upon protocols governing the transmission and use of Instruments of Service or any other information or documentation in digital form. The parties will use AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, to establish the protocols for the development, use, transmission, and exchange of digital data.

§ 1.8 Building Information Models Use and Reliance

Any use of, or reliance on, all or a portion of a building information model without agreement to protocols governing the use of, and reliance on, the information contained in the model and without having those protocols set forth in AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, and the requisite AIA Document G202™–2013, Project Building Information Modeling Protocol Form, shall be at the using or relying party's sole risk and without liability to the other party and its contractors or consultants, the authors of, or contributors to, the building information model, and each of their agents and employees.

ARTICLE 2 OWNER

§ 2.1 General

§ 2.1.1 The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner shall designate in writing a representative who shall have express authority to bind the Owner with respect to all matters requiring the Owner's approval or authorization. Except as otherwise provided in Section 4.2.1, the Construction Manager and the Architect do not have such authority. The term "Owner" means the Owner or the Owner's authorized representative.

§ 2.1.2 The Owner shall furnish to the Contractor, within fifteen days after receipt of a written request, information necessary and relevant for the Contractor to evaluate, give notice of, or enforce mechanic's lien rights. Such information shall include a correct statement of the record legal title to the property on which the Project is located, usually referred to as the site, and the Owner's interest therein.

§ 2.1.3 The Owner, Architect or Construction Manager shall not supervise, direct or have control or authority over, nor be responsible for, the Contractor's means, methods, techniques, sequences or procedures of construction or the safety precautions and programs incident thereto, or for any failure of the Contractor to comply with laws and regulations applicable to the furnishing or performance of the Work. The Owner, Architect and Construction Manager shall not be responsible for the Contractor's failure to perform or furnish the Work in accordance with the Contract Documents.

§ 2.2 Evidence of the Owner's Financial Arrangements – Intentionally Omitted.

(Paragraphs deleted)

§ 2.3 Information and Services Required of the Owner

§ 2.3.1 All permits and fees, approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities are the responsibility of the Contractor under the Contract Documents with the exception of the building permit, which the Owner will obtain from the State Education Department.

§ 2.3.2 The Owner shall retain an architect lawfully licensed to practice architecture, or an entity lawfully practicing architecture, in the jurisdiction where the Project is located. That person or entity is identified as the Architect in the Agreement and is referred to throughout the Contract Documents as if singular in number.

§ 2.3.3 The Owner shall retain a construction manager adviser lawfully practicing construction management in the jurisdiction where the Project is located. That person or entity is identified as the Construction Manager in the Agreement and is referred to throughout the Contract Documents as if singular in number.

§ 2.3.4 If the employment of the Construction Manager or Architect terminates, the Owner shall employ a successor construction manager or architect whose status under the Contract Documents shall be that of the Construction Manager or Architect, respectively.

§ 2.3.5 The Owner shall make available for inspection, upon request, that field survey or testing information of existing conditions that is known to be available and that is held by the Owner at its offices. Such records and documents are not Contract Documents, and the Owner makes no representation as to their accuracy or completeness. Notwithstanding the

foregoing, information furnished by the Owner in the form of surveys, subsurface investigation reports, soil borings, and other material of a similar nature, is for general information only and is not a guarantee of the completeness or accuracy of such information, unless specifically noted otherwise herein. The Contractor shall verify all existing grades, conditions, and dimensions of existing physical conditions and structures and shall report any inconsistencies in writing to the Architect. The Contractor shall establish all lines and levels required to execute the Work and shall bear all costs involved, and shall be responsible for their accuracy and maintenance.

§ 2.3.6 Intentionally omitted.

§ 2.3.7 Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor five (5) sets of Contract Drawings and Project Manuals for use during construction for their own use and for purposes of making reproductions pursuant to Section 1.5.2. The Owner shall furnish additional sets upon a Contractor's written request. Such additional sets will be provided at the cost of printing, postage and handling. Partial sets will not be provided. Subcontractors and other entities desiring copies of Drawings will be provided sets at the cost of printing, postage and handling.

§ 2.3.8 The Owner shall forward all communications to the Contractor through the Construction Manager. Other communication shall be made as set forth in Section 4.2.6.

§ 2.4 Owner's Right to Stop the Work

If the Contractor (1) fails to correct Work that is not in accordance with the requirements of the Contract Documents as required by Section 12.2, or (2) fails to carry out Work in accordance with the Contract Documents as determined by the Owner, Architect or Construction Manager, 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 seven (7) days) any lien filed upon Owner's property by anyone claiming by, through, or under the Contractor, or (5) fails to perform the Work in a safe manner and in compliance with all applicable health and safety requirements and the Contractor's site specific health and safety plan or (6) disregards the instructions of the Architect, Owner or Construction Manager, as determined by the Owner, Architect or Construction Manager, the Owner may issue a written order to the Contractor to stop the 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. Such order or stoppage by the Owner shall not constitute grounds for termination by the Contractor under Article 14 and shall not be a basis for an extension of the Contract Time under Section 8.3 or Article 15.

§ 2.5 Owner's Right to Carry Out the Work

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents (including but not limited to all applicable health and safety requirements) and fails within a three (3) work 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 after such three (3) work day period, without prejudice to other remedies the Owner may have, correct such deficiencies. In such case an appropriate Change Order or Construction Change Directive shall be issued deducting from payments then or thereafter due the Contractor the reasonable cost of correcting such deficiencies, including the Owner's expenses and compensation for the Construction Manager's and Architect's and their respective consultants' additional services and other expenses made necessary by such default, neglect or failure. Such Change Order or Construction Change Directive shall be deemed to have been executed by the Contractor, whether or not actually signed by the Contractor. Such action by the Owner and amounts charged to the Contractor shall be equally binding upon the Contractor's performance and payment bond surety. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner.

§ 2.6 Extent of Owner's Rights

§ 2.6.1 The rights stated in this Article 2 and elsewhere in the Contract Documents are cumulative and not in limitation of any rights of the Owner (1) granted in the Contract Documents, (2) at law or (3) in equity.

§ 2.6.2 In no event shall the Owner, Architect or Construction Manager have any responsibility for the Contractor's construction means, methods, techniques, sequences or procedures or for safety precautions and programs in connection with the Work notwithstanding any of the rights and authority granted the Owner in the Contract Documents.

ARTICLE 3 CONTRACTOR

§ 3.1 General

§ 3.1.1 The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Contractor shall be lawfully licensed, if required in the jurisdiction where the Project is located. The Contractor shall designate in writing a representative who shall have express authority to bind the Contractor with respect to all matters under this Contract. The term "Contractor" means the Contractor or the Contractor's authorized representative.

The term "Contractor" used herein shall include:

1. That Contractor normally responsible for that Work referenced.
2. "Prime Contractor" meaning either General Contractor, HVAC Contractor, Plumbing Contractor, Electrical Contractor, or any other Contractor whom the Owner has a direct contractual relationship for the referenced Work.
3. "Trade Contractor" meaning the Prime Contractor as above.

§ 3.1.2 The plural term "Multiple Prime Contractors" refers to persons or entities who perform construction under contracts with the Owner that are administered by the Construction Manager. The term does not include the Owner's own forces, including persons or entities under separate contracts not administered by the Construction Manager.

§ 3.1.3 The Contractor shall perform the Work in accordance with the Contract Documents.

§ 3.1.4 The Contractor shall not be relieved of obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Construction Manager or Architect in their administration of the Contract, or by tests, inspections or approvals required or performed by persons or entities other than the Contractor.

§ 3.2 Review of Contract Documents and Field Conditions by Contractor

§ 3.2.1 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be performed, and correlated personal observations with requirements of the Contract Documents.

§ 3.2.1.1 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the Contract Documents relative to that portion of the Work, as well as with information furnished by the Owner pursuant to Section 2.3.5, shall take field measurements of any existing conditions related to that portion of the Work, shall observe any conditions at the site affecting it, and shall at once report in writing to the Construction Manager and the Architect errors, inconsistencies or omissions discovered. The Contractor shall not be liable to the Owner, the Construction Manager or the Architect for damage resulting from errors, inconsistencies or omissions in the Contract Documents unless the Contractor knew or reasonably should have known of such error, inconsistency or omission and failed to report it as required by this section to the Construction Manager and the Architect. If the Contractor performs any construction activity knowing it involves, or reasonably should have known it involves, a recognized error, inconsistency or omission in the Contract Documents without such notice to the Construction Manager and the Architect, the Contractor shall assume full responsibility for such performance and shall bear sole responsibility for the costs for correction.

§ 3.2.1.2 The obligations of the Contractor under Section 3.2.1.1 and this Section 3.2.1.2 are for the purpose of facilitating construction by the Contractor and are not for the purpose of imposing an affirmative obligation on the Contractor to discover errors, omissions, or inconsistencies in the design information in the Contract Documents. The Contractor's review of the Contract Documents is made in the Contractor's capacity as a contractor and not as a licensed design professional unless otherwise specifically so provided in the Contract Documents.

§ 3.2.1.3 Failure by the Contractor to promptly report any errors, inconsistencies, or omissions in the Contract Documents discovered by the Contractor, or which the Contractor reasonably should have known or discovered, shall constitute a waiver by the Contractor of any claim that otherwise might result in a change in the Contract Sum or Contract Time.

§ 3.2.2 The Contractor shall be presumed to have examined the Project site(s) to consider fully all conditions that may have a bearing on the Work and to have accounted for these conditions its proposal. The Contractor is deemed to be a qualified expert in the systems and construction requirements of the Work of its Contract. The Contractor hereby specifically acknowledges and declares that the Contract Documents are full and complete, are sufficient to have enabled it to determine the cost of the Work, and that the Drawings, the Specifications, and all Addenda are sufficient to enable the Contractor to construct the Work outlined therein in accordance with applicable laws, statutes, building codes, and regulations, and otherwise to fulfill all of its obligations under the Contract Documents. 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 Construction Manager and the Architect at once. The exactness of grades, elevations, dimensions, or locations given on any Drawings issued by the Architect, or the work installed by other Contractors, is not guaranteed by the Architect, Construction Manager or the Owner. The Contractor shall, therefore, satisfy itself as to the accuracy of all grades, elevations, dimensions, and locations. In all cases of interconnection of its Work with existing or other work, the Contractor 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, dimensions, or locations shall be promptly rectified by the Contractor without any additional cost to the Owner. Except as to any reported errors, inconsistencies or omissions, and except as to concealed or unknown conditions, by executing the Agreement, the Contractor represents to the Owner, Construction Manager, and the Architect that the Work required by the Contract Documents, including, without limitation, all construction details, construction means, methods, procedure and techniques necessary to perform the Work, use of materials, selection of equipment and requirements of product manufacturers are consistent with: (1) good and sound practices within the construction industry; (2) generally prevailing and accepted industry standards applicable to Work; (3) the requirements of any warranties applicable to the Work; and (4) all laws, ordinances, regulations, rules and orders which bear upon the Contractor's performance of the Work.

§ 3.2.3 The Contractor shall perform the Work in accordance with the Contract Documents and submittals approved pursuant to Section 3.12.

§ 3.2.4 The Contractor may submit Requests for Information ("RFI") to the Architect to help facilitate the Contractor's performance of the Work. Prior to submitting each RFI, the Contractor shall first carefully study and compare the Contract Documents, field conditions, other Owner provided information, Contractor-prepared Coordination Drawings, and prior Project correspondence and documentation to determine that the information to be requested is not reasonably obtainable from such sources. The Contractor shall submit each RFI sufficiently in advance of the date by which such information is required in order to allow the Architect sufficient time to permit adequate review and response and to permit Contractor compliance with the latest construction schedule. The Contractor shall reimburse the Owner amounts charged by the Architect for RFI responses that in the opinion of the Architect were available from a careful review of the Contract Documents, field conditions, other Owner provided information, Contractor-prepared Coordination Drawings, and prior Project correspondence and documentation.

§ 3.2.5 If the Contractor, during the progress of the Work, discovers any discrepancies between the Drawings and the Specifications, errors and/or omissions on the Drawings, or any discrepancies between physical conditions of the Work and the Drawings, and has notified the Architect and Construction Manager in writing under Section 3.2.1, no deviations from the Contract Documents shall be performed by the Contractor until it receives approval in writing from the Architect through the Construction Manager. Any Work performed after such discovery without the approval of the Architect shall be at the Contractor's sole risk and expense.

§ 3.2.6 The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Contractor shall promptly report to the Construction Manager and the Architect any nonconformity discovered by or made known to the Contractor as a RFI submitted to the Architect.

§ 3.2.7 If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Architect issues in response to the Contractor's notices or RFIs pursuant to Sections 3.2.1, 3.2.2, 3.2.4, 3.2.5 or 3.2.6, the Contractor shall make a Claim as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2.1, 3.2.2, 3.2.4, 3.2.5 or 3.2.6, the Contractor shall pay such costs and damages to the Owner as would have been avoided if the Contractor had performed such obligations. If the Contractor performs those obligations, the Contractor shall not be liable to the Owner or the Architect for damages resulting from errors, inconsistencies or

omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities.

§ 3.2.8 The Contractor shall be responsible for laying out the Work, shall protect and preserve the established reference points and shall make no changes or relocations without the prior written approval of Owner. The Contractor shall report to the Construction Manager and Architect whenever any reference point is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points by professionally qualified personnel.

§ 3.2.8.1 The Contractor shall be required to establish centerlines, elevations and location of his work when it is required for the benefit of other Contractors needing the information to coordinate location of their work.

§ 3.2.9 Whenever the Drawings show existing or other construction not required as part of the Contract Work, it is understood that it is so shown as a matter of information and that the Owner, while believing such information to be substantially correct, assumes no responsibility thereof. The Contractor shall make itself familiar with all conditions affecting the nature and manner of conducting the Work.

§ 3.2.10 Claims for additional compensation or extension of time due to the Contractor's failure to familiarize itself with the conditions at the site will not be allowed.

§ 3.3 Supervision and Construction Procedures

§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention, and shall complete the Work in a good and workmanlike manner in accordance with the Contract Documents. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences, and procedures and for coordinating all portions of the Work subject to the coordination of the Construction Manager. Where the Drawings 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.

§ 3.3.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors, Suppliers, and their agents and employees, and other persons or entities performing portions of the Work for, or on behalf of, the Contractor or any of its Subcontractors, Suppliers or Sub-subcontractors, and for any damages, losses, costs and expenses resulting from such acts or omissions, including but not limited to reasonable attorneys' fees.

§ 3.3.3 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.

§ 3.3.3.1 The Contractor shall coordinate its operations and cooperate with those of other Contractors performing work on the Project or site thereof to ensure efficient and orderly installation of each part of the Work. Cooperation will be required in the arrangement for the storage of materials and in the detailed execution of the Work. The Contractor shall remain informed of the progress and the detail work of other Contractors and shall notify the Construction Manager immediately of lack of progress or defective workmanship on the part of other Contractors, where such delay or such defective workmanship will interfere with Contractor's own operations. Failure of the Contractor to keep informed of the work progressing on the site or to give notice of lack of progress or defective workmanship by others shall be construed as acceptance of the progress of work and coordination with Contractor's own Work.

§ 3.3.3.2 The Contractor's obligations under the Contract Documents shall include, without limitation, the following:

.1 Review of all specified construction and installation procedures with its employees and/or Subcontractors, including, without limitation, those recommended by manufacturers, prior to the commencement of the relevant portion of the Work to be performed.

.2 Advising the Construction Manager and the Architect:

.1 if a specified procedure deviates from best construction practice;

.2 if following a procedure will affect any warranties, including the Contractor's general warranty; or

.3 of any objections the Contractor may have to a procedure.

.3 Proposing alternative procedures, as appropriate, which procedures shall be covered by the Contractor's warranty as described in Section 3.5 hereof.

.4 The Contractor shall be responsible for organizing and conducting pre-installation conferences and must coordinate such conferences with the Architect and the Construction Manager.

§ 3.3.3.3 The Contractor and its Subcontractors working on the Project shall attend a preconstruction conference(s) or meeting(s) as deemed necessary by the Construction Manager to coordinate all Work (e.g., demolition, installation, etc.), and as required by the Project Manual.

§ 3.3.4 The Contractor shall not be relieved of obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Construction Manager or the Architect in their administration of the Contract, or by tests, inspections or approvals required or performed by persons other than the Contractor. The Contractor shall maintain complete inspection records and test date to ensure the quality of the Work is in strict compliance with the requirements of the Contract Documents.

§ 3.3.5 Where equipment lines, piping, ductwork, and/or conduit are shown diagrammatically, the Contractor shall be responsible for the coordination and orderly arrangement of the various lines of piping and conduit included in the Work of its Contract. The Contractor shall coordinate the work of its Subcontractors and prevent all interferences between or among equipment, lines of piping, and architectural features, and avoid any unsightly arrangements in exposed areas. This Section shall not be construed as limiting any obligation of the Contractor under any other provision of the Contract Documents.

§ 3.3.6 The Contractor shall be responsible for inspection of portions of the Project already performed to determine that such portions are in proper condition to receive subsequent Work.

§ 3.3.7 The Contractor, its employees and Subcontractors, shall be subject to such rules and regulations for the conduct of Work as the Owner may establish, including but not limited to, the Construction Rules and Regulations set forth in Section 3.13.4. The Contractor shall be responsible for the enforcement among its employees of the Owner's instructions.

§ 3.3.8 The Contractor shall inspect all materials as delivered to the Project site and shall reject any materials that will not conform with the requirements of the Contract Documents when properly installed.

§ 3.3.9 The Contractor shall be responsible for and coordinate any and all inspections required by any governmental body having jurisdiction over the Project. Failure to obtain any permits, licenses or other approvals because of the failure of the Contractor to conform to this requirement shall not extend the Contract time, and the Contractor shall not be entitled to any increase in the Contract Sum therefore. In addition, any additional costs and expenses of any nature incurred by the Owner as a result of the Contractor's failure to conform to this requirement shall constitute a charge against the Contractor's Contract.

§ 3.3.10 Shutdowns: Such work as connections to existing sewers, plumbing, heating, and electrical systems shall be coordinated at a time agreeable to the Owner, the Architect, and the Construction Manager, and shall be determined and agreed to well in advance of the actual performance of such work so as to interfere as little as possible with the operation and use of the Owner's existing facilities. Shutdowns must be coordinated through the Construction Manager. The continued uninterrupted operation of all facilities of the Owner's buildings is essential. If any existing facilities must be interrupted, the Contractor for the Work shall provide all necessary temporary facilities and connections necessary for maintaining these existing facilities at no increase in the Contract Sum except as otherwise specified. No mechanical, heating, plumbing, sprinkler, or electric service shall be interrupted at any time except as approved in advance by the Owner or when the buildings are not occupied and shall be coordinated with the Owner, as

well as the Construction Manager. All communication systems must be maintained without interruption. As much related work as possible shall be performed prior to shutdowns, so as to minimize the period of shut down. All material, equipment, and manpower necessary in the performance of a shutdown shall be on site prior to interruption of service.

§ 3.4 Labor and Materials

§ 3.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor (at applicable prevailing wage rates), materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work. All materials provided by Contractor shall be new. The Contractor shall work continuously and expeditiously through completion of the Work. Time is of the essence.

§ 3.4.1.1 Notwithstanding any other provision of the Contract Documents, Contractor shall perform at least twenty five (25%) percent of the field work with its own full-time employees. For the purpose of the preceding sentence any part of the work performed by supervisory personnel (persons above level of foreman) or by office personnel shall not be considered part of the Work performed by Contractor's employees. Such items as bonds, certificates, shop drawings and similar items are not to be counted as satisfying the twenty five (25%) percent requirement**.**

§ 3.4.1.1 A shortage of labor in the industry shall not be accepted as an excuse for not properly manning the Project at each site.

§ 3.4.1.2 The Contractor shall be responsible for the care and protection of all equipment and materials for its Work on the Project, including equipment and material furnished by the Owner.

§ 3.4.2 Except in the case of minor changes in the Work approved by the Architect in accordance with Section 3.12.8 or ordered by the Architect in accordance with Section 7.4, the Contractor may make substitutions only with the consent of the Owner, after evaluation by the Architect, in consultation with the Construction Manager, and in accordance with a resulting Change Order or Construction Change Directive.

§ 3.4.3 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Work. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them, or persons who within the last five (5) days (a) having been exposed to someone having been diagnosed with a COVID-19 infection; or (b) having had a persistent cough, shortness of breath, or a fever of 100.4 or higher. The Owner reserves the right to have any persons removed from the Project upon reasonable objection.

§ 3.4.3.1 In addition to all other safety requirements, the Contractor shall provide suitable and a sufficient number of safety related facilities and personal protective equipment (PPE) at the site related to protection against the spread of COVID-19, including but not limited to handwashing stations, hand sanitizer, gloves, masks, faceshields, and other equipment as the Owner may reasonably request. Notwithstanding the foregoing, nothing herein shall be construed to delegate or relieve Contractor from having sole and exclusive responsibility for all worksite safety.

§ 3.4.4 All mechanics employed on the Project shall be persons skilled in that work which they are to perform. Work will not be approved if it does not meet the quality of workmanship as called for in the Contract Documents. If this quality of workmanship is not exactly defined herein, it shall be assumed to be the best standards of workmanship for the trade.

§ 3.4.5 Employees of the Contractor or its Subcontractors whose work is unsatisfactory to the Owner, Construction Manager or Architect, or considered by them to be unskilled or otherwise objectionable, will be immediately dismissed from the Project upon notice from the Construction Manager. Those dismissed employees shall be immediately replaced by the Contractor so as not to delay progress of the Work and at no additional cost to the Owner. All employees of the Contractor or Subcontractor shall be processed through the Owner's database which excludes sex offenders and other people not deemed safe for presence on a school site. Any person who is flagged by that system shall not be employed on site. Further, the Contractor or its Subcontractor shall not employ any person onsite who is known to them to be a sex offender as defined by New York State.

§ 3.4.6 On receipt of the signed Contract, the Contractor will be expected to place firm orders with vendors for needed materials, including Subcontractors and major material suppliers. If deemed necessary to assure delivery of materials at times needed, the Contractor may accept delivery of such materials at any time, and may include the cost of such materials in its next monthly Application for Payment, provided such materials have actually been delivered to Contractor and properly stored by it with approval or under direction of the Architect and the Construction Manager either at the Project site or in an approved storage shed or warehouse, as provided elsewhere in these General Conditions.

§ 3.4.6.1 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 the Project, product selected shall be compatible with products previously selected, even if previously selected products were also options.

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

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

§ 3.4.6.4 When required, off-site storage shall be the responsibility of the Contractor. If materials are stored off site, the Contractor shall furnish proof of title by Owner and provide a certificate of insurance demonstrating adequate insurance coverage.

§ 3.4.6.5 The Contractor shall deliver all materials at such times as will ensure speedy and uninterrupted progress of the Work.

§ 3.4.6.6 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Work. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them. The Owner reserves the right to object to Contractor's use of persons who appear unfit or not skilled in the tasks assigned to them. Should any disorderly, incompetent, unfit, unskilled or objectionable person be hired or employed by the Contractor, upon or about the Premises of the Owner, for any purpose or in any capacity, they shall, upon request of the Owner, be removed from the Project and not again be assigned thereon without the written permission of the Owner.

§ 3.4.6.7 Unless otherwise stated in the Contract Documents or the bidding requirements, the Contractor, within 10 days of receipt of the signed Contract, shall furnish in writing the Owner through the Construction Manager and Architect a list showing the name of the manufacturer proposed to be used for each of the products identified in the Specifications, and where applicable, the name of the installing Subcontractor. The Architect will promptly reply to the Contractor in writing stating whether or not the Owner or Architect, after due investigation, has reasonable objection to any such proposed manufacturer or installer. If adequate data on a proposed manufacturer or installer is not available, the Architect may state that action will be deferred until the Contractor provides additional data. Failure of the Owner or Architect to promptly reply shall constitute notice of no reasonable objection. Failure to object to a manufacturer or installer shall not constitute a waiver of the requirements of the Contract Documents, and products furnished by the listed manufacturer shall conform to such requirements**.**

§ 3.4.7 The Contractor warrants that it has good title to all materials used by it in, on or in connection with the Work. No materials or supplies shall be purchased by the Contractor or any of its Subcontractors that are subject to any chattel mortgage, conditional sale, or other agreement by which an interest is retained by the seller.

§ 3.4.8 The Contractor shall make every reasonable effort to avoid labor disputes and to insulate the Owner, Architect and Construction Manager from the effects of labor disputes should any arise. 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. For the purposes of this Section, every reasonable effort shall include, but not necessarily be limited to:

.1 make all necessary arrangements to reconcile, without delay, damage or cost to the Owner and without recourse to the Architect, the Construction Manager 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 requiring employees, Subcontractors, suppliers and others to use reserve gates which shall be established for the Project;

.3 rearranging work schedules for the Contractor's Work or the work of its Subcontractors; and

.4 including in Contractor's agreements with its Subcontractors the right to fully implement all provisions of this Section.

§ 3.4.8.5 In case the progress of the Work is effected by any undue delay in furnishing or installing any items or materials or equipment required pursuant to the Contract 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 Work.

§ 3.4.8.5.1 No extension of time shall be granted for delays caused by labor or material disputes.

§ 3.4.8.5.2 Should it become necessary to create a separate entrance for a Contractor involved in a dispute, all costs associated with creating that entrance shall be borne by the Contractor involved in the dispute. Such costs shall include, but not limited to signage, fencing, temporary roads and security personnel as deemed necessary by the Owner for the safety of the occupants of the site.

§ 3.4.8.6 The Contractor shall ensure that its Work continues uninterrupted during the pendency of a labor dispute.

§ 3.4.8.7 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 arising from the labor practices of the Contractor or its Subcontractors, Suppliers or Sub-subcontractors.

§ 3.4.9 The Contractor and its Subcontractors employed upon the Work shall abide by and conform with all labor laws and to all other laws, ordinances, and legal requirements now or hereafter applicable to the Work and the construction area.

§ 3.4.10 The Contractor and its Subcontractors shall be responsible for protection of the Work, the work of Separate or other Contractors, and existing construction, both on and off the site, and in the event of damage, shall restore the same to the original condition at no additional cost to the Owner.

§ 3.4.11 If the Work is to be performed by trade unions, the Contractor shall, with the consent of the Owner and the Architect, which shall not be unreasonably withheld, make all necessary arrangements to reconcile, without delay, damage, or cost to the Owner, any conflict between the Contract Documents and any agreements or regulations of any kind, at any time in force among members or councils that regulate or distinguish what activities are included in the work of any particular trade.

§ 3.4.12 No new asbestos containing building materials shall be used in construction. No materials containing asbestos in any form shall be used in, on, or around the Owner's buildings**.**

§ 3.4.13 Equivalents and Substitutions

§ 3.4.13.1 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, it shall indicate in writing, and prior to award of the 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 equivalents as provided in the Project Manual. Any proposed equivalent shall not be purchased or installed by the Contractor without the Architect's review process having been completed and the product accepted by written notification.

§ 3.4.13.2 Substitutions. After the Contract has been executed, the Owner, Construction Manager and Architect will consider a formal request for the substitution of products in place of those specified only under conditions set forth in the Specifications.

§ 3.4.13.3 By making said requests in conformance with procedures established herein and elsewhere in the Project Manual, the Contractor: (1) represents that it has personally investigated the proposed substitute product and has determined that it is equal to or superior in all respects to that specified; (2) represents that the warranty for the substitution will be the same, or greater than, that applicable to the specified product; (3) certifies that the cost data is complete and includes all related costs under the Contract, including professional services necessary and/or required for the Architect or its consultants to implement said substitution and waives any and all claims for additional costs related to the substitution which subsequently become apparent; (4) 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; and (5) represents that it will reimburse the Owner for all additional costs billed by the Architect or its consultants for the review of the substitution request(s), any redesign of the Work of this Contractor or associated contractors, additional site visits related to the substitution request and for the work to prepare Change Orders or Construction Change Directives.

§ 3.4.13.4 Substitutions and alternates may be rejected without explanation and will be considered only under one or more of the following conditions:

1. required for compliance with interpretation of code requirements or insurance regulations then existing;
2. unavailability of specified products, through no fault of the Contractor;
3. subsequent information discloses inability of specified products to perform properly or to fit in designated space;
4. manufacturer/fabricator refuses to certify or guarantee performance of specified products as required;
5. when in the judgment of the Owner, a substitution would be substantially in the Owner's best interests, in terms of costs, time or other considerations; and
6. where the Contractor establishes that the substituted product is equal or better than the specified product in all respects.

§ 3.5 Warranty

§ 3.5.1 The Contractor warrants to the Owner, Construction Manager and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants good title to all materials, supplies, and equipment installed or incorporated in the Work. The Contractor further warrants that the Work will conform to the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. Work, materials, or equipment not conforming to these requirements may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. All warranties and guarantees specifically called for by the Contract Documents shall expressly run to the benefit of the Owner. If required by the Architect, the Contractor shall furnish satisfactory evidence (including reports of required tests) as to the kind and quality of materials and equipment. All materials and equipment shall be applied, installed, connected, erected, used, cleaned, and conditioned in accordance with instructions of the applicable supplier, except as otherwise provided in the Contract Documents. The Contractor shall perform the Work in strict accordance with the Contract Documents and best industry practices. The Contractor, at its expense, shall upon demand by the Owner, Construction Manager or Architect remove and replace materials not meeting specifications or materials failing to perform as represented or warranted by the manufacturer, regardless of whether incorporated into the Work. The Contractor shall promptly replace or correct any Work or materials that the Owner, Construction

Manager or Architect rejects as failing to conform to the requirements of the Contract Documents. The foregoing warranty obligations shall survive completion or termination of the Contract, are not limited by the provisions of Article 12, and are in addition to and not in limitation of any other warranty, right or remedy set forth in the Contract Documents or otherwise prescribed by law.

§ 3.5.2 The Contractor warrants the Work and its performance to the Owner unconditionally. The Contractor shall perform all warranty obligations and responsibilities for the Work under the Contract Documents. The Contractor, at its own expense, shall remedy defects due to improper and/or defective workmanship or materials appearing within **two (2) years** of the Contractor completing the Work or such longer period as may be set forth in the Contract Documents ("Correction Period"), as further described in Article 12 of this Agreement. Upon completion of the Work, the Contractor shall assign and provide to the Owner all written warranties and guarantees from Subcontractors, suppliers, and material or equipment manufacturers. The Contractor shall fully cooperate with the Owner in the event the Owner pursues remedies under any warranties or guarantees assigned to the Owner. The Contractor acknowledges that its obligations to the Owner under this Section 3.5.2 and under Section 12.2 are joint and several with its Subcontractors, suppliers, vendors and manufacturers of all materials and equipment supplied on account of the Work. The Contractor is responsible for all harm caused by its failure to maintain equipment and materials installed through the Contractor's completion of its Work. The requirements of this Section 3.5 will continue notwithstanding termination of the Contractor for any reason. The foregoing warranty obligations are not limited by the provisions of Article 12, do not limit the Owner's assertion of a breach of warranty obligations following the three-year Correction Period, and are in addition to and not in limitation of any other warranty set forth in the Contract Documents or required by law.

§ 3.5.3 No warranties or guarantees by the Contractor will deprive the Owner of any cause of action, right, or remedy otherwise available for breach of any of the provisions of the Contract Documents. The Correction Period does not limit the time in which the Owner may pursue any such action, right, or remedy.

§ 3.5.3.1 The Contractor shall deliver to the Owner upon completion of all work under its Contract, its written guarantee made out to the Owner in a form acceptable to the Owner, guaranteeing (and he does so guarantee) all of the Work under the Contract to be free from faulty materials, and free from improper workmanship, and guarantees against injury from proper and usual wear and aging. This guarantee shall be made to cover (and does cover) a period of two (2) years from the date of Substantial Completion all work under the Contract, or for a longer period where so stipulated in the Contract Documents.

§ 3.5.4 All required maintenance shall be the Contractor's responsibility until the Owner has accepted the Project as complete, all required maintenance and user's manuals have been turned over to the Owner, and the Owner's designated personnel have been instructed in the maintenance and operation of all applicable materials. This maintenance shall include a complete turnover procedure at the time of completion, including complete cleaning, testing and adjustment. The Contractor shall keep records of all such maintenance performed as required by this Section, including work performed and times and dates on which it was performed. These records shall be turned over to the Owner at closeout.

§ 3.5.5 Neither final payment nor provision in the Contract Documents nor partial or entire occupancy of premises by Owner shall constitute an acceptance of Work not done in accordance with the Contract Documents or relieve the Contractor of liability in respect to any express warranties or responsibilities for faulty or defective materials or workmanship.

§ 3.6 Taxes

Except as otherwise specified, the Contractor shall pay sales, consumer, use and similar taxes for the Work or portions thereof provided by the Contractor that are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect.

§ 3.6.1 The Owner is exempt from payment of federal, state, and local sales and compensation use taxes on all supplies and materials incorporated into and becoming an integral component part of the structures, buildings, or real property pursuant to this Contract. Such taxes are therefore not to be included in the Contractor's bid or the Contract Sum. The Owner shall deliver to the Contractor the appropriate exemption certificate required to be supplied by the Owner, and the Contractor and its Subcontractors and materialmen shall be solely responsible for obtaining and delivering any and all exemption or other certificates and for furnishing a Contractor Exempt Purchase Certificate or other appropriate certificates to all persons, firms, or corporations from whom they purchase supplies, materials, and equipment for the performance of the Work.

§ 3.6.1.1 The Contractor's attention is called to fact that materials not actually incorporated into Work will not be exempt from payment of sales or compensating use taxes, and the Contractor and its Subcontractor shall be responsible for and shall pay any and all applicable taxes. This will apply to such things as:

.1 construction machinery and equipment including rentals or repair parts;
.2 The Contractor's office supplies;
.3 The Contractor's supplies, tools and miscellaneous equipment including forms, materials, and scaffolding (whether purchased or rented);
.4 temporary heat;
.5 telephone or electric services; and
.6 any other items purchased or rented by the Contractor for the Contractor's use in performing its Work and not incorporated into realty.

§ 3.6.2 The Contractor accepts full and exclusive liability for payment of any and all contributions, assessments or taxes for unemployment insurance or old age insurance, or annuities now or hereafter imposed by the government of the United States, or by the government of any city, county or state of United States, which are measured by salaries or other remuneration paid to persons employed by the Contractor or any Subcontractor for Work performed under this Contract.

§ 3.7 Permits, Fees, Notices, and Compliance with Laws

§ 3.7.1 The Contractor shall, as soon as practicable, furnish the Owner, Architect, and Construction Manager with copies or certificates of all permits, fees, licenses, and inspections necessary for the proper execution and completion of the Work, including, without limitation, all applicable building permits other than those required of the Owner under Sections 2.3.1. All inspection fees and other costs of such permits and licenses required to be obtained by the Contractor as may be imposed by any municipal or other entity shall be paid by the Contractor and shall not serve as the basis for any increase in the Contract Sum.

§ 3.7.2 The Contractor shall comply with, and give notices required by, applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to 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 (b) the Architect, Construction Manager and their 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.

§ 3.7.2.1 In accordance with New York State Labor Law Article 8, Section 220, subd. 3-a(a), the Contractor shall submit to the Owner within 30 days after issuance of Contractor's first payroll, and every 30 days thereafter, a transcript of the original payroll record, subscribed and affirmed as true under the penalties of perjury.

§ 3.7.2.2 The Contractor shall comply with all applicable New York State Department of Labor requirements, including the provision that every worker employed in performance of a public work contract shall be certified as having completed an OSHA 10-hour safety training course. The Contractor and its Subcontractors shall be solely responsible for compliance with this requirement with respect to their employees. The Contractor's or Subcontractor's failure to comply with this requirement shall not transfer or in any way impose the responsibility for worker safety upon the Owner or the Architect.

§ 3.7.3 If the Contractor performs Work contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear all costs attributable to the correction thereof or related thereto, including reimbursement to the Owner for any additional services required of the Construction Manager or Architect, or both, as well as all fines and penalties, if any.

§ 3.7.4 Concealed or Unknown Conditions. If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature that 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, the Contractor shall give prompt written notice to the Owner, Construction Manager, and the Architect of such conditions before they are disturbed or affected work is performed and in no event later than three (3) business days after first observance of the conditions. The Architect or Construction Manager will promptly investigate such conditions and, if

the Architect, in consultation with the Construction Manager, determines that 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, in consultation with the Construction Manager, 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 promptly notify the Owner, Construction Manager, and Contractor in writing, stating the reasons. If the Contractor disputes the Architect's determination or recommendation, it may proceed as provided in Article 15. No adjustment in the Contract Time or Contract Sum will be permitted, however, in connection with a concealed or unknown condition that does not differ materially from those conditions disclosed or that reasonably should have been disclosed by the Contractor's (1) prior inspections, tests, and reviews, or (2) inspections, tests, and reviews the Contractor had the opportunity to make or should have performed in connection with the Project.

§ 3.7.5 If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall notify the Owner, Construction Manager, and Architect. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 15.

§ 3.8 Allowances

§ 3.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct, but the Contractor shall not be required to employ persons or entities to whom the Contractor has reasonable objection.

§ 3.8.2 Unless otherwise provided in the Contract Documents:

.1 allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;

.2 Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit, ,including the costs for bonds and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances; and

.3 whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor's costs under Section 3.8.2.2. The Contractor is not entitled to overhead and profit on unexpended allowance amounts or any portions thereof.

§ 3.8.3 Materials and equipment under an allowance shall be selected by the Owner with reasonable promptness.

§ 3.9 Superintendent

§ 3.9.1 Prior to starting the Work, the Contractor shall designate the Project Manager, Superintendent and other key individuals who shall be assigned to the Project through and including Final Completion. Such designations shall be in writing and provided to the Construction Manager, Architect and Owner and shall include the qualifications of such individuals. The Superintendent shall be in attendance at the Project site throughout the work, remain on the Project site not less than eight hours per day, five days per week, until termination of the Contract, unless the job is suspended, work is stopped by the Owner, or no work is scheduled. The Superintendent shall be approved by the Owner in its sole discretion. Said representatives shall be qualified in the type of work to be undertaken and shall not be changed during the course of construction without the prior written consent of the Owner. Should a representative leave the Contractor's employ, the Contractor shall promptly designate a new representative. The Owner shall have the right, at any time and in its sole discretion, to direct a change in the Contractor's representatives if their performance is unsatisfactory. In the event of such a demand, the Contractor shall within seven (7) days after notification thereof, replace said individual(s) with an individual(s) satisfactory to the Owner, in the Owner's sole discretion. If said replacement is disapproved, the Contractor may, at the Owner's option, be terminated for cause. The Superintendent shall represent the Contractor, and communications given to the Superintendent shall be as binding as if given to the Contractor. The Owner shall have no obligation to direct or monitor the Contractor's employees. All references herein to the Superintendent shall be taken to mean the Contractor's superintending staff. Each Subcontractor shall designate

the Project Manager, Superintendent and other key individuals who shall be assigned to the Project. Important communications shall be confirmed in writing. Other communications shall be similarly confirmed on written request in each case. The Contractor's Superintendent shall attend all Project meetings, regardless of whether held prior to or following Substantial Completion of the Work.

§ 3.9.2 The Contractor shall provide, or otherwise see that, the Project Manager, or Superintendents or responsible workers of the Contractor and its major Subcontractors are equipped with cellular phones and radios. The Contractor shall provide the Owner, the Construction Manager, and the Architect with the number for each phone and worker.

§ 3.9.3 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 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.

§3.9.4 The Contractor shall not reduce or terminate supervision of the Work, nor change the superintendent without the prior written approval of the Owner.

§3.9.5 If, for any reason, the Contractor takes an action resulting in any of the changes noted in Subsection 3.9.4, the Owner may take remedial action to ensure continued progress of the Work, including the hiring of suitable supervisory personnel, and charge the Contractor all costs associated with these remedial actions including the costs of legal and additional construction management and architectural services.
§3.9.6 The Contractor shall furnish the Construction Manager, in writing the names, addresses and telephone number of the members of his organization who can be contacted in the event of an off-hours emergency at the building.

§3.9.6 The Contractor shall attend progress meetings with the Construction Manager and such other persons the owner may require. The progress meetings shall include all key personnel on the job, including the contractor and subcontractors, or other persons in charge of various phases of the work.

§3.9.7 Prior to the commencement of Work, the Contractor shall provide the Construction Manager and the Architect with:
.1 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;
.2 The name, address and telephone number of the bonding company, banking and insurance company for the Contractor including the name, address and telephone number of each bonding company's primary contact representative for the Project;
.3 Detailed Subcontractor schedules indicating the approximate quantity of shop drawings, sequence, timing and man loading; and
.4 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 Construction Manage

§ 3.10 Contractor's Construction and Submittal Schedules
§ 3.10.1 The Contractor, promptly, but in no event later than 14 days, after being awarded the Contract, shall prepare and submit for the Owner's and Architect's information and the Construction Manager's approval a Contractor's construction schedule for the Work in electronic format with predecessor logic. The construction schedule shall contain detail appropriate for the Project, including (1) the date of commencement of the Work, interim schedule milestone dates, and the date of Substantial Completion; (2) an apportionment of the Work by construction activity; and (3) the time required for completion of each portion of the Work. The Contractor's construction schedule shall provide for the orderly progression of the Work to completion, and shall not exceed time limits current under the Contract Documents. The Contractor's construction schedule shall be revised at appropriate intervals as required by the conditions of the Work and Project.

(Paragraph deleted)
§ 3.10.1.1 Time is of the essence for this Project. The Work shall be performed continuously and without interruption, so that all Work can be completed in the time set forth in the Contract Documents.

§ 3.10.1.2 The sequence of the Work shall be scheduled with the Owner so as to minimize interference with the Owner's use of existing structures, and the Owner's approval shall be obtained prior to starting of the Work.

§ 3.10.1.3 The Contractor shall conform to the most recent Project Schedule, and all Work shall be completed on or before the dates established in the Contract Documents. The Contractor shall monitor the progress of the Work for conformance with the requirements of the Project Schedule and shall promptly advise the Owner and Construction Manager of any delays or potential delays.

§ 3.10.2.1 The Construction Manager shall prepare, publish, and, from time-to-time, revise a master integrated Project Schedule based upon the construction schedules submitted by the various Prime Contractors. Failure by the Contractor to furnish any required schedule or schedule revision in a timely manner shall entitle the Construction Manager to prepare a schedule for the Contractor's Work, to which the Contractor shall be bound.

§ 3.10.2.2 The Contractor shall cooperate with the Construction Manager in scheduling and performing the Contractor's Work to avoid conflict, delay in or interference with the Work of other Contractors or the construction or operations of the Owner's own forces. The Owner shall have the right, without penalty, to direct the Contractor to delay, postpone or reschedule any portion of the Work that may interfere with or disrupt the operations of the Owner.

§ 3.10.3 The Contractor shall conform to the most recent Project Schedule.

§ 3.10.4 In the event the Owner determines that the performance of the Work has not progressed to the level of completion required of the Contract Documents or that the Contractor has failed to maintain its construction schedule or the Project Schedule, the Owner shall have the right to order the Contractor to take corrective measures necessary to expedite the progress of construction including without limitations, additional shifts, overtime, additional manpower or equipment as well as other similar measures (hereinafter referred to collectively as "extraordinary measures"). Such extraordinary measures shall continue until the progress of Work complies with milestone and critical path dates set forth in the Contract Documents and the Project Schedule. The Contractor shall not be entitled to an adjustment in Contract Sum or Contract Time in connection with extraordinary measures required by the Owner.

§ 3.10.5 The Contractor shall prepare a submittal schedule, promptly after being awarded the Contract and thereafter update it as necessary to maintain a current submittal schedule, and shall submit the schedule(s) for the Construction Manager's and Architect's approval. The Architect and Construction Manager's approval shall not unreasonably be delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor's construction schedule, and (2) allow the Construction Manager and Architect reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals.

§ 3.10.6 The Contractor shall participate with other Contractors, the Construction Manager and Owner in reviewing and coordinating all schedules for incorporation into the Project Schedule that is prepared by the Construction Manager. The Contractor shall revise the construction schedule and submittal schedule as deemed necessary by the Construction Manager to conform to the Project Schedule and the Contract Documents.

§ 3.10.7 The Contractor shall perform the Work in general accordance with the most recent construction schedules submitted to the Owner, Construction Manager and Architect and incorporated into the approved Project Schedule. The Contractor shall monitor the progress of the Work for conformance with the requirements of its construction schedule and Project Schedule and shall promptly advise the Owner of any delays or potential delays affecting the critical path.

§ 3.10.8 If the Contractor fails to maintain the approved construction schedule or Project Schedule and meet all critical path dates for the Work, the Owner may request a recovery plan from the Contractor and reserves the right to withhold payment until such time as the Contractor submits a recovery plan. The recovery plan must show how the Work may plausibly be brought on schedule, including, as necessary, acceleration of the Work by means of overtime, additional crews, additional shifts, additional equipment or re-sequencing of the Work to achieve completion of the remaining critical path dates in the construction schedule or Project Schedule. The Contractor shall submit as part of its recovery plan: (i) a "resource loaded" schedule showing the Contractor's plan to deploy manpower per trade, per work area, per day, together with essential materials and equipment, and other resources necessary to timely accomplish the Work;

and (ii) a two-week "look ahead" schedule identifying tasks to be accomplished within the coming two week period, the work areas and categories of work, and necessary manpower resources, together with other data necessary to demonstrate to the Owner the viability of the Contractor's recovery plan ("2 Week Plans"). The Contractor shall continue to submit 2 Week Plans until either the Contractor demonstrates that the Project Schedule has recovered from the unexcused delay, or the Owner notifies the Contractor in writing that further 2 Week Plans are no longer required. The cost of preparing and performing the recovery plan shall be borne solely by the Contractor. No approval or consent by the Owner of any plan for resequencing or acceleration of the Work submitted by Contractor shall constitute a waiver by Owner of any damages or losses which the Owner may suffer by reason of such resequencing or the failure of Contractor to meet the Substantial Completion Date or the final completion date.

§ 3.10.9 The Contractor specifically represents and warrants to the Owner that that the Contract Sum and the Contract Time contemplate compliance with all current, and reasonable foreseeable future, federal, state and local "Stay at Home," "Social Distancing" and related orders, regulations and guidance related to limiting the spread of COVID-19 disease (the "COVID Requirements"). Accordingly, the Contractor hereby waives any claim for an increase in the Contract Sum or an extension of the Contract Time on account of the COVID Requirements. The Contractor shall promptly notify the Owner of any COVID Requirements that would impact the Project.

§ 3.10.10 Due to the ongoing COVID-19 pandemic and the resulting uncertainty with regard to, among other things, (a) what restrictions, if any, will be applicable to construction activities due to federal, state or local orders, laws, regulations or rules related to the COVID-19 pandemic (including, without limitation, social distancing, PPE, cleaning and disinfection requirements) and (b) the duration of any restrictions imposed on construction activities, the Owner may modify the schedule set forth in the Contract Documents and the Project Schedule. Similarly, restrictions, if any, that will be or are applicable to construction activities due to federal, state or local orders, laws, regulations or rules related to the COVID-19 pandemic (including, without limitation, social distancing, PPE, cleaning and disinfection requirements) may cause the Owner to have the Work or the Project commence later than the date specified in the Contract Documents. The Contractor acknowledges and agrees that there should be no additional compensation paid for schedule modifications caused directly or indirectly by the COVID-19 pandemic. The Contractor further acknowledges and agrees that its sole remedy for any schedule modifications or delays caused directly or indirectly by the COVID-19 pandemic shall be an extension of the Contract Time, if warranted. The Contractor further acknowledges and agrees that it shall have on file and provide a copy to the Owner of its written COVID-19 business reopening plan, and it shall comply in all respects with such plan for the duration of the Project. The Contractor, not the Owner, shall be responsible for compliance with its COVID-19 business reopening plan and all safety requirements associated with COVID-19 protections for workers and the general public.

§ 3.11 Documents and Samples at the Site

§ 3.11.1 The Contractor shall maintain at the site for the Owner one copy of the Drawings, Specifications, Addenda, Change Orders and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and one copy of approved Shop Drawings, Product Data, Samples and similar required submittals. These documents shall be available to the Architect and delivered to the Construction Manager for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

§ 3.11.2 The Contractor shall maintain at the site, and shall make available to the Owner, Construction Manager and 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 structural changes in the design; and (vi) such other information as either the Owner or Architect may reasonably request. At the completion of the work, the 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 righthand corner. The colored record drawing and the as-built reproducible drawing shall be forwarded to the Construction Manager for delivery to the Owner. Final payment and any retainage shall not be due and owing to Contractor until the Record and As-Built drawings receive the approval from the Architect and the Owner (and all other closeout requirements are met).

§ 3.11.3 The Contractor shall maintain all approved permit drawings in a manner so as to make them accessible to government inspectors and other authorized agencies having jurisdiction over the Project. All approved drawings shall be wrapped, marked and delivered to the Owner within 60 days of final completion of the Contractor's Work.

§ 3.12 Shop Drawings, Product Data, and Samples

§ 3.12.1 Shop Drawings are drawings, diagrams, schedules, and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier, or distributor to illustrate some portion of the Work. Each submittal shall bear written confirmation that the Contractor has satisfied its obligations under the Contract Documents with respect to the Contractor's review and approval of the submittal. The Contractor shall comply with the provisions and procedures for Shop Drawings, Product Data, and Samples set forth in Specifications Section 01 33 00, "Submittal Procedures."

§ 3.12.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams, operating and maintenance procedures, and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

§ 3.12.3 Samples are physical examples that illustrate materials, equipment, or workmanship, and establish standards by which the Work will be judged.

§ 3.12.4 Shop Drawings, Product Data, Samples, and similar submittals are not Contract Documents. Their purpose is to (1) demonstrate how the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents, and (2) show a system or product's ability to meet applicable criteria for those portions of the Work for which the Contract Documents require submittals. Review by the Architect and Construction Manager is subject to the limitations of Sections 4.2.10 through 4.2.12. Informational submittals upon which the Construction Manager and Architect are not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Construction Manager or Architect without action.

§ 3.12.4.1 Shop drawings and product submittals for all site improvement, architectural, structural, mechanical, electrical and signal work shall be submitted to the Architect for its review. Refer to Contract (General, Supplementary and other conditions) Section on "SUBMITTALS" for more complete information.

§ 3.12.4.2 The Contractor represents and warrants that all shop drawings shall be prepared by a person or entity possessing expertise and experience in the trade for which the shop drawing has been prepared and, if required by the Contract Documents or law, by a licensed professional engineer.

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve, and submit to the Architect, with copies to the Construction Manager, Shop Drawings, Product Data, Samples, and similar submittals required by the Contract Documents, in accordance with the Project submittal schedule approved by the Construction Manager and Architect or, in the absence of an approved Project submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of other Contractors, Separate Contractors, or the Owner's own forces. The Contractor shall cooperate with the Construction Manager in the coordination of the Contractor's Shop Drawings, Product Data, Samples, and similar submittals with related documents submitted by other Contractors.

§ 3.12.5.1 No extension of time will be granted to the Contractor because of failure to have shop drawings, product data, and samples submitted in ample time to allow for review by the Architect or its consultants.

§ 3.12.6 By submitting Shop Drawings, Product Data, Samples, and similar submittals, the Contractor represents to the Owner, Construction Manager, and Architect, that the Contractor has (1) reviewed and approved them, (2) determined and verified materials, field measurements and field construction criteria related thereto, or will do so, and (3) checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

§ 3.12.7 The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples, or similar submittals, until the respective submittal has been

reviewed and approved by the Architect. Resubmission of rejected documents shall be performed within 10 calendar days, or sooner if required by the progress of construction. No claim for delay or cost shall be accepted as a result of rejected submittal documents. 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.

§ 3.12.8 The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from requirements of the Contract Documents by the Architect's approval of Shop Drawings, Product Data, Samples or similar submittals unless the Contractor has specifically informed the Construction Manager and Architect in writing of such deviation at the time of submittal and (1) the Architect has given written approval to the specific deviation as a minor change in the Work, or (2) a Change Order or Construction Change Directive has been issued authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples or similar submittals by the Architect's approval thereof.

§ 3.12.9 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples or similar submittals, to revisions other than those requested by the Construction Manager and Architect on previous submittals. In the absence of such written notice, the Architect's approval of a resubmission shall not apply to such revisions. 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.

§ 3.12.10 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. The Contractor shall not be required to provide professional services in violation of applicable law.

§ 3.12.10.1 If professional design services or certifications by a design professional related to systems, materials, or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall be entitled to rely upon the adequacy and accuracy of the performance and design criteria provided in the Contract Documents. The Contractor shall cause such services or certifications to be provided by an appropriately licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings, and other submittals prepared by such professional. Shop Drawings, and other submittals related to the Work, designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect. The Owner and the Architect shall be entitled to rely upon the adequacy and accuracy of the services, certifications, and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor the performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review and approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents.

§ 3.12.10.2 If the Contract Documents require the Contractor's design professional to certify that the Work has been performed in accordance with the design criteria, the Contractor shall furnish such certifications to the Construction Manager and Architect at the time and in the form specified by the Architect.

§ 3.12.11 The Architect's review of the Contractor's submittals will be limited to examination of an initial submittal and one resubmittal. The Owner is entitled to obtain reimbursement from the Contractor for amounts paid to the Architect for evaluation of additional resubmittals.

§ 3.13 Use of Site

§ 3.13.1 The Owner shall not be liable to the Contractor, subcontractors of any tier, suppliers, their employees or anyone else with respect to the condition of the Project site. The Owner shall have the right to refuse admittance to the site to any agent or employee of the Contractor, its subcontractors of any tier, or its suppliers whose presence the Owner deems hostile to the Owner's interests. The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities and the Contract Documents and shall not unreasonably encumber the site with materials or equipment. The use of the Owner's assets and property are extremely limited. The Contractor shall fully comprehend the intent of the Contract

Documents pertaining to site and building limitations including, without limitation, Division 1 Specifications sections, the phased construction plan, and the site safety and logistics plan(s).

§ 3.13.2 The Contractor shall coordinate the Contractor's operations with, and secure the approval of, the Construction Manager before using any portion of the site.

§ 3.13.3 The Contractor shall perform and shall ensure that all Subcontractors and suppliers perform all Work in a manner that permits reasonable access to the Project site and to all adjacent premises. The Contractor shall not, and shall not permit any Subcontractor or supplier to, conduct the Work in a manner that disturbs or that could be reasonably anticipated to disturb operations and persons located in or on portions of the site not affected by the Work. The occupied portion of any of the Owner's buildings shall always comply with the minimum requirements necessary to maintain a certificate of occupancy.

§ 3.13.4 Construction Rules and Regulations. The following rules and regulations shall be observed and enforced by all Contractors in connection with all phases of the Work:

.1 In accordance with New York State law, smoking is prohibited anywhere on school property. Violators will be subject to arrest and/or fine of $1,000 per occurrence. No alcoholic beverages or controlled substances are permitted on school property, and persons under the influence of alcoholic beverages or controlled substances may not enter in or remain on school property.

.2 In accordance with the United States Gun-Free School Zones Act of 1994, no firearms are permitted within 1,000 feet of any school building, with certain limited exceptions as set forth therein. In addition to such limitations, no firearms shall be brought on school property without the Owner's express prior consent.

.3 Appropriate protective gear (hard hats, safety shoes, goggles, etc.) are to be worn as required by OSHA standards, the New York State Department of Labor, and prudent practice. Shirts are to be worn at all times. No short pants are permitted.

.4 Any person who uses inappropriate language, or who is disruptive to the school environment, will be banned from the site.

.5 The Contractor's personnel shall not converse with school employees, students and or local residents.

.6 All persons on the Project site will comply with all reasonable instructions regarding conduct and safety which are given by the Architect, the Construction Manager or the Owner's school administrators.

.7 All construction materials shall be stored in a safe and secure manner. No deliveries will be allowed during school bus drop off or pick up hours as determined by the Owner. All deliveries shall be scheduled and coordinated with the Construction Manager and the Owner's security department. Unexpected or uncoordinated deliveries may be turned away by the Owner or the Construction Manager at the discretion or necessity of the Owner. The Owner's enforcement of this provision shall not be construed by the 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.

.8 Use of the existing building facilities during construction is prohibited, specifically including toilet rooms, telephones and water fountains.

.9 The Contractor's schedule shall allow for blackout dates during which no noisy Work will be allowed, as determined by the Construction Manager. The Contractor may consult the Owner's school calendar for all test and examination dates, but these dates are subject to change.

.10 To gain access to the Work, entrances and parking areas will be designated by the Owner for the Contractor's use. Any vehicles or trucks in non-designated areas may be towed at the Contractor's expense. Gates shall always be locked unless a worker is in attendance to prevent unauthorized entry.

.11 Should it become necessary to obtain access to the existing building during construction hours for measurements or other non-disruptive work, the Contractor shall be escorted by the Construction Manager.

.12 All persons must wear photo identification badges at all times while working at the site. Identification badges must be provided by the Contractor for its personnel, including subcontractors, consultants, visitors and others.

.13 No asbestos containing products are to be used anywhere on this Project.

.14 No lead containing products are to be used anywhere on this Project.

.15 Asbestos manifests showing the locations of all known asbestos bearing materials are available in each building, and should be consulted prior to the commencement of any work, including but not limited to demolition.

.16 Demolition is to occur only when the building is unoccupied. Dust partitions and negative air are to be installed prior to commencing demolition. The Contractor must obtain Construction Manager approval on dust partitions and negative air prior to commencing demolition work. Debris shall be removed by using an enclosed chute or similar sealed system.

.17 (a) Prior to the commencement of Work, the Contractor must submit construction plans, which show the location of dust particles, exhaust & fresh air fans and describe in detail the operation procedures during demolition and construction which may generate dust.

(b) All entrances to classrooms shall be sealed with at least 6 mil. polyethylene sheeting to prevent dust created by demolition and construction work from entering the classrooms. Entrances and egress to the work zone shall be covered with a triple flap 6 mil. polyethylene doorway to allow access to the area without the release of dust. The Contractor is, additionally, responsible for all debris and dust infiltrating adjacent and undisturbed areas of the building.

(c) Shut down and lock out all electrical and HVAC in the work area. Cut, cap, and seal all duct work where it enters the work area from another space. All duct work and conduit within the space shall be removed during demolition work.

(d) The Contractor shall install dust protection barriers and poly sheeting. There shall be no or minimum damage to adjacent surfaces. The Contractor is responsible to repair any damage to existing surfaces.

.18 Painting or other chemical applications shall be done in the Owner's existing building only when it is unoccupied. Storage of chemicals and painting shall be outside the Owner's existing or new structures, and shall follow manufacturer's storage guidelines.

.19 Oxygen or other gas containers shall be properly stored and secured per OSHA requirements, to the satisfaction of the Construction Manager. Failure to do so will result in a $250 back-charge, per occurrence.

.20 The Contractor is responsible for cleaning its own materials and debris. Failure to maintain a clean work site daily will result in others performing the work at the Owner's request, and the Contractor will be backcharged for the cleaning cost plus construction administration fees. This may be done without the typical 3-day notice to the Contractor.

.21 The Contractor must send a qualified representative, knowledgeable in the Project and authorized to make decisions on behalf of the Contractor, to every Project meeting.

.22 The Contractor shall cooperate with the Owner's school principal and custodial staff; however, if any additional work is requested the Contractor shall not proceed unless written approval is received from the Owner. The Contractor will not be compensated for any additional work performed without the Owner's prior written approval.

.23 Deliveries sent to the Project site will not be signed for or unloaded by the Owner. They will be directed to the construction site and if no employee is on site, the delivery will be rejected, at the Contractor's expense.

.24 The General Construction Contractor shall be responsible for managing dust and dirt. On the exterior, site shall be watered down frequently to prevent dust clouds from rising. Streets shall be maintained clean per the Construction Manager's request.

.25 All hot tar roofing shall be installed after school hours or on weekends/holidays only. Kettles shall not be lit until all students have left the Owner's building.

.26 The Contractor shall submit a weekly work schedule indicating workdays, work hours and manpower allocation.

.27 No storage of materials will be permitted within the Owner's buildings at any time during construction. The Contractor must provide exterior storage containers when required. The Contractor shall be responsible for securing appropriate space for its material with the Construction Manager prior to delivery. Final location of storage containers shall be determined by the Owner and/or Construction Manager. 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 Construction Manager may direct.

.28 The General Construction Contractor shall be responsible for maintaining all appropriate site safety signage.

.29 The Contractor shall be responsible for protecting the Owner's property. All existing shrubs, trees, lawn fixtures, sculptures and miscellaneous equipment shall be protected at all times. Any removals or relocation of said objects, if allowed shall be as directed by the Owner in writing.

.30 The General Construction Contractor shall provide and service portable lavatories for the duration of construction as provided in the Contract Documents. Lavatories shall be serviced by the General Construction Contractor on a regular basis to maintain sanitary conditions.

.31 The General Construction Contractor shall protect all existing roofs during construction and shall be responsible for any damage to roofs during construction. The General Construction Contractor shall make all repairs to any damaged areas, as required by the manufacturer of the roof system.

.32 The General Construction Contractor shall be responsible for providing weather-proof protection over all rough openings, including windows.

.33 The Contractor shall be responsible for conducting pre-construction walk-throughs and videotaping existing conditions. The Contractor shall schedule a representative of both the Owner and the Construction Manager 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 or the Construction Manager.

.34 Manufacturers Material Safety Data Sheets (MSDS) shall be available at the site for all products used in the Project.

.35 No weapons are permitted on the Owner's property by law.

.36 Neither the Contractor nor any person on its behalf shall, in any manner, engage in discrimination, intimidation or harassment of any person on the Project site.

.37 Proper attire is required for personal safety and clothing must not sexually explicit or contain messages of a vulgar nature, disrespectful of ethnic or religious groups or any group covered under the Dignity for All Students Act, or which promote the use of tobacco, alcohol or drugs.

.38 Only materials and equipment that are to be used directly in the Work shall be brought to and stored on the Project site by the Contractor. After equipment is no longer required for the Work, it shall be promptly removed from the Project site. Protection of construction materials and equipment stored at the Project site from weather, theft, damage, and all other adversity is solely the responsibility of the Contractor.

.39 The Contractor will ensure that the Work, at all times, is performed in a manner that affords reasonable access, both vehicular and pedestrian, to the site of the Work and all adjacent areas. The Work will be performed in such a manner that public areas adjacent to the site of the Work will be free from all debris, building materials and equipment likely to cause hazardous conditions. Without limitation of any other provision of the Contract Documents, the Contractor will use its best efforts to minimize any interference with the occupancy or beneficial use of (1) any areas and buildings adjacent to the site of the Work; or (2) the Owner's building in the event of partial occupancy, as more specifically described in Section 9.9.

.40 The Contractor is required to protect its own Work and work areas, preconstruction, during construction and post construction.

.41 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.

.42 The Contractor shall exert utmost care and diligence when working in or near any existing buildings or site work. 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 due to the actions or inactions of the Contractor shall be repaired by and charged to the Contractor.

.43 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.

.44 The General Construction Contractor shall provide necessary and required security measures to adequately safeguard the construction site from vandalism and intrusion of unauthorized persons. The General Construction Contractor shall submit its means and methods of security to the Construction Manager for review and comment. The Project site 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 General Construction Contractor 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 General Construction Contractor. 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.

.45 The Contractor and any entity for which the Contractor is responsible shall not erect any sign on the Project site without the written consent of the Owner, which may be withheld in the sole discretion of the Owner.

.46 Without limitation of any other provision of the Contract Documents, the Contractor will comply with all reasonable rules and regulations promulgated by the Owner or Construction Manager in connection with the use and occupancy of the Project site and the buildings, as amended from time to time by the Owner or the Construction Manager.

§ 3.13.5 Only materials and equipment that are to be used directly in the Work shall be brought to and stored on the Project site by the Contractor. After equipment is no longer required for the Work, it shall be promptly removed from the Project site. Protection of construction materials and equipment stored at the Project site from weather, theft, damage, and all other adversity is solely the responsibility of the Contractor.

§ 3.13.6 The Contractor shall ensure that the Work, at all times, is performed in a manner that affords reasonable access, both vehicular and pedestrian, to the site of the Work and all adjacent areas. The Work will be performed in such a manner that public areas adjacent to the site of the Work will be free from all debris, building materials and equipment likely to cause hazardous conditions. Without limitation of any other provision of the Contract Documents, the Contractor shall use its best efforts to minimize any interference with the occupancy or beneficial use of (1) any areas and buildings adjacent to the site of the Work; or (2) the building in the event of partial occupancy, as more specifically described in Paragraph 9.9.

§ 3.13.7 The Contractor shall not permit any workers to use any existing facilities at the Project site, including without limitation, lavatories and toilets. To gain access to the Work, entrances and parking areas will be designated by the Owner for the Contractor's use. Without limitation of any other provision of the Contract Documents, the Contractor will comply with all reasonable rules and regulations promulgated by the Owner in connection with the use and occupancy of the Project site and the Owner's building(s), as amended from time to time by the Owner.

§ 3.13.8 Construction areas that are under the control of the Contractor and therefore not occupied by the Owner's 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 Owner's building(s). 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.

§ 3.13.9 Prior to starting Work, the Contractor shall submit a written report to the Owner, Construction Manager and Architect identifying existing damage to roads, walks, lawns, buildings and other property to be affected by this Contract. Failure to submit the report shall render the Contractor responsible for existing damage. The Contractor may request and schedule an inspection with the Owner, Construction Manager and Architect prior to submittal of the report. The Contractor shall obtain the consent of adjoining property owners regarding temporary easements of any other manner of physical encroachment.

§ 3.14 Cutting and Patching

§ 3.14.1 The Contractor shall be responsible for cutting, fitting, or patching required to complete the Work or to make its parts fit together properly. All areas requiring cutting, fitting, or patching shall be restored to the condition existing prior to the cutting, fitting, or patching, unless otherwise required by the Contract Documents.

§ 3.14.2 The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner, Separate Contractors, or of other Contractors by cutting, patching, or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter construction by the Owner, Separate Contractors, or by other Contractors except with written consent of the Construction Manager, Owner, and

such other Contractors or Separate Contractors. Consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold, from the Separate Contractors, other Contractors, or the Owner, its consent to cutting or otherwise altering the Work.

§ 3.14.3 The word "new" used herein shall mean Work which has been or is to be installed under the terms of the Contract for this Project. The word "existing" used herein shall mean existing conditions previous to the award of a Contract for this Project. In order to eliminate cutting and patching as much as possible, the Contractor shall, during the progress of its Work, provide and set proper sleeves, inserts, and other fixtures as required for its new Work and shall give proper and detailed instructions to others where the Work may be affected by their work, with adequate notice prior to the erection of new Work. Cutting and patching work as required to install new Work or remove existing work shall be done carefully and neatly with as little damage as possible. The Contractor shall refer to the Specifications for proper cutting and patching requirements. Any costs caused by defective or ill-timed Work of the Contractor shall be borne by the Contractor. Cutting and patching of any Work shall be made in such a manner as to not breach any provisions of any guaranty or warranty on existing work left in place or any guaranty or warranty required for the Contractor's new Work. Patching of work shall match existing adjacent surfaces and patchwork shall be disguised completely to hide any trace of patching. All new Work on existing roofs must be provided by a company specializing in performing the Work and approved by the existing roofing material manufacturer. It shall be the responsibility of the Contractor performing the cutting and patching to maintain any existing roofing warranty.

§ 3.14.4 Only trades persons skilled and experienced in cutting and patching shall perform such work.

§ 3.15 Cleaning Up

§ 3.15.1 The Contractor shall keep the premises and surrounding area free from accumulation of waste materials and rubbish caused by operations under the Contract. On a daily basis, the 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. At completion of the Work, the Contractor shall remove waste materials, rubbish, the Contractor's tools, construction equipment, machinery and surplus materials from and about the Project. The Contractor shall completely clean the site of the Work, removing and disposing of all construction-related debris and rubbish, and cleaning all Work-related stains, spots, marks, dirt, mortar smears, plaster smears, paint smears, caulking smears, and other foreign materials from exposed surfaces inside and outside the Owner's buildings and within the Project limit lines.

§ 3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner, or Construction Manager with the Owner's approval, may do so and the Owner shall be entitled to reimbursement from the Contractor. At its option, the Owner may deduct the cost of clean-up pursuant to this Section 3.15.2 from any payments otherwise due to the Contractor pursuant to this Contract.

§ 3.16 Access to Work

The Contractor shall provide the Owner, Construction Manager, and Architect with access to the Work in preparation and progress wherever located. Federal, state, and local agencies with jurisdiction over the Project shall at all times have access to the Work wherever it is in preparation or progress. The Contractor shall provide for such access so that such agencies may perform their functions. The Contactor shall also allow access for all required tests and inspections.

§ 3.17 Royalties, Patents and Copyrights

The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of copyrights and patent rights and shall hold the Owner, Construction Manager, and Architect harmless from loss on account thereof, but shall not be responsible for defense or loss when a particular design, process, or product of a particular manufacturer or manufacturers is required by the Contract Documents, or where the copyright violations are contained in Drawings, Specifications, or other documents prepared by the Owner, Architect, or Construction Manager. However, if an infringement of a copyright or patent is discovered by, or made known to, the Contractor, the Contractor shall be responsible for the loss unless the information is promptly furnished to the Architect through the Construction Manager.

§ 3.18 Indemnification

§ 3.18.1 To the fullest extent permitted by law, the Contractor shall, and cause its Subcontractors to, defend, indemnify and hold harmless the Owner, Construction Manager, Architect, and their consultants, officers, directors, board members, agents and employees of any of them (collectively, "Indemnitees," individually, "Indemnitee") from and

against all losses, damages, liabilities, actions, causes of action, claims, demands, fines, penalties, judgments, costs (including but not limited to attorneys' fees and expenses incurred in connection therewith and in the enforcement of this indemnification), charges, expenses and demands of whatever kind in connection with or arising from or out of (a) any negligent, willful or wrongful act or omission resulting in bodily injury (including death), personal injury or property damage (including loss of use) by the Contractor, its Subcontractors, Suppliers, their respective officers, employees, servants, agents, suppliers, invitees, successors and assigns (collectively, "Contractor Parties," and individually, "Contractor Party"), (b) performance of or failure to perform the Work or any breach of this Contract or infringement of any patent right by any Contractor Party, or (c) any statutorily imposed liability for injury to employees or failure to comply with any laws or regulations affecting the Work, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder. Nothing contained herein shall be construed to obligate the Contractor to indemnify, defend, and hold an Indemnitee harmless for claims caused solely by the Indemnitee's negligent acts or omissions.

The Contractor agrees to include the following indemnity provision in each and every contract it enters into with a Subcontractor, and to require that Subcontractor to include such provision in each contract it enters into with any lower tier Sub-subcontractor: "To the fullest extent permitted by law, sub-contractor shall defend, indemnify and hold harmless the Contractor, Owner, Owner's Consultants, Construction Manager's and Architect's consultants, and each of their respective representatives, board members, employees, directors, officers, and agents, from and against any and all claims, suits, actions, damages, losses, fines, penalties, costs, charges and expenses, including but not limited to attorneys' fees and the costs of any proceeding, arising out of or resulting from any performance of or failure to perform the Work, acts or omissions of the Subcontractor, its lower-tier Sub-subcontractors, and others for whom the Subcontractor is responsible, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or economic losses or damages, damage to or destruction of property, and for environmental damage, or to injury to or destruction of tangible property and nuisance, but only to the extent caused by the acts or omissions or a breach of contract of the a Subcontractor, a Sub-Subcontractor to Subcontractor, and any person or entity directly or indirectly employed by them or any person or entity 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."

§ 3.18.2 In claims against any person or entity indemnified under this Section 3.18 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 Section 3.18.1 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' compensation acts, disability benefit acts, or other employee benefit acts.

§ 3.18.3 The Contractor's defense and indemnity obligations under this Section 3.18 shall specifically include all claims and judgments that may be made against the Indemnitees under the Labor Law of the State of New York, and similar laws of other state or governmental bodies having jurisdiction; and further, against claims and judgments arising from violation of public ordinances and requirements of governing execution of the Work.

§ 3.18.4 Claims by Governmental Authorities. To the fullest extent permitted by law, the Contractor shall defend, indemnify, and hold harmless the Indemnitees from and against claims, damages, losses, and expenses arising out of any claims made against the Indemnitees under the laws of federal, state, or other governmental bodies having jurisdiction over the Work, including but not limited to claims arising from violation of public ordinances and other requirements of governing authorities, due to the Contractor's method of execution of the Work or implementation of any of the Contractor's other obligations under the Contract Documents.

§ 3.18.5 Liens and Security Interests. To the fullest extent permitted by law, the Contractor shall defend, indemnify, and hold harmless the Indemnitees from and against any actions, law suits, or other proceedings brought against Indemnitees as a result of liens or security interests of any type arising from the Work and filed against the Work, the site of any of the Work, the Project site and any improvements thereon, payments due the Contractor, or any portion of the property of any of the Indemnitees.

§ 3.18.6 Intellectual Property. The Contractor shall defend, indemnify, and hold harmless the Indemnitees from and against any claim or demand for patent fees, royalties, or otherwise on account of any invention, machine, article, process, copyright, or arrangement that may be used by the Contractor in performing the Work, other than as to any of the foregoing expressly called for in the Contract Documents to be so used. In the event of any injunction or legal action regarding such claim or demand that results in stopping the Work in whole or part, the Owner shall have the

right to direct the Contractor to change the manner of performance of the Work to avoid such stoppage, all cost and expense occasioned thereby to be borne solely by the Contractor.

§ 3.18.7 The Contractor shall further indemnify and hold harmless the Indemnitees from and against any costs and expenses (including reasonable attorneys' fees) incurred by any of the Indemnitees in enforcing any of the Contractor's defense, indemnity, and hold harmless obligations under this Section 3.18 or as may otherwise be provided elsewhere in the Contract.

§ 3.18.8 Subject to Section 3.18.9, all obligations of the Contractor under this Section 3.18 to defend the Indemnitees are obligations to provide full defenses at the sole cost and expense of the Contractor, regardless of any alleged culpability on the part of any Indemnitee or any ultimate determination of relative shares of liability of any Indemnitee or limitation of the Contractor's indemnity obligations in light of such determination.

§ 3.18.9 To the extent any defense, indemnity, or hold harmless obligations under this Section 3.18 are made void or otherwise impaired by any law controlling their construction (including but not limited to laws limiting such obligations to the extent of the portion of damages caused by an indemnitor), such obligations shall be deemed to conform to the greatest rights to defense and indemnity permitted by such law (including but not limited to New York State General Obligations Law Section 5-322.1).

§ 3.18.10 All provisions of this Section 3.18 shall survive termination of the Agreement or final completion. No obligations under this Section 3.18 shall be construed to negate, abridge, or reduce other rights or obligations to defense and indemnity, including but not limited to common law indemnity, which would otherwise exist as to a party or person described in this Section 3.18.

§ 3.19 Existing Features and Underground Data

§ 3.19.1 The location of existing features shown on plans is intended for general information only. The Contractor, alone, is responsible for accurate determination of the location of all structures, and shall not be entitled to any increase in the Contract Sum or Contract Time due to difficulties or distances encountered in the Work, which should have been foreseeable thereby.

§ 3.19.2 The locations, depths and data as to underground conditions have been obtained from records, surface indications and data furnished by others. Information furnished is solely for the convenience of the Contractor without any warranty, expressed or implied as to its accuracy or completeness. The Contractor shall make no claim against the Owner, Construction Manager or Architect with respect to the accuracy or completeness of such information if it is erroneous, or if the conditions found at the time of construction are different from those as indicated.

§ 3.20 Construction Stresses

§ 3.20.1 The Contractor shall be solely responsible for the conditions which develop during construction and in the event any structure is dislocated, over strained, or damaged so as to affect its usefulness, the Contractor shall be solely responsible. The Contractor shall, at its own expense, take whatever steps necessary to strengthen, relocate, or rebuild the structure to meet all applicable requirements.

§ 3.20.2 The Contractor is responsible for restoration or repair of utilities, private property, buildings, pavement, walkways, roads, or other property damaged by its activities under this Agreement.

§ 3.21 Training and Instructions

§ 3.21.1 Upon Substantial Completion of the Work, the Contractor shall orient and instruct personnel of the Owner designated by it in the operation and maintenance of all equipment furnished by the Contractor and shall turn over all pertinent literature and operational manuals relating to the equipment. The format for organizing, binding, and delivering such manuals shall be as described in the Specifications.

ARTICLE 4 ARCHITECT AND CONSTRUCTION MANAGER

§ 4.1 General

§ 4.1.1 The Architect is the person or entity retained by the Owner pursuant to Section 2.3.2 and identified as such in the Agreement.

§ 4.1.1.1 Architect's Consultants: All firms listed on the title sheet of the Specifications, except for the Owner and Construction Manager, are Consultants employed by the Architect, and are agents of the Architect and will make observation of their respective branches of the Work. All changes in the Work must be processed through the Architect. Consultants shall not order extra Work or make changes in the Work.

§ 4.1.2 The Construction Manager is the person or entity retained by the Owner pursuant to Section 2.3.3 and identified as such in the Agreement.

§ 4.1.3 The Architect is the interpreter of the technical requirements of the Drawings and Specifications with regard to questions the Contractor may have concerning its obligations under either. The Architect shall render such interpretations with such promptness as necessary to maintain progress of the Work.

§ 4.2 Administration of the Contract

§ 4.2.1 The Construction Manager and Architect will provide administration of the Contract as described in the Contract Documents and will be the Owner's representatives during construction until the date the Architect issues the final Certificate for Payment and during the correction period described in Article 12. The Construction Manager and Architect have the authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

§ 4.2.2 The Architect will visit the site at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner, to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. On the basis of the site visits, the Architect will keep the Owner and the Construction Manager reasonably informed about the progress and quality of the portion of the Work completed, and promptly report to the Owner and Construction Manager known deviations from the Contract Documents and defects and deficiencies observed in the Work.

§ 4.2.3 The Construction Manager shall provide one or more representatives who shall be in attendance at the Project site whenever the Work is being performed. The Construction Manager will determine in general if the Work observed is being performed in accordance with the Contract Documents, will keep the Owner and Architect reasonably informed of the progress of the Work, and will promptly report to the Owner and Architect known deviations from the Contract Documents and the most recent Project schedule, and defects and deficiencies observed in the Work.

§ 4.2.4 The Construction Manager will schedule and coordinate the activities of the Contractor and other Multiple Prime Contractors in accordance with the latest approved Project Schedule. The Contractor shall participate with other Contractors and the Construction Manager, the Architect and Owner in reviewing their construction schedules when directed to do so. The Contractor shall make any revisions to the construction schedule deemed necessary by the Owner or Construction Manager. The approved construction schedules shall be integrated into the Project Schedule and constitute the schedules to be used by the Contractor, other Contractors, the Architect, the Construction Manager and the Owner until subsequently revised.

§ 4.2.4.1 The Contractor shall assume full responsibility for the execution of its Work in the allotted duration times set forth in the Project Schedule.

§ 4.2.5 The Construction Manager, except to the extent required by Section 4.2.4, and Architect will not have control over, or charge of, construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents, except as provided in Section 3.3.1, and neither will be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. Neither the Construction Manager nor the Architect will have control over or charge of or be responsible for acts or omissions of the Contractor, Subcontractors, or their agents or employees, or of any other persons or entities performing portions of the Work.

§ 4.2.6 Communications Facilitating Contract Administration. Except as otherwise provided in the Contract Documents or when direct communications have been specially authorized, the Owner and Contractor shall endeavor to communicate with each other through the Construction Manager, and shall contemporaneously provide the same communications to the Architect about matters arising out of or relating to the Contract Documents. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors

and material suppliers shall be through the Contractor. Communications by and with other Multiple Prime Contractors shall be through the Construction Manager and shall be contemporaneously provided to the Architect if those communications are about matters arising out of or related to the Contract Documents. Communications by and with the Owner's own forces shall be through the Owner.

§ 4.2.7 The Construction Manager and Architect will review and certify all Applications for Payment by the Contractor, in accordance with the provisions of Article 9. The Construction Manager will assemble each of the Contractor's Applications for Payment with similar applications from other Prime Contractors into a Project Application and Certificate for Payment, all of which will be submitted to the Architect with the Construction Manager's recommendations as to certifications in whole or part by the Architect.

§ 4.2.8 The Architect and Construction Manager have authority to reject Work that does not conform to the Contract Documents and will notify each other about the rejection. The Construction Manager shall determine in general whether the Work of the Contractor is being performed in accordance with the requirements of the Contract Documents and notify the Owner, Contractor and Architect of defects and deficiencies in the Work. Whenever the Construction Manager considers it necessary or advisable, the Construction Manager will have authority to require additional inspection or testing of the Work in accordance with Sections 13.5.2 and 13.5.3, upon written authorization of the Owner, whether or not such Work is fabricated, installed or completed. The foregoing authority of the Construction Manager will be subject to the provisions of Sections 4.2.18 through 4.2.20 inclusive, with respect to interpretations and decisions of the Architect. However, neither the Architect's nor the Construction Manager's authority to act under this Section 4.2.8 nor a decision made by either of them in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect or the Construction Manager to the Contractor, Subcontractors, material and equipment suppliers, their agents or employees, or other persons performing any of the Work.

§ 4.2.9 The Construction Manager will receive and promptly transmit to the Architect all submittals from the Contractor such as Shop Drawings, Product Data and Samples. The Construction Manager's actions will be taken in accordance with the Project submittal schedule approved by the Architect or, in the absence of an approved Project submittal schedule, with reasonable promptness while allowing sufficient time to permit adequate review by the Architect.

§ 4.2.10 The Architect will review and approve or take other appropriate action upon the Contractor's submittals such as Shop Drawings, Product Data and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect's action will be taken in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness while allowing sufficient time in the Architect's professional judgment to permit adequate review. Upon the Architect's completed review, the Architect shall transmit its submittal review to the Construction Manager.

§ 4.2.11 Review of the Contractor's submittals by the Architect 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, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5 and 3.12. The Architect's review shall not constitute approval of safety precautions or, unless otherwise specifically stated by the Architect, of any 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.

§ 4.2.11.1 The Architect's review of Contractor's submittals shall be limited to an initial submittal and one (1) resubmittal. If the Architect is required to review additional submittals because the initial submittal and resubmittal failed to conform to the information given and the design concept expressed in the Contract Documents, the amount of compensation paid to the Architect by the Owner for additional services shall be deducted from the payments to the Contractor.

§ 4.2.11.2 The review will not be considered complete until an "ACTION" stamp or other written notice to that effect has been received by the Contractor.

§ 4.2.12 The Construction Manager will prepare Change Orders and Construction Change Directives.

§ 4.2.13 The Construction Manager and the Architect will take appropriate action on Change Orders or Construction Change Directives in accordance with Article 7 and the Architect will have authority to order minor changes in the Work as provided in Section 7.4. The Architect, in consultation with the Construction Manager, will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

§ 4.2.14 Utilizing the documents provided by the Contractor, the Construction Manager will maintain at the site for the Owner one copy of all Contract Documents, approved Shop Drawings, Product Data, Samples and similar required submittals, in good order and marked currently to record all changes and selections made during construction. These will be available to the Architect and the Contractor, and will be delivered to the Owner upon completion of the Project.

§ 4.2.15 The Construction Manager will assist the Architect in conducting inspections to determine the dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion in conjunction with the Architect pursuant to Section 9.8; and receive and forward to the Owner written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10. The Construction Manager will forward to the Architect a final Application and Certificate for Payment or final Project Application and Project Certificate for Payment upon the Contractor's compliance with the requirements of the Contract Documents.

§ 4.2.16 If the Owner and Architect agree, the Architect will provide one or more project representatives to assist in carrying out the Architect's responsibilities at the site. The duties, responsibilities and limitations of authority of such project representatives shall be as set forth in an exhibit to be incorporated in the Contract Documents.

§ 4.2.17 The Architect will interpret and decide matters concerning performance under, and requirements of the Contract Documents on written request of the Construction Manager, Owner or Contractor through the Construction Manager. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness.

§ 4.2.18 Interpretations and decisions of the Architect will be consistent with the intent of and reasonably inferable from the Contract Documents and will be in writing or in the form of drawings.

§ 4.2.18.1 If Work is described or indicated in a manner which makes it impossible to carry out the requirements of the Contract Documents, or should discrepancies appear among the Contract Documents, the Contractor shall request interpretation before proceeding with the Work. If the Contractor fails to make such a request, no excuse will be entertained for failure to carry out the Work of the Contract Documents. Should a conflict occur in or between Contract Documents, the Contractor is deemed to have included in the Contract Sum the more expensive manner of doing the Work.

§ 4.2.19 The Architect's decisions, after consultation with the Owner, on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents.

§ 4.2.20 The Construction Manager will receive and review requests for information from the Contractor, and forward each request for information to the Architect, with the Construction Manager's recommendation. The Architect will review and respond in writing to the Construction Manager to requests for information about the Contract Documents. The Construction Manager's recommendation and the Architect's response to each request will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information.

(Paragraph deleted)

ARTICLE 5 SUBCONTRACTORS

§ 5.1 Definitions

§ 5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include other Contractors or Separate Contractors or the subcontractors of other Contractors or Separate Contractors.

§ 5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the site. The term "Sub-subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Sub-subcontractor or an authorized representative of the Sub-subcontractor.

§ 5.2 Award of Subcontracts and Other Contracts for Portions of the Work

§ 5.2.1 Unless otherwise stated in the Contract Documents or the bidding requirements, the Contractor, within ten (10) days after award of the Contract, shall furnish in writing to the Construction Manager for review by the Owner, Construction Manager and Architect the names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each principal portion of the Work. The Construction Manager may reply within 14 days to the Contractor in writing stating (1) whether the Owner, the Construction Manager or the Architect has reasonable objection to any such proposed person or entity or, (2) that the Construction Manager, Architect or Owner requires additional time for review. Failure of the Construction Manager, Owner, or Architect to reply within the 14-day period shall constitute notice of no reasonable objection.

§ 5.2.1.1 In no case shall payments be made on the Contract until a complete list of Subcontractors has been submitted by the Contractor to the Construction Manager for review by the Owner, Construction Manager, and Architect. Such list shall not be considered complete if the Owner, Construction Manager or Architect has any reasonable objection to any name listed thereon. Such list shall be submitted and resubmitted if necessary until it is considered complete.

§ 5.2.1.2 Subcontractors will not be acceptable unless, when requested by the Owner, Architect or Construction Manager, evidence is furnished by the Contractor that the proposed Subcontractor has satisfactorily completed similar subcontracts as contemplated under this Contract, and has the necessary experience, personnel, equipment, plant and financial ability to complete the proposed subcontract in accordance with the intent of the Contract Documents and the Project Schedule. As verification of financial ability, the Owner reserves the right to request and receive up to five (5) years of financial statements, bank references, bond/insurance company references and all other information required to assess financial ability.

§ 5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner, Construction Manager or Architect has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

§ 5.2.3 If the Owner, Construction Manager or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner, Construction Manager and Architect have no objection.

§ 5.2.4 The Contractor shall not substitute a Subcontractor, person, or entity for one previously selected if the Owner, Construction Manager or Architect makes reasonable objection to such substitution.

§ 5.2.5 The Maintenance of the Project Schedule is critical. The Contractor shall award subcontracts to entities capable of performing in a manner that will maintain the Project Schedule and require its subcontractors to complete their work in accordance with the Project Schedule.

§ 5.2.6 Upon written request from or on behalf of the Owner, the Contractor shall provide to the Owner executed, unredacted copies of all subcontracts, purchase orders or other agreements relating to the Work.

§ 5.3 Subcontractual Relations

§ 5.3.1 By appropriate written agreement, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including responsibility for safety of the Subcontractor's Work, which the Contractor, by these Documents, assumes toward the Owner, Construction Manager and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner, Construction Manager and Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to 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 the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed

Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement that may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors. Each subcontract shall contain provision for execution of lien waivers in form and substance acceptable to the Owner as a condition of payment by the Contractor. The Contractor shall require each Subcontractor to (1) inspect the Project site, including all relevant surfaces and job conditions, before beginning the Work and (2) accept or cite necessary corrections in the Project site, including surfaces or job conditions, before beginning the Work.

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

§ 5.4 Contingent Assignment of Subcontracts

§ 5.4.1 Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner, provided that

.1 assignment is effective only after termination of the Contract by the Owner pursuant to Article 14 and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor; and

.2 assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

When the Owner accepts the assignment of a subcontract agreement, the Owner assumes the Contractor's rights and obligations under the subcontract.

§ 5.4.2 Upon such assignment, if the Work has been suspended for more than 60 days, through no fault of the Subcontractor, the Subcontractor's compensation shall be equitably adjusted for increases in cost resulting from the suspension.

§ 5.4.3 Upon assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor Contractor or other entity.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

§ 6.1 Owner's Right to Perform Construction with Own Forces and to Award Other Contracts

§ 6.1.1 The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, which include persons or entities under separate contracts not administered by the Construction Manager, and to award other contracts in connection with other portions of the Project or other construction or operations on the site under Conditions of the Contract identical or substantially similar to these including those portions related to insurance and waiver of subrogation.

§ 6.1.2 When the Owner performs construction or operations with the Owner's own forces or Separate Contractors, the Owner shall provide for coordination of such forces and Separate Contractors with the Work of the Contractor, who shall cooperate with them.

§ 6.1.3 Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner's own forces or with Separate Contractors, the Owner or its Separate Contractors shall have the same obligations and rights that the Contractor has under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6, and Articles 10, 11, and 12.

§ 6.1.4 The Contractor accepts assignment of, and liability for, all purchase orders and other agreements for procurement of materials and equipment that are identified as part of the Contract Documents. The Contractor shall be responsible for such pre-purchased items, if any, as if the Contractor were the original purchaser. The Contract Sum includes, without limitation, all costs and expenses in connection with delivery, storage, insurance, installation and testing of items covered in any assigned purchase orders or agreements. All warranty and correction of the Work obligations under the Contract Documents shall also apply to any pre-purchased items, unless the Contract Documents specifically provide otherwise.

§ 6.2 Mutual Responsibility

§ 6.2.1 The Contractor recognizes and acknowledges that the Project is governed by and subject to the provisions of New York State General Municipal Law §101, et seq., governing the award of contracts on public improvement projects. As such, the Contractor recognizes and acknowledges that other Contractors or Separate Contractors will be performing work on the project in conjunction with it. As such, the Contractor shall afford the Owner's own forces and other Contractors or Separate Contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor's construction and operations with theirs as required by the Contract Documents.

§ 6.2.1.1 The Contractor shall not commit or permit any act which will interfere with the performance of the work of any other Contractor or Separate Contractor performing work on the Project. If the Contractor sustains any damage through any act or omission of Separate or 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 Separate or other Contractor, the Contractor shall promptly notify the Owner and the Construction Manager of such damage

§ 6.2.1.2 The Contractor agrees to defend and indemnify Owner, Architect, Construction Manager, Consultants and Sub-consultants, from all claims made against any of them arising out of the Contractor's acts or omissions or the acts or omissions of any Subcontractor of the Contractor which have caused damage to the Owner, Architect, Construction Manager, Separate Contractor or other Contractor 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 the Contractor's Contract Sum an amount sufficient to cover such damage and all expenses and costs associated with the damage sustained.

§ 6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner's own forces, Separate Contractors or other Contractors, the Contractor shall, prior to proceeding with that portion of the Work, promptly notify the Construction Manager and Architect of apparent discrepancies or defects in the construction or operations by the Owner or Separate Contractor or other Contractors that would render it unsuitable for proper execution and results of the Contractor's Work. Failure of the Contractor to notify the Construction Manager and the Architect of apparent discrepancies or defects prior to proceeding with the Work shall constitute an acknowledgment that the Owner's or Separate Contractor's or other Contractors' completed or partially completed construction is fit and proper to receive the Contractor's Work. The Contractor shall not be responsible for discrepancies or defects in the construction or operations by the Owner or Separate Contractors or other Contractors that are not apparent.

§ 6.2.2.1 The Contractor shall promptly correct discrepancies or defects in its Work identified by Separate Contractors as affecting proper execution and results of the work of the Separate Contractors.

§ 6.2.3 The Contractor shall reimburse the Owner for costs the Owner incurs, including costs that are payable to a Separate Contractors or to other Contractors, because of the Contractor's delays, improperly timed activities or defective construction.

§ 6.2.4 The Contractor shall promptly remedy damage that the Contractor wrongfully causes to completed or partially completed construction, or to property of the Owner, Separate Contractors, or other Contractors as provided in Section 10.2.5 or elsewhere in the Contract Documents.

§ 6.2.5 The Owner, Separate Contractors, and other Contractors shall have the same responsibilities for cutting and patching as are described for the Contractor in Section 3.14.

§ 6.2.6 Should the Contractor or its Subcontractors cause damage to the work or property of any Separate Contractor or other Multiple Prime Contractor, the Contractor shall, upon due notice, promptly attempt to settle by agreement or otherwise resolve the dispute with the Separate Contractor or other Multiple Prime Contractor. If such separate trade contractor or other Multiple Prime Contractor sues or makes any other claim against the Owner, Construction Manager, or Architect on account of any damage alleged to have been caused by the Contractor or its Subcontractors, the Contractor shall defend, indemnify, and hold harmless the Owner, Construction Manager, and Architect against such claim or proceedings at the Contractor's own expense. 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

Documents or by law. Further, the Owner shall be entitled to withhold from the Contractor's Contract Sum an amount sufficient to cover such damage and all expenses and costs associated with the damage sustained.

§ 6.2.7 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.

§ 6.2.8 In case of interference between the operations of the Contractor and other Contractors, the Construction Manager 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.

§ 6.2.9 The Contractor, including its Subcontractors, shall keep itself informed of the progress of other Contractors and shall notify the Architect or the Construction Manager 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 Work.

§ 6.2.10 Delays or oversights on the part of the Contractor or its Subcontractors in getting any or all of the 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 or additional time.

§ 6.2.11 The Contractor shall promptly correct discrepancies or defects in its Work which have been identified by Separate Contractor(s) or other Contractor(s) as affecting proper execution and results of the work of such other Contractor(s).

§ 6.3 Owner's Right to Clean Up

If a dispute arises among the Contractor, Separate Contractors, other Contractors, and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and the Construction Manager, with notice to the Architect, will allocate the cost among those responsible.

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 General

§ 7.1.1 Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, only by Change Order, Construction Change Directive or field order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents. The Owner may in its sole discretion reduce the scope of the Contractor's Contract with or without any specific reasons therefor.

§ 7.1.2 A Change Order shall be based upon agreement among the Owner, Construction Manager, Architect and Contractor; a Construction Change Directive requires agreement by the Owner, Construction Manager and Architect and may or may not be agreed to by the Contractor; a field order for a minor change in the Work may be issued by the Architect alone.

§ 7.1.2.1 Field orders are an interpretation of the Drawings or Specifications which order minor changes in the Contractor's work which will not result in an increase or decrease in the 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 the Contract Time. 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 or Separate Contractors engaged by the Owner in connection with the Project. All field orders shall be given to the Contractor and the Construction Manager by the Architect in writing.

§ 7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents, and the Contractor shall proceed promptly, unless otherwise provided in the Change Order, Construction Change Directive or field order for a minor change in the Work. Additional work performed without authorization of a Change Order will

not entitle the Contractor to an increase in the Contract Sum or an extension of the Contract Time. No course of conduct or prior dealings between the parties, nor express or implied acceptance of alterations or additions to the Work, and no claim that the Owner has been unjustly enriched by any alteration or addition to the Work, whether or not there is, in fact, any unjust enrichment of the Owner, shall be the basis for any claim 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.**

§ 7.1.4 Costs for changes in the Work shall not be allowed in excess of usual rentals charged in the area where the Project is located for similar equipment of like size and condition, including costs of necessary supplies and repairs for operating equipment on site in connection with other work unless its use incurs actual and additional costs to Contractor. If equipment not on Site is required for change in work only, cost of transporting equipment to and from Site will be allowed.

§ 7.1.5 When the Owner or Architect (in association with the Construction Manager) 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 request that the Contractor submit its proposal for performing such additional work. The Contractor shall submit its proposal to the Construction Manager and 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 Sub-subcontractor(s) perform in connection with additional work shall be properly itemized and supported by sufficient substantiating data, including but not limited to material descriptions, material quantities, material unit prices, labor trade listings, labor hour quantities, labor trade rates, equipment descriptions and equipment rates with a percentage allowance for overhead and profit as set forth in Section 7.3.11.

§ 7.1.6 Overtime, when specifically authorized by the Owner in writing, and not as a corrective measure by the Contractor to expedite the progress of construction as ordered by the Owner based on its determination that the performance of the Work has not progressed to the level of completion required by the approved Schedule, shall be paid for by the Owner on the basis of premium payment only, plus the cost of insurance and taxes based on the premium payment period. Overhead and profit will not be paid by the Owner for overtime.

§ 7.1.7 Costs to which overhead and profit is to be applied shall be determined in accordance with Section 7.3.4. The allowable overhead and profit mark-up shall include, but not be limited to, the following:

.1 home office expense;
.2 field office expense;
.3 supervision;
.4 project management & estimation; and
.5 small tools & equipment.

§ 7.1.8 Unit prices shall be submitted in the Bid Form for various items as set forth therein, and are subject to approval and acceptance by the Owner. The Owner reserves the right to reject any unit price which is unreasonable or unbalanced, as compared with prevailing costs, or as compared with the unit prices submitted by other bidders for the Project. Approved unit prices quoted shall include all profit, overhead, bonds, insurance, labor, materials, equipment, tools, applicable taxes necessary to complete the work item and shall apply to all work added or work deducted.

§ 7.2 Change Orders

§ 7.2.1 A Change Order is a written instrument prepared by the Construction Manager and signed by the Owner, Construction Manager, Architect, and Contractor, stating their agreement upon all of the following:

.1 The change in the Work;
.2 The amount of the adjustment, if any, in the Contract Sum; and
.3 The extent of the adjustment, if any, in the Contract Time.

§ 7.2.1.4 Changes in the Work involving additional Work or deletion of Work effecting an addition to or subtraction from the Contract Sum shall not be made until the Contractor submits to the Architect and Construction Manager the cost of the added or deleted Work with a complete and detailed listing of all Subcontractors involved, all materials, labor, overhead and profit and an appropriate Change Order has been issued. If requested, the Contractor shall submit detailed quotations for Subcontractors and material suppliers. Changes in the Work when not involving additions or

deletions from the Contract Sum shall not be made until the Architect has issued an appropriate Change Order. All Change Orders must have the approval of the Owner, Construction Manager and Architect in writing.

§ 7.2.2 Methods used in determining adjustments to the Contract Sum may include those listed in Section 7.3.3.

§ 7.2.3 Agreement on any Change Order shall constitute a final settlement of all Claims and other matters related to the change in Work that is the subject of the Change Order, including, but not limited to, all direct and indirect costs associated with such change (including, without limitation, all costs of associated delay, interference, acceleration, inefficiency, overhead, as well as costs of material, labor and supervision), and any and all adjustments to the Contract Sum and the Contract Time. Payment of a Change Order shall constitute accord and satisfaction of all Claims of the Contractor in connection with the change or changes to the Contract addressed by the Change Order and it is understood and agreed that a signed Change Order shall be the complete and fully integrated agreement for all related costs and there are no oral or written understandings, reservations, representations or agreements, directly or indirectly, connected with the Change Order and not affirmatively stated on the signed Change Order. In the event a Change Order increases the Contract Sum, the Contractor shall include the Work covered by such Change Orders in Applications for Payments as if such Work were originally part of the Contract Documents.

§ 7.2.4 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; and

.2 Copies of invoices from its Subcontractors supplying work in connection with the Change Order work.

§ 7.2.5 Additional work performed without authorization of a Change Order will not entitle the Contractor to an increase in the Contract Sum or an extension of the Contract Time, except at provided in Section 7.3, and except in the case of an emergency as provided in Section 10.4.

§ 7.3 Construction Change Directives

§ 7.3.1 A Construction Change Directive is a written order prepared by the Construction Manager and signed by the Owner, Construction Manager and Architect, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions, or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

§ 7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order. In the event the Contractor and the Owner cannot agree on the sum by which the Contract Sum or the amount of time by which the Contract Time is to be increased or reduced based upon changes to the scope of the Work as described in Article 7, the Architect or Construction Manager shall issue a Construction Change Directive reflecting the addition to or reduction of the scope of the Contractor's Contract.

§ 7.3.2.1 If the Owner and the Contractor cannot agree that the requested Work properly forms the basis for a Change Order or on the sum by which the Contract is to be increased or reduced based upon changes to the scope of Work, the Architect or Construction Manager shall issue a Construction Change Directive signed by the Owner, Construction Manager and Architect reflecting the addition to, or removal of, the scope of Work and the Contractor shall (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 the Contractor or other Contractors working at the site an keep records of its performance of such additional work, and (b) in the case of work to be removed from the scope of the Contractor's Work, refrain from taking any steps in connection with the work associated with the deduction of the Contractor's Work. The Construction Change Directive shall include: (a) a description of the work being added or removed from the Contractor's scope of Work; (b) the amount the Owner has determined to be the cost associated with the additional work (as those costs are identified and limited in Section 7.3.4) or removal 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; and (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 15 of these General Conditions. Failure to timely file any claim in accordance with requirements set forth therein shall constitute a waiver of such claim.

§ 7.3.3 If the Construction Change Directive provides for a method for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:

.1 Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;

.2 Unit prices stated in the Contract Documents or subsequently agreed upon (unit prices shall be deemed to include all costs and expenses for the Contractor's changed Work, including costs of general conditions, insurance/bonds and overhead and profit attributable to the change);

.3 Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee subject to the limitations of Section 7.3.11; or

.4 As provided in Section 7.3.4 subject to the limitations of Section 7.3.11.

§ 7.3.4 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Construction Manager shall determine the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in Section 7.3.11. In such case, and also under Section 7.3.11, the Contractor shall keep and present, in such form as the Construction Manager may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.4 shall be limited to the following:

.1 Actual costs of labor, including social security, old age and unemployment insurance, fringe benefits required by agreement or custom, and workers compensation insurance;

.2 Actual costs of materials, supplies, and equipment, including cost of transportation, whether incorporated or consumed;

.3 Actual rental costs of machinery and equipment, exclusive of hand tools, rented from third parties; and

.4 Actual costs of premiums for all bonds and insurance, permit fees, and sales, use or similar taxes related to the additional work.

§ 7.3.5 If the Contractor disagrees with the adjustment in the Contract Time, the Contractor may make a Claim in accordance with applicable provisions of Article 15.

§ 7.3.6 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Construction Manager of the Contractor's agreement or disagreement with (1) the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time or (2) the amount of the increase or decrease in the Contract Sum and Contract Time as provided in Section 7.3.2.1. Any claims must be filed in accordance with the requirements set forth in Article 15 of these General Conditions. Failure to timely file any claim in accordance with requirements set forth therein shall constitute a waiver of such claim.

§ 7.3.7 A Construction Change Directive signed by the Contractor indicates the Contractor's agreement therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

§ 7.3.8 When the Owner or Architect request that portions of the Contractor's Work originally included in the Drawings or Specifications be deleted and which will result in a reduction of the Contract Sum, the Architect shall request that the Contractor submit its proposal for deleting the scope of such Work from the Contract. The Contractor's proposal shall include a complete itemization of the costs associated with deducting such Work including labor, materials, overhead and profit. The Contractor shall not be entitled to retain its overhead 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, if any, with respect to that change.

§ 7.3.9 Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The Construction Manager and Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Construction Manager and Architect determine to

be reasonably justified. The interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.

§ 7.3.10 When the Owner and Contractor agree with a determination made by the Construction Manager and Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and the Construction Manager shall prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

§ 7.3.11 The limit for the combined overhead and profit included in the total cost to the Owner shall be based on the following schedule:

.1 For the Contractor, for Work performed by the Contractor's own forces, fifteen percent (15%) of the direct cost for labor and materials.

.2 For the Contractor, for Work performed by the Contractor's Subcontractor, maximum of five percent (5%) of the amount due the Subcontractor for the Contractor's overhead and profit. For the Subcontractor, for Work performed by the Subcontractor's own forces, ten percent (10%) of the direct cost for labor and materials. The total combined overhead and profit for a change order shall be limited to 15% of the direct cost regardless if the Work is performed by the Contractor or the Subcontractor.

.3 The markup on any part of the Work a Subcontractor subcontracts will be limited to one overhead and profit figure, in addition to the Contractor's overhead and profit markup. The Subcontractor and Sub-subcontractor may divide the overhead and profit amount as they agree upon.

.4 Cost to which overhead and profit is to be applied shall be determined in accordance with Section 7.3.7.

.5 In order to facilitate checking of quotations for extras and credits, all proposals, except those so minor that their propriety can be seen by inspection, shall be accompanied by a complete itemization of costs including labor, materials, and subcontracts. Labor and material shall be itemized in the manner prescribed above. Where major cost items are subcontracts, they shall be itemized also.

.6 Overhead and profit mark-up shall include, but not be limited to, the following:

- **.1** home office expense;
- **.2** field office expense;
- **.3** supervision;
- **.4** project management & estimation;
- **.5** small tools & equipment;
- **.6** research & layout;
- **.7** inspections & permits;
- **.8** material handing;
- **.9** record drawings: and
- **.10** safety and cleanup

§ 7.4 Minor Changes in the Work

The Architect may order minor changes in the Work that are consistent with the intent of the Contract Documents and do not involve an adjustment in the Contract Sum or an extension of the Contract Time. The Architect's order for minor changes shall be in writing. If the Contractor believes that the proposed minor change in the Work will affect the Contract Sum or Contract Time, the Contractor shall notify the Construction Manager and shall not proceed to implement the change in the Work. If the Contractor performs the Work set forth in the Architect's order for a minor change without prior notice to the Construction Manager that such change will affect the Contract Sum or Contract Time, the Contractor waives any adjustment to the Contract Sum or extension of the Contract Time.

ARTICLE 8 TIME

§ 8.1 Definitions

§ 8.1.1 Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

§ 8.1.2 The date of commencement of the Work is the date established in the Agreement. The date shall not be postponed or extended by the failure to act of the Contractor or persons or entities for whom the Contractor is responsible to act.

§ 8.1.3 The date of Substantial Completion is the date certified by the Architect in accordance with Section 9.8. The date of final completion is the date certified by the Architect and Owner in accordance with Section 9.10. Unless

otherwise agreed in writing by the Owner, the Contractor agrees that Final Completion shall occur not more than 30 calendar days after the date of Substantial Completion.

§ 8.1.4 The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

§ 8.1.5 Work remaining to be completed after Substantial Completion, shall be limited to items which can ordinarily be completed within a thirty (30) day period (one month) before final payment is made.

§ 8.2 Progress and Completion

§ 8.2.1 Time limits stated in the Contract Documents 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.

§ 8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, commence the Work prior to the effective date of insurance required to be furnished by the Contractor and Owner and the Owner's approval of such insurance. The date of commencement of the Work shall not be changed by the effective date of such insurance. The Work can not start until the required insurance and bonds are provided and the Contract has been executed.

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion and final completion within the Contract Time. The Contractor agrees that the Work shall be prosecuted regularly, diligently and uninterruptedly at such rate of progress as will ensure full completion thereof within the Contract Time specified and, further, to provide such protections as may be necessary. It is expressly understood and agreed by the Contractor that the time for the substantial and final completion of the Work is a reasonable time for its completion, taking into consideration, among other things, the average climatic range and usual weather conditions prevailing in the Project's locality.

§ 8.2.4 In no case shall the Contractor delay the progress of the Work, or any part thereof, on account of changes in the Work or disputes caused by proposed or ordered changes in the Work (including the equitable value of the changes), or any disputes or disagreements as to the Work or extra work.

§ 8.2.5 If the Contractor does not achieve the completion date and milestone date for each work item in the Contract, a milestone or critical path date reflected on the Project Schedule, or the date of Substantial Completion for the Work or any part thereof, the Contractor shall be responsible for all direct and consequential damages to Owner arising from any delay of the Contractor, its Sub-Contractors, Sub-subcontractors, and suppliers, in performing or completing the Work in accordance with the time requirements of the Contract, by way of example but not as a limitation: (i) additional architectural and construction management fees related to extended services; (ii) additional project management costs; (iii) financing costs (including delayed or lost State Building Aid); (vi) temporary storage and dislocation costs; and (v) costs related to the disruption or relocation of the Owner's personnel, academic and other departments, including equipment and machinery, affected by the Owner's inability to timely occupy the Project facilities. The Owner shall have the right to deduct the amount of the foregoing damages from any payment then due or thereafter becoming due from the Owner to the Contractor. If the Contract Sum is exhausted, the Contractor shall pay such amounts to the Owner on demand.

§ 8.2.6 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 without the express written authorization of the Owner. 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, Architect and Construction Manager personnel as required to make facility accessible by Contractor and perform inspections during such off hours.

§ 8.2.7 The Contractor understands that in order to meet the requirements of the Project schedule, including intermittent milestone and critical path dates set forth in the Contract Documents, it may be required to work its personnel and equipment overtime on regular work days and on Saturdays and holidays, the cost of which is included in the Contract Sum. If the Owner specifically approves in writing reimbursement for overtime, the Contractor shall be paid by the Owner on the basis of the premium payment.

§ 8.2.8 The Owner shall have the right at any time to modify the Project Schedule; to suspend, delay or accelerate, in whole or in part, the commencement or execution of the Work or any potion thereof or to vary the sequence thereof; and to prescribe the time, order and priority of the various portions of the Work, and all other matters relating to the scheduling of the Work. The Contractor shall not be entitled to additional compensation for any such decisions made by the Owner.

§ 8.3 Delays and Extensions of Time

§ 8.3.1 If the Contractor is delayed in the commencement or progress of the Work as a result of: Acts of God (such as tornado, flood, hurricane, pandemics [see exception below], epidemics, etc. making performance temporarily impossible); the negligent acts or omissions of the Owner, Architect, Construction Manager, other Contractors, or their agents or employees; strikes, lockouts or other labor disturbances (not arising from the labor practices of Contractor or its Subcontractors, Suppliers, or Sub-subcontractors to comply with their obligations arising under the Contract); unusually adverse weather conditions; freight embargoes (provided that delays by the Contractor, its Subcontractors, Sub-subcontractors or Suppliers do not constitute an excusable cause of delay); changes in the work to be performed by the Contractor (not caused or resulting from the failure of the Contractor or its Subcontractors, Suppliers or Sub-subcontractors); or changes to laws or regulations after the effective date of the Contract, provided the Contractor has used all reasonable efforts to mitigate the foregoing causes; then the Contractor shall be entitled to a day for day extension of the Contract Time for the established delay to the critical path of the Work subject to the provisions of this Article 8 and Article 15. All other delays of the Project, including but not limited to, Architect review and/or approval of shop drawings or other 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 among the Multiple Prime Contractors; unavailability of materials and/or equipment; surveying/testing; closeout, etc. are deemed to be foreseeable and contemplated and, therefore, shall not form the basis for a claim for an extension of time or additional compensation by the Contractor. Conditions caused by the COVID-19 pandemic or epidemic, or any variants of the disease, shall not form the basis of an excuse under this section. No additional time or compensation shall be provided to the Contractor for COVID-19 or any variant.

§ 8.3.1.1 The Contractor further acknowledges and agrees that adjustments in the Contract Time will be permitted for a delay only to the extent such delay (1) is not caused or could not have been anticipated by the Contractor, (2) could not be limited or avoided by the Contractor's timely notice to the Owner of the delay or reasonable likelihood that a delay will occur, and (3) is of a duration of more than one (1) day.

§ 8.3.1.2 The Contractor's inability to secure sufficient personnel for the performance of the Work shall not constitute a basis for an extension of time. The Contractor shall not be entitled to an extension of time if the Architect or Construction Manager stops the Work due to the existence of or reasonable suspicion of a deficiency in the Work.

§ 8.3.1.3 An extension of the Contract Time, if requested by the Contractor, shall only be considered after the Contractor has made reasonable effort to recover the lost time. An extension, or extensions, of time may be granted subject to the provisions of this Article 8, but only after written application therefore by the Contractor. An extension of time shall be only for the number of days of delay which the Architect may determine to be due solely to the causes set forth in the application for extension of time. The Contractor shall not be entitled to receive a separate extension of time for each one of several causes of delay operating concurrently; but if at all, only the actual period of delay as determined by the Construction Manager or Architect.

§ 8.3.1.4 All requests for additional time shall be made in writing, delivered to the Construction Manager within five (5) days from the time when the circumstance with potential for delay becomes reasonably known to the Contractor, supported by documentation which demonstrates to the Architect and Construction Manager's satisfaction that the critical path of the Work has been significantly altered by the delays to the activities in question, and that the Project schedule cannot be maintained by re-ordering other activities within the Project at no cost. This request shall also contain, at a minimum, the following information: (1) date of start of delay; (2) specific cause of delay; (3) effect of delay on construction progress; and (4) date of termination of delay. 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, Architect

and Construction Manager. When 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; rather, only the actual period of delay as determined by the Owner or its Architect may be allowed.

§ 8.3.1.5 Failure of the Contractor to give written notice as required by Section 8.3.1.4 or to strictly comply with the requirements of Article 8 shall be deemed conclusively to be a waiver and release of such claim, and such notice shall be a condition precedent to the Contractor's right to make a claim for any claim arising out of, under or in connection with the Contractor or the performance of the Work.

§ 8.3.2 Notwithstanding anything to the contrary in the Contract Documents, an extension in the Contract Time, to the extent permitted and justified under Section 8.3.1, shall be the sole remedy of the Contractor for, and the Contractor waives its right to any claim for damages to the extent arising from, 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 claims for disruption, interference, inefficiencies, impedance, hindrance, acceleration, resequencing, schedule impacts, lack of timeliness by the Owner or its consultants, and lack of coordination, errors or omissions in the design of the Project, cumulative impact of multiple change orders, delay and other impacts (collective referred to herein as "Delay(s)"). 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, delay costs, loss of productivity or efficiency, lost profits, extended jobsite general conditions and home office overhead, 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 interference, hindrance or obstruction with the Contractor's performance of the Work and shall not entitle the Contractor to any additional compensation. The Contractor shall include a no-damages-for-delay clause in all subcontracts for the performance of the Work.

§ 8.3.3 Delays that affect the scheduled completion of the Work and are attributable to interference between Multiple Prime Contractors, Separate Contractors, Subcontractors, suppliers, utility companies or municipalities, shall be compensated solely by the granting of an extension of time to the Contractor by the Owner to complete the Work without charges to the Owner. The parties acknowledge that the Contract Time takes into account the time necessary for review of shop drawings, design errors or omissions, coordination amongst Contractors, change orders, delays incurred by seasonal limitations and other administrative processing by all parties involved and are not compensatory. The Contractor agrees that it has included in its Bid prices the additional cost of doing work under this Contract caused by interference of other Prime Contractors, Separate Contractors, Subcontractors, etc. and the other non-compensatory Delays described above.

§ 8.3.4 When the Contract Time has been extended, as provided under Section 8.3, such extension of time shall not be considered as justifying extra compensation to the Contractor for administrative costs, home office, estimating, extended general conditions or other similar impact costs. The Contractor acknowledges that in agreeing to the Contract Sum it assessed the potential impact of the limitations in Section 8.3.2 on its ability to recover additional compensation in connection with a Work delay, interference, impact or hindrance and agrees that those limitations shall apply regardless of the accuracy of the Contractor's assessment or actual costs incurred by the Contractor.

§ 8.3.5 If the Contractor submits a progress report indicating, or otherwise expresses an intention to achieve, completion of the Work prior to any completion date required by the Contract Documents or expiration of the Contract Time, no liability of the Owner to the Contractor for any failure of the Contractor to so complete the Work shall be created or implied.

§ 8.3.6 The intent of the Contract is for Work to follow a logical sequence. The Contractor, however, may be required by the Owner, Construction Manager or Architect to temporarily omit or leave out any section of Work or perform Work out of sequence. Out of sequence work and come back time to these areas shall be performed at no additional cost to the Owner.

§ 8.3.7 Claims relating to Contract Time shall be made in accordance with applicable provisions of Article 15.

§ 8.4 LIQUIDATED DAMAGES

§ 8.4.1 Contractor realizes that time is of the essence on this Contract and the Construction Schedule shall be submitted per Sections included herein. In the event the Contractor fails to submit a Construction Schedule by said date, the sum per calendar day of ($300) THREE HUNDRED DOLLARS will be subtracted from the Contract Sum due the Contractor in the form of a change order.

§ 8.4.2 Contractor realizes that time is of the essence on this Contract and the completion date for any work or the date of Substantial Completion shall be no later than the date indicated in these Contract Documents. The Contractor understands that the substantial disruption of the School District's educational process will occur if the project is not completed by the dates outlined in Division 1 of the specifications. In the event that the Contractor fails to complete any work or substantially complete the work under the Contract by said schedule, the sum per calendar day of ($1,000) FIVE HUNDRED DOLLARS will be deducted from the Contract Sum due the Contractor in the form of a change order, except in cases where a delay is due to unforeseeable causes beyond the control and without the fault or negligence of the Contractor, including acts of God, or of the Public enemy, acts of the government, in either sovereign or contractual capacity, fires, floods, epidemics, (except COVID-19 or its variants) quarantine restrictions (except from COVID-19 or its variants), freight embargos, or delays of Subcontractors or suppliers due to such causes. Delays in acquisition of materials other than by reason of freight embargoes will not constitute a delay excusable under this provisions unless approved by the Owner in writing.

Within five (5) calendar days from the occurrence of any such delay, the Contractor shall notify the Owner in writing the cause of delay. The Owner will ascertain the facts and extent of the delay, and extend the time for completing the Work when in his judgment the findings of fact justify such an extension. Owner's findings of fact will be final and binding on any litigation.

The said sum per calendar day shall constitute the Liquidated Damages incurred by the Owner for each day of the delay beyond the agreed upon dates. 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 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 the 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 Liquidated Damages, the Contractor shall be liable for all additional costs incurred by the Owner to provide staff, Architect, and Owner's Representative personnel as required to make facility accessible by Contractor and perform inspections during such off hours. In the event that the completion dates are not met, inspections will be performed once each week unless, the Owner or the Architect determine, at their sole discretion, that additional inspections are needed.

All costs incurred by the Owner, Owner's Representative, Architect, Architect's consultants, for the cost of additional inspections, at the rate of ($800) EIGHT HUNDRED DOLLARS per inspection or more due to time requirements, 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. Additionally, a cost of $750 per day for extended Construction Management time will be charged to the Contractor causing the delay.

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 Contract Sum

§ 9.1.1 The Contract Sum is stated in the Agreement and, including authorized adjustments, is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents. Notwithstanding anything to the contrary contained in the Contract Documents, the Owner may withhold or offset any payment to the Contractor if and for so long as the Contractor fails to perform any of its obligations under any of the Contract Documents; provided, however, that any such holdbacks shall be limited to an amount sufficient in the reasonable opinion of the Owner to cure any default or failure of performance by the Contractor.

§ 9.1.2 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed so that application of such unit prices to the actual quantities causes substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

§ 9.2 Schedule of Values

§ 9.2.1 Within 30 days of Contract Award, the Contractor shall submit to the Construction Manager a schedule of values allocated to various portions of the Work for each building, prepared in the currently authorized form of AIA Document G703 – Continuation Sheet and supported by such data to substantiate its accuracy as the Construction Manager and Architect may require. This schedule, unless objected to by the Construction Manager or Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment. The schedule of values shall state the names of all Subcontractors, Sub-subcontractors and material suppliers and the amounts to become due to each breakdown by specification section. The schedule of values shall contain, along with individual work items, separate line items for (1) mobilization, bonds, insurance, etc., (2) value of administrative close out submittals, (3) Allowance(s) if required elsewhere in the Project Manual, (4) separate subtotals by building, and (5) buildings further separated between "Additions/New Construction" and "Renovations/Reconstruction" as applicable. At the direction of the Architect, it shall include quantities, if applicable. The total for all items shall aggregate the Contract Sum.

§ 9.2.2 Any schedule of values that 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 Construction Manager and the Architect and is subsequently used, but later is found by the Construction Manager or Architect to be improper for any reason, sufficient funds shall be withheld from the Contractor's future applications for payment to ensure an adequate reserve (exclusive of normal retainage) to complete the Contractor's Work.

§ 9.2.3 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.

§ 9.3 Applications for Payment

§ 9.3.1 In accordance with Article 5 of the Agreement and the Payment Procedures in the Specifications, the Contractor shall submit to the Architect an itemized Application for Payment prepared in accordance with the schedule of values, notarized and reflecting retainage as provided elsewhere in the Contract Documents. Applications for Payment will be in the currently authorized form of AIA Document G732 - 2019, "Application and Certificate for Payment," accompanied by AIA Document G703-1992, "Continuation Sheet," and must include (add and/or deduct) adjustments to the Contract Sum resulting from Work performed under approved Change Orders (specified under Article 7) and shall be shown separately on the application for previous and current periods. Each Application and Certificate of Payment shall be accompanied by two (2) copies of the Pay Application Lien Waiver and Release in the form set forth in the Payment Procedures in the Specifications. Each Application for Payment shall be prepared in such form and supported by such data to substantiate the Contractor's right to payments as the Owner, Construction Manager or Architect may require such as copies of requisitions from Subcontractor and material suppliers. Each Application for Payment forwarded to the Owner by the Construction Manager or Architect shall be subject to audit and approval by the Owner in accordance with the Owner's normal audit.

§ 9.3.1.1 The Construction Manager and Architect shall review the application for payment submitted by the Contractor and shall advise the Contractor of any adjustments to be made thereto. The Construction Manager and/or the Architect may make such adjustments under the circumstances set forth in Section 9.5.1. If any such adjustments are made by the Architect or Construction Manager, the Contractor shall submit an original itemized revised application with all documentation required by Section 9.3.1.

§ 9.3.1.2 As provided in Section 7.3.9, such applications may include requests for payment on account of changes in the Work that have been properly authorized by Construction Change Directives, or by interim determinations of the Construction Manager and Architect, but not yet included in Change Orders.

§ 9.3.1.3 Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor does not intend to pay a Subcontractor or material supplier unless such Work has been performed by others whom the Contractor intends to pay.

§ 9.3.1.4 Until Substantial Completion, the Owner shall pay ninety-five percent (95%) of the amount due the Contractor on account of progress payments, less an amount necessary to satisfy any claims, liens, or judgments against Contractor, which have not been suitably discharged. In accordance with Section 9.8.5, the Owner shall pay the entire amount retained from previous progress payments less two (2) times the amount required to complete items

identified in a list prepared in accordance with Section 9.8.2 and the amount required to satisfy any outstanding claims, liens, or judgments against the Contractor.

§ 9.3.1.5 The Contractor and its Subcontractors are required to submit certified payroll information to the Owner in accordance with New York State Law.

§ 9.3.2 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the Project site for subsequent incorporation in the Work. If approved in advance in writing by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest. The costs of applicable insurance, storage, and transportation to the site for such materials and equipment stored off the site shall not increase the Contract Sum.

§ 9.3.2.1 Payment may be made for materials and equipment delivered and suitably stored on-site for future incorporation in the Work, subject to the following conditions:

.1 Request for payment shall be considered for material or equipment, which is in short or critical supply, which has been specially fabricated for the Project or, at the discretion of the Construction Manager and Architect, for other materials or equipment.

.2 A request for payment of material stored on-site must be made by the Contractor ten (10) days prior to actual, monthly cut-off date for Payment Applications.

.3 Procedures required by the Owner shall include, but not necessarily limited to, submission by the Contractor to the Construction Manager and Architect of bills of sale and bills of lading for such materials and equipment, provisions of opportunity for the Construction Manager's and Architect's visual verification that such materials and equipment are in fact in storage; and, if stored off-site, submission by the Contractor of verification that such materials and equipment are stored in a bonded warehouse.

.4 All such materials and equipment, including materials and equipment stored on-site but not yet incorporated into the Work, upon which partial payments have been made shall become the property of the Owner, but the care and protection of such materials and equipment shall remain the responsibility of the Contractor until incorporation into the Work and accepted by the Owner at substantial completion, including maintaining insurance coverage on a replacement cost basis without voluntary deductible.

§ 9.3.2.2 Payment may be made for materials and equipment delivered and suitably stored off-site for future incorporation in the Work, subject to the following conditions:

.1 The Contractor shall submit: a written validation by the Owner, Construction Manager or Architect that such materials are stored safely off site, in the quantities and condition stated by the Contractor; a copy of an invoice for the material and equipment; a bill of sale or equivalent indication of the quantity and value of the material or equipment; a written statement indicating the location and method of storage; and property insurance certificate or rider covering the specific material or equipment, which shall name the Owner as an additional insured party.

.2 The Contractor shall submit a verification that such materials and equipment are stored in a bonded warehouse.

.3 A request for payment of material stored off-site must be made by the Contractor 10 days prior to actual, monthly cut-off date for Payment Applications.

.4 All such materials and equipment upon which partial payments have been made shall become the property of the Owner, but the care and protection of such materials and equipment shall remain the responsibility of the contractor until incorporation into the Work and accepted by the Owner at substantial completion, including maintaining insurance coverage on a replacement cost basis without voluntary deductible.

§ 9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information and belief, be free and clear of liens, claims, security interests or

encumbrances in favor of the Contractor, Subcontractors, material suppliers, or other persons or entities making a claim by reason of having provided labor, materials and equipment relating to the Work.

§ 9.3.4 The Contractor further expressly undertakes to defend the Indemnitees (as defined previously in Section 3.18), at the Contractor's sole expense, against any actions, lawsuits or proceedings brought against Indemnitees as a result of liens filed against the Owner, the Work, the site of any of the Work, the Project site and any improvements thereon, payments due the Contractor or any portion of the property of any of the Indemnities (referred to collectively as liens in this Section 9.3.4). The Contractor hereby agrees to defend, indemnify, and hold Indemnitees harmless against any such liens or claims of lien and agrees to pay any judgment or lien resulting from any such actions, lawsuits, or proceedings.

§ 9.3.5 The Owner shall release any payments withheld due to a lien or a claim of 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 than One Hundred Fifty percent (150%) of such lien claim. By posting a lien bond or other acceptable security, however, the Contractor shall not be relieved of any responsibilities or obligations under this Section 9.3, including, without limitation, the duty to defend and indemnify the Indemnities in an action on the lien, lien discharge bond or underlying debt. The cost of any premiums incurred in connection with such bonds and security shall be the responsibility of the Contractor and shall not be part of, or cause any adjustment to, the Contract Sum.

§ 9.4 Certificates for Payment

§ 9.4.1 The Construction Manager will, within seven (7) days after the Construction Manager's receipt of the Contractor's Application for Payment, review the Application, certify the amount the Construction Manager determines is due the Contractor, and forward the Contractor's Application and Certificate for Payment to the Architect. Within seven (7) days after the Architect receives the Contractor's Application for Payment from the Construction Manager, the Architect will either issue to the Owner a Certificate for Payment, with a copy to the Construction Manager, for such amount as the Architect determines is properly due, or notify the Construction Manager and Owner in writing of the Architect's reasons for withholding certification in whole or in part as provided in Section 9.5.1. The Construction Manager will promptly forward to the Contractor the Architect's notice of withholding certification.

§ 9.4.2 Where there is more than one Contractor performing portions of the Project, the Construction Manager will, within seven (7) days after the Construction Manager receives all of the Contractors' Applications for Payment: (1) review the Applications and certify the amount the Construction Manager determines is due each of the Contractors; (2) prepare a Summary of Contractors' Applications for Payment by combining information from each Contractor's application with information from similar applications for progress payments from the other Contractors; (3) prepare a Project Application and Certificate for Payment; (4) certify the amount the Construction Manager determines is due all Contractors; and (5) forward the Summary of Contractors' Applications for Payment and Project Application and Certificate for Payment to the Architect.

§ 9.4.2.1 Within seven (7) days after the Architect receives the Project Application and Project Certificate for Payment and the Summary of Contractors' Applications for Payment from the Construction Manager, the Architect will either (1) issue to the Owner a Project Certificate for Payment, with a copy to the Construction Manager; or (2) issue to the Owner a Project Certificate for Payment for such amount as the Architect determines is properly due, and notify the Construction Manager and Owner of the Architect's reasons for withholding certification in part as provided in Section 9.5.1; or (3) withhold certification of the entire Project Application for Payment, and notify the Construction Manager and Owner of the Architect's reason for withholding certification in whole as provided in Section 9.5.1. The Construction Manager will promptly forward the Architect's notice of withholding certification to the Contractors.

§ 9.4.3 The Construction Manager's certification of an Application for Payment shall be based upon the Construction Manager's evaluation of the Work and the information provided as part of the Application for Payment. The Construction Manager's certification will constitute a representation that, to the best of the Construction Manager's knowledge, information and belief, the Work has progressed to the point indicated and the quality of the Work is in accordance with the Contract Documents. The certification will also constitute a recommendation to the Architect and Owner that the Contractor be paid the amount certified.

§ 9.4.4 The Architect's issuance of a Certificate for Payment shall be based upon the Architect's evaluation of the Work, the recommendation of the Construction Manager, and information provided as part of the Application for Payment. The Architect's certification will constitute a representation that, to the best of the Architect's knowledge, information and belief, the Work has progressed to the point indicated, that the quality of the Work is in accordance with the Contract Documents, and that the Contractor is entitled to payment in the amount certified.

§ 9.4.5 The representations made pursuant to Sections 9.4.3 and 9.4.4 are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion and to specific qualifications expressed by the Construction Manager or Architect.

§ 9.4.6 The issuance of a separate Certificate for Payment or a Project Certificate for Payment will not be a representation that the Construction Manager or Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work, (2) reviewed the Contractor's construction means, methods, techniques, sequences or procedures, (3) reviewed copies of requisitions received from Subcontractors and material suppliers and other data requested by the Owner to substantiate the Contractor's right to payment or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

§ 9.5 Decisions to Withhold Certification

§ 9.5.1 The Construction Manager or Architect may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Construction Manager's or Architect's opinion the representations to the Owner required by Section 9.4.4 and 9.4.5 cannot be made. If the Construction Manager or Architect is unable to certify payment in the amount of the Application, the Construction Manager will notify the Contractor and Owner as provided in Section 9.4.1. If the Contractor, Construction Manager and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Construction Manager or Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence or subsequent observations, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Construction Manager's or Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from the acts and omissions described in Section 3.3.2 because of

- **.1** defective Work not remedied;
- **.2** third party claims filed or reasonable evidence indicating probable filing of such claims unless security acceptable to the Owner is provided by the Contractor;
- **.3** failure of the Contractor to make payments properly to Subcontractors or suppliers for labor, materials or equipment;
- **.4** reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
- **.5** damage to the Owner, another Prime Contractor or a Separate Contractor;
- **.6** reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay;
- **.7** failure to carry out the Work in accordance with the Contract Documents;
- **.8** 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;
- **.9** failure to comply with applicable federal, state or local statutes, regulations, and/or laws, including, without limitation, laws and regulations applicable to the provision of certified payrolls;
- **.10** failure of the Contractor to provide executed performance and payment bonds and a current certificate of insurance and endorsements;
- **.11** reasonable evidence that the Work has not progressed as indicated on the Application for Payment;
- **.12** damages caused to the Owner, Construction Manager, the Architect or another Contractor as a result the Contractor's performance of its Work;
- **.13** the Architect's and/or the Construction Manager's discovery or observation of work which has been previously paid for by the Owner which is defective and/or incomplete;
- **.14** The amount requested exceeds the percent completion of Work on the site; or
- **.15** breach of this Agreement.

Notwithstanding the extent to which the Construction Manager and/or Architect certify an Application for Payment, the Owner shall have the right to withhold payment, in whole or in part, should the Owner determine that any of the grounds for withholding certification set forth in this Section 9.5.1 do in fact exist. If the Owner withholds payment, in

whole or in part, the Owner shall promptly provide to the Contractor, Architect and Construction Manager a written explanation of the reason(s) for which payment is withheld and shall promptly pay, in accordance with the Contract Documents, all amounts which are not in dispute.

§ 9.5.2 If the Contractor disputes any determination by the Owner, Construction Manager or Architect with regard to any Certificate for Payment or in the event of a bona fide dispute between the Contractor and Owner, the Contractor nevertheless shall expeditiously continue to prosecute the Work and may submit a Claim in accordance with Article 15.

§ 9.5.3 When the above reasons for withholding certification or the Owner's withholding of payment are removed, certification will be made for amounts previously withheld.

§ 9.5.4 If the Architect or Construction Manager withholds certification for payment under Section 9.5.1, or if the Owner otherwise deems it necessary to protect its interests or the interests of the Project, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or material or equipment suppliers to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Architect and the Construction Manager and both will reflect such payment on the next Certificate for Payment.

§ 9.5.5 Notwithstanding anything above to the contrary, the Owner has the right to withhold payment to the Contractor to protect itself against damages incurred or which may be incurred as a result of the Contractor's breach or negligence, including, but not limited to, the items set forth in Section 9.5.1. With respect to any liens, claims, or other circumstances for which the Owner is entitled to withhold payments pursuant to decisions by the Architect pursuant to Section 9.5.1, the Owner shall be entitled to withhold a sum equal to twice the stated amounts of such liens or claims, or, where there is no stated amount, twice the amount determined by the Architect to be necessary to protect the interests of the Owner. The Owner will release payments withheld due to liens provided that the Contractor obtains a discharge of record of such lien, by bonding or otherwise. By posting a lien discharge bond, however, the Contractor shall not be relieved of any responsibilities or obligations under the Agreement, including, without limitation, the duty to defend, indemnify, and hold harmless the Indemnitees (as defined previously in Section 3.18). The cost of any premiums or other expenses incurred in connection with such bonds or other means of discharge of record shall be the sole responsibility of the Contractor and shall not be part of, or cause any adjustment to, the Contract Sum.

§ 9.5.6 If the Owner is entitled to reimbursement or payment from the Contractor under or pursuant to the Contract, including but not limited to these General Conditions, 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 Contract Sum by an amount equal to that which the Owner is entitled.

§ 9.6 Progress Payments

§ 9.6.1 After the Architect has issued a Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents unless such requisition is not in accordance with the terms of the Contract Documents, and shall so notify the Construction Manager and Architect.

§ 9.6.2 Payments received by the Contractor for Work properly performed by Subcontractors and suppliers shall be held in trust by the Contractor for those Subcontractors or suppliers who performed Work or furnished materials, or both, under contracts with the Contractor for which payment was made by the Owner. The Contractor shall strictly comply with any common law, statutory, or decisional law trust fund requirements in the State of New York (including, without limitation, the requirements of New York Lien Law Article 3-A), and hereby agrees that the Owner has the same rights as any beneficiary of such trusts to examine the books and records of the Contractor to determine such compliance, from time to time at the Owner's sole discretion. The Contractor shall promptly pay each Subcontractor, upon receipt of payment from the Owner, out of the amount paid to the Contractor on account of such Subcontractor's portion of the Work, the amount to which said Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of such Subcontractor's portion of the Work. The

Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in similar manner.

§ 9.6.2.1 Within seven (7) days of receipt of a payment from the Owner, the Contractor shall pay each of its Subcontractors and suppliers for work performed and materials furnished by them as reflected in the payment from the Owner, less an amount necessary to satisfy any outstanding claims, liens, or judgments and less a retained amount of not more than 5%, except that the Contractor may retain not more than 10% provided that prior to entering into a Subcontract with the Contractor, the Subcontractor is unable or unwilling to provide a performance bond and labor and material payment bond both in the full amount of the subcontract at the request of the Contractor. The Contractor shall not retain portions of the proceeds owed any Subcontractor or supplier from the Owner's payment to the Contractor for the "contract balance." Similar provisions apply to the Subcontractor and/or supplier paying each of its Subcontractors and suppliers. Nothing in this Section shall create in the Owner any obligation to pay, or to ensure that the Contractor pays, any Subcontractor or supplier, or any relationship in contract or otherwise, implied or expressed, between any Subcontractor or supplier and the Owner. The Contractor agrees that it shall comply with the payment requirements of Section 106-b(2) of the New York General Municipal Law, as amended, and that to the extent there is any conflict between that statutory section and the provisions of this Section 9.6.2.1, the provisions of the statute shall prevail.

§ 9.6.3 The Construction Manager will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Owner, Construction Manager and Architect on account of portions of the Work done by such Subcontractor.

§ 9.6.4 The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and material and equipment suppliers amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within seven (7) days, the Owner shall have the right to contact Subcontractors to ascertain whether they have been properly paid. Neither the Owner nor Construction Manager nor Architect shall have an obligation to pay or to see to the payment of money to a Subcontractor except as may otherwise be required by law.

§ 9.6.5 The Contractor's payments to its suppliers shall be treated in a manner similar to that provided in Sections 9.6.2, 9.6.3 and 9.6.4.

§ 9.6.6 A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

§ 9.6.7 Payments received by the Contractor for Work properly performed by Subcontractors and suppliers shall be held by the Contractor for those Subcontractors or suppliers who performed Work or furnished materials, or both, under contract with the Contractor for which payment was made by the Owner. Nothing contained herein shall require money to be placed in a separate account and not commingled with money of the Contractor, shall create any fiduciary liability or tort liability on the part of the Contractor for breach of trust or shall entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.

(Paragraph deleted)

§ 9.7 Failure of Payment

§ 9.7.1 If, through no fault of the Contractor, the Construction Manager and Architect do not issue a Certificate for Payment within 20 days of the Construction Manager's receipt of the Contractor's Application for Payment or if, through no fault of the Contractor, the Owner does not pay the Contractor the amount certified by the Construction Manager and Architect, subject to the Owner's right to withhold payment under the terms of the Contract Documents, within 30 days of the date established for such payment in the Contract Documents, then the Contractor may, upon seven (7) additional days' written notice and opportunity to cure to the Owner, Construction Manager and Architect, stop the Work until payment of the amount owing has been received. To the extent it is determined that payment to the Contractor was improperly held through no fault of the Contractor and the Contractor elected to stop its Work consistent with the procedure set forth in this Section, the Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shut-down, delay and start-up as provided for in the Contract Documents. However, if the Contractor stops its Work and it is determined that the Owner had the right to withhold payment under the terms of the Contract Documents, then the Contractor shall be responsible to the Owner for all costs and damages (including attorneys' fees) arising from such stoppage of Work and

the Contractor shall not be entitled to any adjustment in the Contract Sum or the Contract Time. This Section shall not apply: (a) to the extent that the Contractor owes to the Owner any amount pursuant to the provisions of this Contract, or (b) to the extent the Owner is required to expend amounts to purchase additional insurance on behalf of the Contractor to meet the insurance requirements of this Agreement.

§ 9.7.2 If the Owner is entitled to payment from the Contractor under or pursuant to the Contract Documents, such payment shall be made promptly upon demand by the Owner. Notwithstanding anything contained in the Contract Documents to the contrary, if the Contractor fails to promptly make any payment due the Owner, or the Owner incurs any costs or 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 Contract Sum by an amount equal to that which the Owner is entitled.

§ 9.8 Substantial Completion

§ 9.8.1 The date of Substantial Completion of the Project or a designated portion thereof is the date when construction is sufficiently complete in accordance with the Contract Documents so the Owner can occupy or utilize the entire Project (or such portion thereof as Owner earlier elects to occupy or utilize) for the use for which it is intended. Minor items of completion or correction ("Punch List Work") may be performed after Substantial Completion, provided that such items can and shall be performed at such times and in such manner that such Work does not unreasonably interfere with the Owner's occupancy and use of the Project. Substantial Completion shall not be deemed to exist until (a) the Owner receives a Certificate of Occupancy for the Project (or such portion as elected by Owner) if such Certificate of Occupancy is required, and any other permits, approvals, licenses and any other documents from governmental authorities having jurisdiction therefore necessary for the beneficial occupancy of the Project and (b) the Contractor, Construction Manager, Architect and Owner have agreed upon a schedule for final completion and to provide the Owner with all as-built drawings, operating manuals, warranties and other required closeout documents. Warranties called for by the Agreement or by the Drawings and Specifications shall commence on the date of Substantial Completion of the Project or designated portion thereof, or any later date that the parties agree. This date shall be established by a Certificate of Substantial Completion signed by the Owner, Contractor, Architect and Construction Manager.

§ 9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall notify the Construction Manager, and the Contractor and Construction Manager shall jointly prepare and submit to the Architect a comprehensive list which shall identify all non-conforming, defective and incomplete Work and establish the date of commencement of warranties in connection with any such Work. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

§ 9.8.3 Upon receipt of the list, the Architect, assisted by the Construction Manager, will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect's inspection discloses any item, whether or not included on the list, which is not sufficiently complete in accordance with the requirements of the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Construction Manager or Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect, assisted by the Construction Manager, to determine Substantial Completion. If the Architect and the Construction Manager are required to perform additional substantial completion inspections because the Work fails to be substantially complete, the amount of compensation paid to the Architect and the Construction Manager by the Owner for additional services shall be deducted from the final payment to the Contractor.

§ 9.8.4 When the Architect, assisted by the Construction Manager, determines that the Work or designated portion thereof is substantially complete, the Construction Manager will prepare, and the Construction Manager and Architect shall execute a Certificate of Substantial Completion that shall establish the date of Substantial Completion, shall establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance, and shall fix the time within which the Contractor shall finish all Punch List Work, which timeframe shall not exceed 30 days. Warranties required by the Contract Documents shall commence on the date of Substantial

Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

§ 9.8.5 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in such Certificate. Upon such acceptance and consent of surety, if any, the Owner shall make payment of retainage applying to such Work or designated portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

§ 9.8.5.1 In conformance with New York General Municipal Law Section 106-b(1)(a), upon proper execution of Certificate of Substantial Completion of Work, the Contractor shall submit a requisition for payment of the remaining amount of the Contract Sum. Upon certification of payment by the Architect, the Owner will approve and promptly pay the remaining amount of the Contract Sum less two times value of any remaining items to be completed or corrected and less an amount necessary to satisfy any claims, liens or judgments against Contractor which have not been suitably discharged. Such payment shall be made under terms and conditions governing final payment except that the Owner's making of such payment shall not constitute the Owner's waiver of any objection to all or any portion of the Work performed by the Contractor or any claims the Owner may then have against the Contractor.

§ 9.8.5.2 Neither the requisition for payment stipulated in Section 9.8.5.1 nor any portion of retained percentage shall become due until the Contractor submits to the Construction Manager:

.1 an affidavit that all payrolls, bills for materials and equipment, and other indebtedness connected with the work for which the Owner or the Owner's property might in any way be responsible, have been paid or otherwise satisfied, the form of which will be the currently authorized AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims";

.2 consent of all sureties, if any, to such payment, the form of which will be the currently authorized AIA Document G707A, "Consent of Surety to Reduction in or Partial Release of Retainage," but which will not be required if the amount withheld under Section 9.8.3.1 exceeds the amount of retainage; and

.3 if required by the Owner, other data establishing payment or satisfaction of all such obligations, such as receipts, releases, and waivers of liens arising out of contract to such extent and in such form as may be designated by the Owner.

§ 9.8.5.3 As the Punch List Work is satisfactorily completed or corrected, the Contractor may submit a requisition for payment of these items. The Contractor shall submit with each such requisition for payment affidavits, consents of surety, and other data as described in Section 9.8.5.2 covering work for which payment is requested. Upon certification of such requisitions by the Architect and Construction Manager, the Owner will approve and promptly pay the requisition less an amount two times that which is necessary to satisfy any claims, liens or judgments against the Contractor which have not been suitably discharged.

§ 9.8.5.4 Where the Project includes heating, air conditioning, electrical, communication, data or other systems which are not put into operation at the time of occupancy, a sum shall be withheld until these systems have operated to the general satisfaction of the Architect. The Contractor shall provide complete start up and commissioning of the systems with a detailed check list as recommended by the equipment or system manufacturer. The retained amount shall approximate five percent (5%) of the cost of the systems as determined by the cost breakdown submitted. The guaranty/warranty period for such systems will not commence until after such Architect approval.

§ 9.8.5.5 The Contractor shall complete the Punch List Work for the Project no later than 30 days after Substantial Completion of the Project. The Contractor shall be fully liable to the Owner for all damages suffered by the Owner as a result of delay in achieving final completion of the Work, including without limitation, additional architectural and construction management fees related to extended services.

§ 9.8.6 If the Architect or the Construction Manager is required to inspect the Work more than two (2) times prior to certifying the Work as being substantially complete on account of the discovery of one or more items that are not sufficiently complete, the Contractor shall be liable to the Owner for the amount of any costs, additional fees or compensation due from or paid by the Owner to the Architect and/or the Construction Manager for the additional inspections.

§ 9.9 Partial Occupancy or Use

§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer as required under Section 11.3.1.5 and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor and Construction Manager shall jointly prepare and submit a list to the Architect as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect after consultation with the Construction Manager.

§ 9.9.2 Immediately prior to such partial occupancy or use, the Owner, Construction Manager, 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 Work.

§ 9.9.3 Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

§ 9.9.4 The Contractor shall cooperate with the Owner in order to make portions of the Project available as soon as possible.

§ 9.9.4.1 The Project site and buildings, whether work of the Contractor is partially or fully completed or not, are property of the Owner who shall have certain rights and privileges in connection with use of same.

§ 9.9.4.2 Should there be, in the opinion of the Architect or Construction Manager, unwarranted delay on part of any Contractor in completion of incomplete or defective work or other Contract requirements, and the Architect so certifies, the Owner may have full or partial use and occupancy of any or all portions of buildings as required for moving in or installing furniture, fixtures, supplies, or equipment and for general cleaning and maintenance work. In such event, the Contractor whose unfinished work is done subsequent to installation of furniture, fixtures, equipment, etc., shall be responsible for the prevention of any damage to such installation. Such use or occupancy by the Owner shall in no instance constitute acceptance of any of the Work.

§ 9.10 Final Completion and Final Payment

§ 9.10.1 Upon completion of the Work, the Contractor shall forward to the Construction Manager a written notice that the Work is ready for final inspection and acceptance and shall also forward to the Construction Manager a final Contractor's Application for Payment. Upon receipt, the Construction Manager will evaluate the completion of Work of the Contractor and then forward the notice and Application, with the Construction Manager's recommendations, to the Architect who will promptly make such inspection. When the Architect, finds the Work acceptable under the Contract Documents and the Contract fully performed, the Construction Manager and Architect will promptly issue a final Certificate for Payment or Project Certificate for Payment stating that to the best of their knowledge, information and belief, and on the basis of their on-site visits and inspections, the Work has been completed in accordance with the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Construction Manager's and Architect's final Certificate for Payment or Project Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

§ 9.10.1.1 If the 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 one-year correction period described in Article 12.2 shall be set by the Architect at his discretion, but not later than the date of the final Certificate for Payment.

§9.10.1.2 If the Architect and the Construction Manager are required to provide additional services, extend the duration of services to the Owner, and/or perform additional final inspections because the Work fails to comply with the requirements of the Contract Documents, or the Contractor did not complete the Work in accordance with the construction schedule or Project schedule, the amount of compensation paid to the Architect and the Construction Manager by the Owner for additional services shall be deducted from the final payment due to the Contractor.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect through the Construction Manager (1) all closeout documents required by the Contract Documents, including, without limitation, as-built drawings, attic stock, maintenance manual, operating instructions and other documents required to be delivered under the Contract in connection with the Work in the form required by the Owner, (2) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (3) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect and will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner, (4) a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents, (5) consent of surety, if any, to final payment, (6), if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner, and (7) all warranties and guarantees required by the Contract Documents. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien. If such lien remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such lien, including all costs and reasonable attorneys' fees.

§ 9.10.2.1 In addition to the submittals required in Section 9.10.2 above, the Contractor shall submit separate final release or waivers of lien for each Subcontractor, material supplier, or others with lien rights against the Project, and shall submit a list of such parties.

§ 9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Construction Manager and Architect so confirm, the Owner shall, upon application by the Contractor and certification by the Construction Manager and Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed, corrected, and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of the surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect through the Construction Manager prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

§ 9.10.4 The making of final payment
(Paragraphs deleted)
by the Owner shall not constitute a waiver of claims, causes of action, damages or complaints by the Owner.

§ 9.10.5 Acceptance of final payment by the Contractor, a Subcontractor or material supplier shall constitute a waiver of claims by that payee except those previously made in writing in accordance with Article 15 and identified by that payee in writing as unsettled at the time of the final Application for Payment.

§ 9.10.6 At any time a lien is filed against the Project funds, the Owner may demand that the Contractor discharge said lien, through bonding or otherwise, and the Contractor must obtain the discharge of said lien within seven (7) days of such demand at the Contractor's sole cost and expense, and at no cost to the Owner. If any lien or other encumbrance required to be removed at the Contractor's sole cost and expense pursuant to this Section is not discharged of record as aforesaid, the Owner shall have the right to take such action as the Owner shall deem appropriate (which shall include the right to cause such lien or other encumbrance to be canceled and discharged of record), and in such event, all costs and expenses incurred by the Owner in connection therewith (including, without limitation, premiums for any bond furnished in connection therewith, and reasonable attorneys' fees,
court costs and disbursements), shall be paid by the Contractor to the Owner on demand or, at the option of the Owner, deducted from any payment then due or thereafter becoming due from the Owner to the Contractor in accordance with the provisions of these General Conditions.

§ 9.10.7 Existing warranties shall not deprive the Owner of any cause of action, right, or remedy otherwise available for breach of any of the provisions of the Contract Documents. The periods referred to above shall not be construed as limitations on the time in which the Owner may pursue any such action, right or remedy.

§ 9.10.8 The Contractor shall achieve final completion of all Work, including, without limitation, correction of punch-list items, preparation and delivery of all manuals, presentation of training and completion of final paper submissions not later than 30 days following the date of Substantial Completion. In the event the Contractor shall fail to achieve final completion of the Work within such a period of time, the Contractor and the Contractor's surety, if any, shall be liable for and shall reimburse the Owner for any and all fees paid to the Architect and Construction Manager and other expenses made necessary by the Contractor's failure. Additional fees and expenses shall be charged by the Owner against any Final Payment due or which may become due to the Contractor, and the Contractor shall promptly pay or refund the Owner the excess, if any, upon the Owner's written request.

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 Safety Precautions and Programs

The Contractor shall be responsible for initiating, implementing, directing, controlling, maintaining, and supervising all safety precautions and programs in connection with the performance of the Contract. The Contractor shall submit the Contractor's safety program to the Construction Manager for review and coordination with the safety programs of other Contractors. The Construction Manager's responsibilities for review and coordination of safety programs shall not extend to direct control over or charge of the acts or omissions of the Contractors, Subcontractors, agents or employees of the Contractors or Subcontractors, or any other persons performing portions of the Work and not directly employed by the Construction Manager. The Contractor's safety precautions and programs shall include specific steps designed to minimize the risk of contracting or spread of COVID-19, including provision of all appropriate personal protective equipment, social distancing, avoiding stacking of trades, and other reasonable precautions.

§ 10.2 Safety of Persons and Property

§ 10.2.1 The Contractor shall take necessary precautions for safety of, and shall provide reasonable protection to prevent damage, injury, infection or exposure to COVID-19, or loss to

.1 employees on the Work and other persons who may be affected thereby;

.2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody, or control of the Contractor, a Subcontractor, or a Sub-subcontractor;

.3 the Owner's real and personal property and other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction;

.4 construction or operations by the Owner, Separate Contractors, or other Contractors; and

.5 the existing buildings and premises in the vicinity of or affected by the Contractor's operations.

.6 the contractor agrees, in order that the work will be completed with the greatest degree of safety, to conform to the requirements of the NYS SED rescue regulations (excerpt of the constructors responsibilities section 155.5) and the Occupational Safety and Health Act of 1970 (OSHA) as amended and the Construction Safety Act of 1969 as amended, including all standard and regulations that have been since or shall be promulgated by the governmental authorities which administer such acts, and shall indemnify and hold harmless the owner, Construction Manager, the Architect, and all.

§ 10.2.1.6 Safe access to and egress from any building under construction as part of this Contract, or any existing building in which Work is being done under this Contract, shall be maintained and remain unencumbered by the Contractor in accordance with all applicable codes, rules and regulations of authorities having jurisdiction on the Work. The Contractor and its Subcontractors shall cooperate in maintaining this condition. Roadways, paths, walks, exits, service drives and other areas shall remain unobstructed and shall be maintained in a safe and satisfactory condition, for all persons using the building and premises. Materials shall not be stored promiscuously about the site or in the building, but shall be carefully stored in areas which will not interfere with pedestrian traffic or with access to and egress from adjacent properties and use of the building. The Contractor shall provide and maintain such temporary Work as may be required for the protection of its finished Work where liable to injury. The Contractor will be responsible for all of its Work, materials and equipment that may be damaged or stolen during the duration of the Contract and until the Work is accepted by the Owner. The Contractor shall make good any such damage or loss without expense to the Owner. The Contractor shall not permit unnecessary hazards to be created nor permit them to continue if they are discovered. The Contractor's storage and staging areas shall be only in locations assigned or approved by the Owner and Architect and may be required to be relocated by the Contractor as building occupancy or use changes during the course of the Work. This relocation will be done by the Contractor at no additional cost to the Owner.

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

§ 10.2.2.1 The Contractor acknowledges that the Labor Law of the State of New York, and regulations adopted thereunder, place upon both the Owner and the Contractor certain duties and that liability for failure to comply therewith is imposed on both the Owner and the Contractor regardless of their respective fault. The Contractor hereby agrees that, as between the Owner and the Contractor, the Contractor is solely responsible for compliance with all such laws and regulations imposed for the protection of persons performing the Contract. The Contractor shall indemnify and hold harmless the Owner 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 or 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 fee, in recovering such defense costs from the Contractor.

§ 10.2.2.2 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 10 hours in duration. The Contractor and its Subcontractors shall conduct their operation in accordance with the Safety Guides for Construction as issued by State Education Department, and the Contractor's safety program.

§ 10.2.2.3 All safety equipment including hard hats, weather protective gear and PPE required for the Contractor to perform its Work are to be supplied by the Contractor or its Subcontractors. Within the designated construction areas, the Contractor's employees, superintendents, or other agents, and its Subcontractors, employees, superintendents, or other agents are required to wear hard hats and other required 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, Construction Manager or 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.

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

§ 10.2.4 When use or storage of explosives or other hazardous materials or equipment or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel.

§ 10.2.5 The Contractor shall promptly remedy damage and loss to property referred to in Sections 10.2.1.2, 10.2.1.3 and 10.2.1.4 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 and for which the Contractor is responsible under Sections 10.2.1.2, 10.2.1.3 and 10.2.1.4, except damage or loss attributable to acts or omissions of the Owner, Construction Manager or Architect or anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18, and shall not be limited by such damage or loss being insured under property insurance required by the Contract Documents.

§ 10.2.6 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. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner, Construction Manager and Architect.

§ 10.2.7 The Contractor shall not load or permit any part of the construction or site to be loaded so as to cause damage or create an unsafe condition. The Contractor shall not load any part of the Work with materials, equipment, shores,

bracing, or other items which in any way could cause damage to the Work or to other Work or could endanger persons in or about the Work.

§ 10.2.8 If, during the construction, public or private property is damaged or destroyed as a consequence of its Work, the Contractor shall, at its own expense, restore such property to a condition equal to that existing before such damage or injury was done, by repairing, rebuilding or replacing it, or otherwise making good such damage or destruction in an acceptable manner.

§ 10.2.9 The Contractor shall be responsible for all breakage of glass, which has been furnished and installed as part of Contract and existing glass that is broken due to operations under the Contract for Work. No matter by whom or what cause glass was broken, the Contractor shall replace all broken glass before completion and acceptance of the Contractor's Work. The Contractor may claim damages, if applicable.

§ 10.2.10 In addition to all requirements set forth herein, the Contractor and its Subcontractors shall fully comply with the provisions of the federal Occupational Safety and Health Act of 1970, as amended, and with any rules and regulations pursuant to the Act. This requirement shall apply continuously and not be limited to normal working hours.

§ 10.2.11 The Contractor shall also be responsible, at the Contractor's sole cost and expense, for all measures necessary to protect any property adjacent to the Project and improvements therein. Any damage to such property or improvements shall be promptly repaired by the Contractor at its sole expense.

§ 10.2.12 The Contractor shall immediately contact the Construction Manager and, within 24 hours, report, in writing, to the Owner, Architect and Construction Manager, all accidents arising out of or in connection with the Work which cause death, personal injury, or property damage, giving full details and statements of 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, Construction Manager, and Architect.

§ 10.2.13 The Contractor shall be solely responsible for any conditions that develop during construction and in the event any structure is dislocated, over strained, or damaged so as to affect is usefulness, the Contractor shall be solely responsible. The Contractor shall take whatever steps necessary to strengthen, relocate or rebuild the structure to meet requirements at the sole expense of the Contractor.

§ 10.2.14 The Contractor is responsible for restoration or repair of utilities, private property, buildings, pavement, walkways, roads, etc. damaged by its activities under this Agreement to the satisfaction of the Owner, Construction Manager and Architect.

§ 10.2.15 From the commencement to the final completion of the Work, the Contractor shall keep the Work and the Owner's building(s) free from accumulation of water no matter the source or cause of water infiltration.

§ 10.2.16 During construction, the Contractor shall be responsible for maintaining a watertight structure. This responsibility shall include additions/alterations of 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(s), the Contractor shall be responsible for all costs associated with clean up, remediation and repairs. Inasmuch as flooding and water damage have safety implications to the general public, clean up, remediation and repairs may be made by the Owner without prior notice to the Contractor. Administration costs incurred by the Owner, Construction Manager and Architect will also be back charged to the Contractor. The Contractor, by entering into this Contract, agrees to be liable for these costs.

§ 10.2.17 Injury or Damage to Person or Property

If either party suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, notice of the injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 21 days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.

§ 10.3 Hazardous Materials

§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents and all applicable laws, rules and regulations regarding hazardous materials. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to, asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and report the condition to the Owner, Construction Manager and Architect in writing. The Owner shall arrange for the material to be tested and if the test reveals that the material is a hazardous material or substance which has not been rendered harmless, the Owner shall pay for the test; otherwise, the Contractor shall bear the cost of the test and the Contract Sum shall be reduced by the amount of that cost. The Contractor shall comply with the reasonable instructions of the Owner after the test is conducted. This Section shall not apply in the case of asbestos which is to be removed and disposed of as part of the Work of the Contract.

§ 10.3.2 Upon receipt of the Contractor's written notice, the Owner shall obtain the services of a licensed laboratory to verify a presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased in the amount of the Contractor's reasonable additional costs of shut-down, delay and start-up.

§ 10.3.3 To the fullest extent permitted by law, but only to the extent of available insurance proceeds, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Construction Manager, Architect, their consultants, and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area if in fact the material or substance presents the risk of bodily injury or death as described in Section 10.3.1 and has not been rendered harmless, provided that the person seeking indemnification: (1) did not bring such material onto the Project site; (2) timely provided notice of the condition and stopped Work in the affected area as required by Section 10.3.1; and (3) has a claim, damage, loss or expense that is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself). The Owner shall have no indemnity obligation to the extent that such damage, loss or expense is due to the fault or negligence of the party seeking indemnity or the fault or negligence of a third party for whom the Owner is not responsible.

§ 10.3.4 The Owner shall not be responsible under this Section 10.3 for materials or substances the Contractor brings to the site unless such materials or substances are required by the Contract Documents. The Owner shall be responsible for materials or substances required by the Contract Documents, except to the extent of the Contractor's fault or negligence in the use and handling of such materials or substances.

§ 10.3.5 The Contractor shall indemnify the Owner for the cost and expense the Owner incurs (1) for remediation of a material or substance the Contractor brings to the site and negligently handles, or (2) where the Contractor fails to perform its obligations under Section 10.3.1, except to the extent that the cost and expense are due to the Owner's fault or negligence.

§ 10.3.6 If, without negligence or fault on the part of the Contractor, the Contractor is held liable by a government agency for the cost of remediation of a hazardous material or substance (that was not brought to the site by the Contractor or those for whom the Contractor is responsible) solely by reason of performing Work as required by the Contract Documents, the Owner shall reimburse the Contractor for all cost and expense thereby incurred.

§ 10.3.7 The Contractor shall notify the Owner of any storage, use, or discovery of hazardous material on the Project site which the Contractor knows or reasonably should know could cause bodily injury or death and of any injury or death attributable to any such hazardous material.

§ 10.3.8 The Contractor shall take all reasonable precautions and measures to prevent any contamination by or spread or disturbance of hazardous or potentially hazardous substances or materials stored, used, or discovered on the Project site.

§ 10.3.9 For the avoidance of any doubt, COVID-19 shall not be considered a Hazardous Material for purposes of this Article 10.3.

§ 10.4 Emergencies

§ 10.4.1 The Contractor shall provide at the site, such equipment and medical facilities as are necessary to supply first-aid service to anyone at the Work.

§ 10.4.2 The Contractor must promptly report in writing to the Construction Manager all emergencies whatsoever arising out of, or in connection with the performance of the Work, whether on, or adjacent to the site, which caused death, personal injury or property damages, giving full details and statements of witnesses. In addition, if death, injury, or damages are caused, the emergency shall be reported immediately to the Construction Manager, Owner, and Architect.

§ 10.4.3 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. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 15 and Article 7.

§ 10.4.4 All fire and emergency access, including roads, rights-of-way, corridors, doors, and stairs, and all existing fire and smoke detection systems shall be maintained at all times in accordance with fire safety laws. If the Work requires the temporary obstruction of any fire and emergency access or existing fire and smoke detection systems, the Construction Manager shall be notified at least 72 hours in advance.

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 Contractor's Insurance and Bonds

§ 11.1.1 The Contractor agrees to secure and maintain, at Contractor's own expense, all insurance coverage required in this Article 11 from one or more insurance companies licensed and admitted to write such insurance in New York State. Insurers must carry an A.M. Best Financial Strength rating of A- or higher. The Contractor's insurance must include the following, without limitation, and must be written with limits no less than specified in Section 11.1.2:

- **.1** claims under workers' compensation, disability benefit, and other similar employee benefit acts applicable to the Work to be performed, including, without limitation, claims by the employees of private entities performing Work at the site that are exempt from workers' compensation insurance coverage requirements on account of number of employees or occupation, which entities must maintain voluntary compensation coverage at the same limits specified for mandatory coverage for the duration of the Project;
- **.2** claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor's employees;
- **.3** claims for damages because of bodily injury, sickness, disease, or death of any person other than the Contractor's employees;
- **.4** claims for damages insured by usual personal injury liability coverage sustained (1) by a person as a result of an offense directly or indirectly related to employment of such person by the Contractor, or (2) by another person;
- **.5** claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including resulting loss of use resulting;
- **.6** claims for damages because of bodily injury, death of a person, or property damage arising out of ownership, maintenance, or use of a motor vehicle; and
- **.7** claims involving contractual liability applicable to the Contractor's obligations under Section 3.18.
- **.8** A fully completed New York Construction Certificate of Liability Insurance Addendum (Acord 855 2014/15) must be included with the certificates of insurance. For any "yes" answers on Items G through L on this Form – additional details must be provided in writing. No exclusions, restrictions and/or modifications to coverages will be accepted.
- **.9** **Where the Contract or Subcontract involves asbestos, the insurance required by section 11.1 shall specifically include the words asbestos abatement work and shall specify any limitations on completed operation time. If there is a limitation it will be at the owner's discretion to accept or reject that limitation.**
- .10 Insurance must remain in effect at least until final payment and all items thereafter when the contractor may be correcting, removing or replacing defective work in accordance with this document, and
- .11 Liability insurance shall include all major divisions of coverage and be on a comprehensive basis including:
  .1 Premises operations without exclusion of x,c, and u coverage;

.2 Independent Contractors Protective;
.3 Products and completed operation;
.4 Personal Injury Liability;
.5 Owned, non-owned and owned motor vehicles
.7 Broad form property damage including completed operations

§ 11.1.2 Coverages, whether written on an occurrence or claims-made basis, must 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. Claims-made coverage will only be allowed when the Contractor demonstrates that occurrence-based coverage is not available for a specific type of required coverage. The insurance required by Section 11.1.1 must be written for not less than the following limits, or greater limits as may be required by law, and include the following terms:

.1 Commercial General Liability. Occurrence-based Commercial General Liability coverage to include bodily injury, personal injury, and property damage applicable to ongoing operations, products & completed operations, and contractual liability, all with a per-project aggregate endorsement. No XCU exclusion is allowed for explosion, collapse, and underground operations. Products and Completed Operations coverage must be maintained in force for a minimum of two (2) years following Final Completion of the Project. Minimum limits are:

$2,000,000	General Aggregate
$2,000,000	Products and Completed Operations Aggregate
$1,000,000	Personal and Advertising Injury
$1,000,000	Each Occurrence
$1,000,000	Personal and Advertising Injury
$ 100,000	Fire Damage (any one fire)
$ 10,000	Medical Expense (any one person)

.2 Automobile Liability. Bodily Injury and Property Damage coverage for the Contractor as the owner or lessee of automobiles, trucks, trailers, self-propelled Contractor's equipment, and all other owned and non-owned vehicles registered for use on the public highway and/or used in operations relating to the Contractor's Work, with a minimum Combined Single Limit of $1,000,000. If any such vehicles are to be used to transport hazardous materials, the Contractor shall also provide pollution liability broadened coverage evidenced by ISO Form CA 99 48.

.3 Excess Liability and/or Umbrella Liability. Minimum limits are:

$5,000,000 each Occurrence and $5,000,000 for general construction and no work at elevation (1 story – 10 feet) or Project values less than or equal to $1,000,000.

$10,000,000 each Occurrence and $10,000,000 Aggregate for high risk construction, work at elevation (>1 story or 10 feet) or Project values greater than $1,000,000.

Umbrella/Excess coverage shall be on a follow-form basis.

.4 Workers' Compensation

.1 Workers' Compensation Requirements. To comply with the New York State Workers' Compensation Law, the Contractor must (1) be legally exempt from obtaining workers' compensation insurance coverage, or (2) obtain such coverage from insurance carriers, or (3) be self-insured or participate in an authorized group self-insurance plan. Minimum limitations are:

Bodily Injury by Accident: $500,000 Each Accident
Bodily Injury by Disease: $500,000 Each Employee
Bodily Injury by Disease: $500,000 Policy Limit

.2 Workers' Compensation Coverage Evidence. To demonstrate compliance with the New York State Workers' Compensation Law, the Contractor must provide **one** of the following forms to the Owner:

.1 **Either** CE-200, "Affidavit For New York Entities And Any Out Of State Entities With No Employees, That New York State Workers' Compensation And/Or Disability Benefits Insurance Coverage Is Not Required"; **or** CE-200, "Affidavit That An Out-Of-State Or Foreign Employer Working In New York State Does Not Require Specific New York State Workers' Compensation And/Or Disability Benefits Insurance Coverage" (either affidavit must be stamped as received by the New York State Workers' Compensation Board); **or**

.2 **Either** C-105-2, "Certificate of NYS Workers' Compensation Insurance Coverage" (for employers insured for workers' compensation through a private insurance carrier – the Contractor's insurance

carrier must send this form to the Owner),**or** U-26.3, "New York State Insurance Fund Certificate of Workers' Compensation Coverage" (for employers insured for workers' compensation through the State Insurance Fund); **or**

.3 **Either** SI-12, "Certificate of Workers' Compensation Self-Insurance," **or** GSI-105-2, "Certificate of Participation in Workers' Compensation Group Self-Insurance (for employers participating in group self-insurance for workers' compensation – the Contractor's Group Self-Insurance Administrator must send this form to the Owner).

.5 **Employer's Liability/Disability**

.1 **Disability Benefits Requirements.** To comply with the New York State Disability Benefits Law, the Contractor must (1) be legally exempt from obtaining disability benefits insurance coverage, (2) obtain such coverage from insurance carriers, or (3) be self-insured.

.2 **Disability Benefits Coverage Evidence.** To demonstrate compliance with the New York State Disability Benefits Law, the Contractor must provide **one** of the following forms to the Owner:

.1 **Either** CE-200, "Affidavit For New York Entities And Any Out Of State Entities With No Employees, That New York State Workers' Compensation And/Or Disability Benefits Insurance Coverage Is Not Required" **or** CE-200, "Affidavit That An Out-Of-State Or Foreign Employer Working In New York State Does Not Require Specific New York State Workers' Compensation And/Or Disability Benefits Insurance Coverage" (either affidavit must be stamped as received by the New York State Workers' Compensation Board); **or**

.2 **Either** DB-120.1, "Certificate of Disability Benefits," **or** DB-820/829, "Certificate/Cancellation of Insurance" (the Contractor's insurance carrier must send either form to the Owner); **or**

.3 DB-155 (3/04), "Certificate of Disability Benefits Self-Insurance."

.6 **Hazardous Materials.** If the Contractor's Work involves handling or disturbance of asbestos or other hazardous materials, the Contractor shall provide bodily injury and property damage liability insurance applicable to such operations, covering both ongoing operations and products & completed operations. Products and Completed Operations coverage must be maintained in force for a minimum of two (2) years following Final Completion of the Project. Coverage must be for limits not less than:

.1 If covered by the Contractor's umbrella/excess liability policy:

$2,000,000 General Aggregate
$2,000,000 Each Occurrence or Incident:

.2 If not covered by the Contractor's umbrella/excess liability policy:

$6,000,000 General Aggregate
$6,000,000 Each Occurrence or Incident:

.7 **Owner's Protective Liability Policy.** The XCU exclusion must be deleted, and the Named Insureds will be "Nanuet Union Free School District." Minimum limits are:

$2,000,000 Each Occurrence
$4,000,000 Aggregate

§ 11.1.3 Certificates of insurance acceptable to the Owner, together with copies of all insurance policies procured by the Contractor pursuant to this Article 11, including, without limitation, terms, conditions, declarations, riders, and endorsements, must be submitted to the Construction Manager for transmittal to the Owner, with copies to the Architect, prior to commencement of the Work. If any of the foregoing insurance coverages are required to remain in force after final payment, an additional certificate evidencing continuation of such coverage must be submitted with the final Application for Payment as required by Section 9.10.2.2. Information concerning reduction of coverage must be furnished by the Contractor with reasonable promptness. In addition to the Certificates of Insurance and accompanying documents, the Contractor shall provide to the Certificate Holders, on a timely basis, copies of any subsequently issued endorsements that amend any coverages or limits. In addition:

.1 "Certificate Holders" are the Nanuet Union Free School District, 101 Church Street, Nanuet, NY,10954

.2 Coverages reflected in certificates of insurance and underlying policies must comply with all requirements of this Article 11.

.3 All insurance documents must be executed with *authorized* signatures.

.4 All required liability policies must be endorsed to provide that any Notice of Cancellation or Notice of Non-Renewal given to the First Named Insured must also be given to the Additional Insureds identified in Section 11.1.4. **Copies of such endorsements must be furnished to the Certificate Holders.**

.5 Failure of the Owner to object to the Contractor's failure to furnish a certificate or other evidence of required insurance coverages, or to object to any defect in such certificate or other evidence, or to demand receipt of such certificate or other evidence, is not a waiver of the Contractor's obligation to furnish the required

insurance coverages. Furthermore, nothing contained in this Article 11 imposes on the Owner a duty or obligation to review any certificates or other evidence of insurance coverages or to issue any formal approval or acceptance of such evidence, the duty and obligation of the Contractor being to provide insurance meeting the requirements of this Article 11 regardless of any review or lack of review by the Owner of the Contractor's evidence of insurance.

.6 The Contractor's liability to and indemnification of the Owner is not relieved or diminished by the Contractor securing insurance coverage in accordance with this Article 11. Any acknowledgement of receipt of, or lack of objection by the Owner to, the Contractor's evidence of required insurance coverage is not acceptance in any way of any deficiencies in the Contractor's insurance coverage.

§ 11.1.4 Additional Insureds

§ 11.1.4.1 Policies of insurance required under Sections 11.1.2.1 (Commercial General Liability), 11.1.2.2 (Automobile Liability), 11.1.2.3 (Excess Liability and/or Umbrella Liability), and 11.1.2.6 (Hazardous Materials – if applicable) must also apply to the following as Additional Insureds on a primary and non-contributory basis, with the following designation, unaltered:

Nanuet Union Free School District and their respective employees, interim administrators, authorized volunteers, committee members, student teachers, auxiliary instructors, members of the Board of Education, and consultants (the "District Indemnitees"); KSQ Architects, PC and its consultants ("Designers"), and Jacobs ("Construction Manager"), during both ongoing and complete operations. The additional insured coverage provided shall not preclude coverage in favor of the any District Indemnitees, Designers, or Construction Manager, based on its lack of privity with Contractor or other third party additional insured. Further, such coverage shall not exclude or deny coverage to District Indemnitees, Designers, or the Construction Manager on the basis that the named insured Contractor's Work or operations are not performed directly for the District Indemnitees, Designers, or Construction Manager or other third party additional insured.

§ 11.1.4.2 Coverage Evidence. Additional Insured coverage must be effected through the use of **either** ISO Form CG 20 10 11 85 **or** Forms CG 20 10 04 13 **and** CG 20 37 04 13 **together**. Form CG 20 10 04 13 alone is not acceptable. Certificates of Insurance must clearly state how coverage is effected in the Excess/Umbrella Liability layer. Certificates of Insurance must show the form numbers used to effect all of the Additional Insured coverages. A copy of the actual policy language or endorsement that effects this coverage in each policy must be provided to the Owner and Construction Manager with the Certificate of Insurance. In the event Contractor is unable to procure such coverage specifically naming the "District Indemnitees," "Designers," "Construction Manager," or any other third party as an additional insured as required above, Contractor shall notify the Owner and Construction Manager prior to commencing Work and shall not proceed with any Work until authorized by the Owner to do so.

§ 11.1.4.3 No Reliance on "Following Form." The Contractor acknowledges that "Following Form" wording generally does not meet the primary and non-contributory coverage requirement for Additional Insureds, and that the coverage primacy aspect of Additional Insured coverage is typically addressed in the "Other Insurance" provisions of a policy's "Conditions" section, and often requires an amending endorsement to effect coverage on a primary and non-contributory basis. The Contractor therefore must provide such endorsements to the Owner, or other documentation acceptable to the Owner evidencing that the primary and non-contributory coverage requirements are met as to all policies for which they are required under Section 11.4.1.1.

§ 11.1.5 Normal Expiration/Renewal. When any required insurance is to expire due to a normal expiration or renewal date, the Contractor shall supply the Owner, at least ten (10) days prior to either such date, in addition to Certificates of Insurance, with either (1) copies of all renewed insurance policies, including, without limitation, terms, conditions, declarations, riders, and endorsements evidencing continuation of all coverages in the same manner, limits of protection, and scopes of coverage as was provided by the previous policy, or (2) if acceptable to the Owner, all declaration pages, mandatory riders, and/or endorsements that clearly evidence the continuation of all coverages in the same manner, limits of protection, and scope of coverage as provided by the previous policy.

§ 11.1.6 Subcontractors. The Contractor shall cause each Subcontractor to (1) procure insurance during the life of its Subcontract or Sub-subcontract the same insurances as are required of the Contractor as per this Article 11, and (2) cause the issuers of those insurance policies to name the Additional Insureds as Additional Insureds under each Subcontractor's comprehensive general, automobile, excess/umbrella, and hazardous materials liability policies. The

Additional Insured endorsement included in each such Subcontractor's policies must state that coverage is afforded to all Additional Insureds with respect to any and all claims arising out of operations performed by or on behalf of the Contractor. If the Additional Insureds have other insurance otherwise applicable to a loss, such other insurance will only apply, if at all, on an excess or contingent basis. The amount of each Subcontractor's insurers' liability under each such insurance policy will not be reduced by the existence of such other insurance.

§ 11.1.7 Owner Insurer Loss Payments. In the event the Owner's insurer(s) make(s) any payment toward any loss covered under any policy of insurance the Contractor is required to procure under this Article 11, the Owner's insurer(s) are subrogated to all of the Contractor's rights of recovery against any person or organization including, but not limited to, the Contractor's insurer(s), and the Contractor shall execute and deliver all instruments, papers, and whatever else is necessary to secure those rights. The Contractor shall do nothing after the payment of any damages to prejudice those rights.

§ 11.2 Owner's Liability Insurance

The Owner shall purchase and maintain the Owner's usual liability insurance. The Owner may also, at its sole option, purchase and maintain other insurance for protection against claims that may arise from operations under the Contract Documents. The Contractor is not responsible for purchasing and maintaining such optional Owner's liability insurance unless specifically required in the Contract Documents. Neither the Owner's usual liability insurance nor any other insurance obtained by the Owner reduces or otherwise affects the Contractor's insurance requirements under Section 11.1.

(Paragraphs deleted)

§ 11.3 Property Insurance

§ 11.3.1 Unless otherwise provided, the Owner shall purchase and maintain, in a company or companies lawfully authorized to do business in the State of New York, property insurance on a replacement cost basis. Such property insurance will be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment is made as provided in Section 9.10 or until no person or entity other than the Owner has an insurable interest in the property required by this Section 11.3 to be covered, whichever is later. This insurance will include interests of the Owner, Contractor, Subcontractors, and Sub-subcontractors in the Project.

§ 11.3.1.1 Property insurance will be on a builder's risk, "all-risk," or equivalent policy form and include, without limitation, insurance against the perils of fire (with extended coverage) and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, earthquake, flood, windstorm, falsework, testing and startup, temporary buildings, and debris removal including demolition occasioned by enforcement of any applicable legal requirements, and will cover reasonable compensation for the Architect's, Contractor's, and Construction Manager's services and expenses required as a result of such insured loss. Coverage for other perils is not required unless otherwise provided in the Contract Documents. The form of policy for this coverage shall be Completed Value.

§ 11.3.1.1.1 Contractor is responsible for all tools, equipment, materials, Work, etc., until Substantial Completion and possession by Owner. The Contractor shall provide insurance for theft as he may require for himself, his subcontractors, and his employees' protection. The insurance coverage referred to in this subparagraph shall be in accordance with a standard Builder's Risk Policy used in the State of New York.

§ 11.3.1.2 The Contractor shall provide insurance coverage for portions of the Work stored off the site, in transit and stored on the site but not incorporated into the Work as full replacement cost basis without voluntary deductible. The Contractor shall provide Certificate copies to the Construction Manager showing the coverage for their materials in transit or stored off site.

§ 11.3.1.3 If the property insurance requires deductibles, the Owner shall pay costs not covered because of such deductibles.

§ 11.3.1.4 The property insurance will cover portions of the Work stored off the site, and also portions of the Work in transit. The insurance required by this Section 11.3 will not, however, cover machinery, tools, equipment, vehicles, shanties, tool houses, trailers, or other temporary or permanent structures owned or rented by the Contractor, a Subcontractor, or a Sub-subcontractor, or their employees, utilized in performance of the Work but not incorporated

into the permanent improvements. The Contractor is solely responsible for all such items of its own and any under its control. The Contractor shall, at the Contractor's own expense, provide insurance coverage for all of the items described in this Section 11.3.1.4, which is subject to the provisions of Section 11.3.7.

§ 11.3.1.5 Partial occupancy or use in accordance with Section 9.9 may not commence until the insurance company or companies providing property insurance consent to such partial occupancy or use by endorsement or otherwise. The Owner and the Contractor shall take reasonable steps to obtain consent of the insurance company or companies and shall, without mutual written consent, take no action with respect to partial occupancy or use that would cause cancellation, lapse, or reduction of insurance.

§ 11.3.1.6 The Owner shall not be responsible to or for the Contractor or Subcontractor against any loss by fire, lightning, extended coverage, all risk, theft or vandalism and malicious mischief, or any tools, equipment, vehicles, shanties, tool houses, trailers or other temporary or permanent structures wherever located and owned by the Contractor, Subcontractors, their employees or agents.

§ 11.3.1.7 The form of policy for the coverage required by 11.3.1 shall be Completed Value.

§ 11.3.2 Boiler and Machinery Insurance. The Owner, if applicable to the Work and at its sole option, may purchase and maintain boiler and machinery insurance or shall do so if required by law, which shall specifically cover such insured objects during installation and until final acceptance by the Owner. This insurance will include interests of the Owner, Construction Manager, Contractor, Subcontractors and Sub-subcontractors in the Work.

§ 11.3.3 Intentionally omitted.

§ 11.3.4 If the Contractor requests in writing that insurance for risks other than those described in this Section 11.3 or other special causes of loss be included in the property insurance policy, the Owner shall, if possible, include such insurance, and the cost for it will be charged to the Contractor by appropriate Change Order.

§ 11.3.5 Intentionally omitted.

§ 11.3.6 Upon the Contractor's request, the Owner will provide copies of each policy that includes insurance coverages required by this Section 11.3. Each policy shall contain all generally applicable conditions, definitions, exclusions and endorsements related to this Project.

§ 11.3.7 Waivers of Subrogation. The Owner and Contractor waive all rights against (1) each other and any of their respective subcontractors, sub-subcontractors, agents and employees, and (2) the Construction Manager, Construction Manager's consultants, Architect, Architect's consultants, separate contractors described in Article 6, if any, and any of their respective subcontractors, sub-subcontractors, agents, and employees, for damages caused by fire or other causes of loss to the extent of proceeds under property insurance obtained pursuant to this Section 11.3 or other property insurance applicable to the Work, except such rights as the Owner and Contractor may have to the proceeds of such insurance held by the Owner. The Owner or Contractor, as appropriate, shall require of the Construction Manager, Construction Manager's consultants, Architect, Architect's consultants, Owner's separate contractors described in Article 6, if any, and any of their respective subcontractors, sub-subcontractors, agents, and employees, by appropriate written agreements, similar waivers each in favor of other parties enumerated in this Section 11.3.7. The policies must provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation is effective as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity has an insurable interest in the property damaged.

§ 11.3.8 A loss insured under the Owner's property insurance will be adjusted by the Owner and made payable to the Owner for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.3.10. The Contractor shall pay Subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriate written agreements shall require Subcontractors to make payments to their Sub-subcontractors in similar manner.

§ 11.3.9 If required in writing by a party in interest, the Owner shall, upon occurrence of an insured loss, give a bond for proper performance of the Owner's duties. The cost of the bond will be charged against proceeds received. The

Owner shall deposit in a separate account proceeds so received, which the Owner shall distribute in accordance with such agreement as the parties in interest may reach, or as determined in accordance with the method of binding dispute resolution selected in the Agreement. If after such loss no other special agreement is made, and unless the Owner terminates the Contract for convenience, replacement of damaged property will be performed by the Contractor after notification of a Change in the Work in accordance with Article 7.

§ 11.3.10 The Owner will adjust and settle a loss with insurers unless one of the parties in interest objects in writing within five days after occurrence of loss to the Owner's exercise of this power; if such objection is made, the dispute will be resolved in the manner selected as the method of binding dispute resolution in the Agreement. Nothing in this Agreement calls for the name of any party other than the Owner as loss payee on the Owner's insurance and no draft or other instrument in payment of any loss will name any other party as a joint payee.

§ 11.3.11 The Contractor's Insurance Company shall acknowledge in writing to the Construction Manager that they have read and will comply with all requirements under Indemnification Section 3.18 of the General Conditions.

§ 11.4
(Paragraphs deleted)
Performance Bond and Payment Bond
(Paragraphs deleted)
§ 11.4.1 The Contractor shall furnish bonds covering faithful performance of the Contract and payment of obligations arising under it. Bonds must be obtained from a surety company or companies satisfactory to the Owner, licensed to do business in the State of New York, and listed in the latest issue of U.S. Treasury Circular 570. The amount of each bond will be equal to one hundred (100) percent of the Contract Sum. Each bond must be maintained throughout the duration of the Project, and subsequently to the extent the Contractor has ongoing performance and payment obligations following completion of the Project.

§ 11.4.1.1 No Performance or Payment Bond shall require, as a condition precedent to termination of a Contract or Contractor, that any notice be sent to or meeting be arranged or held with a Contractor (Principal) and/or surety, prior to such termination. Any such requirement(s) shall be void and unenforceable and the Owner shall have the right to reject any such bond(s) and/or ignore such condition. The exclusive method of termination of a Contract or Contractor is contained in the Contract Documents and a Contractor and surety expressly agreed to be bound thereby.

§ 11.4.1.2 Rider including the following provisions shall be attached to each Performance Bond: "Surety 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 relieve the surety of its obligations hereunder and notice to the surety of such matters is hereby waived"

§ 11.4.2 Bonds must be prepared on the forms of AIA Documents A312-2010 - Performance Bond and A312-2010 - Payment Bond, without modifications other than (1) a mandatory statement in Section 16 of the Performance Bond that it is given as a statutory or other legally required bond and that Section 13 of the Performance Bond applies in full, without exception, (2) a mandatory statement in Section 16 of the Performance Bond that it includes performance by the Contractor of any correction and warranty obligations in the Contract Documents, including such performance after the dates of Substantial and Final Completion, and (3) a mandatory statement in Section 18 of the Payment Bond that it is given as a statutory or other legally required bond and that Section 14 of the Payment Bond applies in full, without exception. The cost of the bonds is included in and will not increase the Contract Sum.

- **.1** The Contractor shall deliver the required bonds to the Owner not later than 7 days following the date the Agreement is entered into and before commencing any of the Work.
- **.2** The Contractor shall require any attorney-in-fact who executes the required bonds on behalf of the surety to affix to the bonds a certified and current copy of their power of attorney authorizing him or her to sign the bond.
- **.3** The bonds must specifically name the Nanuet Union Free School District as Obligee.

§ 11.4.3 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall authorize a copy to be furnished.

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 Uncovering of Work

§ 12.1.1 If a portion of the Work is covered contrary to the Construction Manager's or Architect's request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by either, be uncovered for their examination and be replaced at the Contractor's expense without change in the Contract Time.

§ 12.1.2 If a portion of the Work has been covered which the Construction Manager or Architect has not specifically requested to observe prior to its being covered, the Construction Manager or Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, costs of uncovering and replacement shall, by appropriate Change Order, be at the Owner's expense. If such Work is not in accordance with the Contract Documents, such costs and the cost of correction shall be at the Contractor's expense unless the condition was caused by the Owner or one of the other Contractors in which event the Owner shall be responsible for payment of such costs.

§ 12.2 Correction of Work

§ 12.2.1 Before or After Substantial Completion

The Owner, through its Architect or Construction Manager, shall have the authority to reject Work performed by the Contractor that does not conform to the requirements of the Drawings, Specifications, or both. The Contractor shall promptly correct Work rejected by the Construction Manager or Architect or failing to conform to the requirements of the Contract Documents, whether discovered before or after Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Construction Manager's and Architect's services and expenses made necessary thereby, shall be at the Contractor's expense.

§ 12.2.2 After Substantial Completion

§ 12.2.2.1 If, within two years after the date of Substantial Completion of the Work or a designated portion of the Work, or the date of acceptance of a portion of the Work that is subject to correction or completion after the date of Substantial Completion of the Work, whichever is later, or after the date for commencement of warranties established under Section 9.9.1, or by terms of any applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of notice from the Owner to do so, unless the Owner has previously given the Contractor a written acceptance of such condition. The obligation set forth hereunder shall survive acceptance by the Owner of the Work or termination of the Contract. The Owner shall give such notice promptly after discovery of the condition.

§ 12.2.2.2 The two-year period for correction of the Work shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual completion of that portion of the Work.

§ 12.2.2.3 Upon completion of any Work under or pursuant to this Section 12.2, the two-year period for correction of Work in connection with the Work requiring correction shall be renewed and recommence.

§ 12.2.2.4 The obligations shall cover any repair and replacement to any part of the Work or other property caused by the defective Work.

§ 12.2.3 The Contractor shall remove from the site portions of the Work that are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

§ 12.2.3.1 If the Contractor fails to commence to correct, repair and make good any defects in its Work within a reasonable time, not to exceed ten (10) days from the date the Contractor received written notice from the Owner per Section 12.2.2.1, the Owner may correct it in accordance with Section 2.5 and the Contractor shall, upon demand, pay to the Owner all amounts which it expends for such corrective work.

§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction of the Owner, Multiple Prime Contractors or Separate Contractors, whether completed or partially completed, caused by the Contractor's correction or removal of Work that is not in accordance with the requirements of the Contract Documents. The Contractor shall also replace or repair to satisfaction of Owner any and all damage done to the building or its contents in consequence of work performed in fulfilling any applicable warranty. This clause is general in nature and will not operate to waive stipulations of other clauses that specify warranty periods in excess of two (2) years.

§ 12.2.5 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations the Contractor has under the Contract Documents. Establishment of the two-year period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

§ 12.3 Acceptance of Nonconforming Work

If the Owner prefers to accept Work that is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as determined by the Owner, with the advice of the Construction Manager and Architect. Such adjustment shall be effected whether or not final payment has been made. For this Section to apply, the Owner must accept non-conforming Work in writing specifying the non-conforming Work being accepted. Notwithstanding any acceptance by the Owner, if the Owner discovers non-conforming Work that the Owner has not expressly accepted in writing, the Owner may demand that the Contractor correct such Work as per the provisions of Article 12 hereof.

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 Governing Law

The Contract shall be governed by the law of the State of New York, and the parties expressly agree that any claim, dispute, or other controversy of any nature arising out of the Contract or performance of the Work shall be commenced and maintained in New York State Supreme Court, Rockland County.

§ 13.1.2 The Contractor shall at all times observe and comply with all federal, state and local 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 defend, indemnify and save harmless the Owner and its Board of Education, 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. 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 the Agreement 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.

§ 13.2 Successors and Assigns

§ 13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns, and legal representatives to covenants, agreements, and obligations contained in the Contract Documents. Except as provided in Section 13.2.2, neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

§ 13.2.2 The Owner may, without consent of the Contractor, assign the Contract to a lender providing construction financing for the Project, if the lender assumes the Owner's rights and obligations under the Contract Documents. The Contractor shall execute all consents reasonably required to facilitate the assignment.

§ 13.3 Rights and Remedies

§ 13.3.1 Duties and obligations imposed by the Contract Documents 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.

§ 13.3.2 Neither the acceptance of all or any part of the work covered by the Contract; nor any payment therefore; nor any order or application for payment issued under the Contract or otherwise issued by the Owner, Architect,

Construction Manager, or any board member, officer, agent or employee of the Owner; nor any permission or direction to continue with the performance of the Contract before or after its specified completion date; nor any performance by the Owner of any of the Contractor's duties or obligations; nor any aid lent to the Contractor by the Owner in its performance of such duties or obligations; nor any delay or omission by the Owner to exercise any right or remedy accruing to it under the terms of the Contract or existing at law or in equity or by statute or otherwise; nor any other thing done or omitted to be done by the Owner, its commissioners, officers, agents or employees; shall be deemed to be a release to the Contractor or its sureties from any obligations, liabilities or undertakings in connection with the Contract or the performance bond or a waiver of any provision of the Contract or of any rights or remedies to which the Owner may be entitled because of any breach thereof, excepting only a written instrument expressly providing for such release or waiver. No cancellation, rescission or annulment hereof, in whole or as to any part of the Contract, because of any breach hereof, shall be deemed a waiver of any money damages to which the Owner may be entitled because of such breach. No waiver by the Owner of any breach of the Contract shall be deemed to be a waiver of any other or any subsequent breach.

§ 13.3.3 The rights stated in these General Conditions and the Contract Documents are cumulative and not in limitation of any rights of the Owner at law or in equity.

§ 13.3.4 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.

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

§ 13.3.6 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, the Architect or the Construction Manager taken in connection with the Contractor's Work on the Project.

§ 13.3.7 The Contractor agrees that it waives the defense of privity of contract as between itself and each other Prime Contractor. In the event that an act or omission by a Prime Contractor or its Subcontractors of any tier causes impact, damage or loss in any form to the Contractor, then the Prime Contractor responsible in whole or in part for such impact, damage or loss agrees it is directly responsible and liable to the Contractor. The Contractor acknowledges and agrees that this waiver of the defense or privity of contract permits and requires it to commence an action or suit directly against the responsible Prime Contractor. The Owner, Architect and the Construction Manager shall not be parties to such suit. The Contractor waives and relinquishes any right and claim as against the Owner, to the extent such claim is caused, or contributed to, by a Prime Contractor or its Subcontractors of any tier.

§ 13.4 Tests and Inspections

§ 13.4.1 Tests, inspections and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules and regulations or lawful orders of public authorities. Tests, inspections and approvals of portions of the Contractor's Work required by the Drawings or Specifications shall be made at an appropriate time. Unless otherwise provided, the Contractor shall arrange for such tests, inspections and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections and approvals. The Contractor shall give the Construction Manager and Architect timely notice of when and where tests and inspections are to be made so that the Construction Manager and Architect may be present for such procedures. The Owner shall bear costs of (1) tests, inspections or approvals that do not become requirements until after bids are received or negotiations concluded, and (2) tests, inspections or approvals where building codes or applicable laws or regulations prohibit the Owner from delegating their cost to the Contractor.

§ 13.4.2 If the Construction Manager, Architect, Owner or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection or approval not included under Section 13.4.1, the Construction Manager or Architect shall, upon written authorization from the Owner, instruct the Contractor to arrange for such additional testing, inspection or approval by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Construction Manager and Architect of when and where tests and inspections are to be

made so that the Construction Manager and Architect may be present for such procedures. Such costs, except as provided in Section 13.4.3, shall be at the Owner's expense.

§ 13.4.3 If such procedures for testing, inspection or approval under Sections 13.4.1 and 13.4.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure including those of repeated procedures and compensation for the Construction Manager's and Architect's services and expenses shall be at the Contractor's expense, including the cost of retesting for verification of compliance if necessary until the Architect certifies that the Work in question does comply with the requirements of the Contract Documents, and none of such costs shall be included in computing the Contract Sum.

§ 13.4.4 Required certificates of testing, inspection or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Construction Manager for transmittal to the Architect.

§ 13.4.5 If the Construction Manager or Architect is to observe tests, inspections, or approvals required by the Contract Documents, the Construction Manager or Architect will do so promptly and, where practicable, at the normal place of testing.

§ 13.4.6 Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

§ 13.4.7 Any material to be furnished shall be subject to inspections and tests in the shop and field by the Architect. Shop inspection shall not relieve the Contractor of the responsibility to furnish satisfactory materials and the right is reserved to reject any material at any time before final acceptance of the Work, when in the opinion of the Architect the materials and/or workmanship do not conform to the Specification requirements.

§ 13.5 Interest

Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at the legal rate as required in General Municipal Law Section 106-b.

§ 13.6 Time Limits on Claims

§ 13.6.1 No action or proceeding shall lie or be maintained by the Contractor, nor anyone claiming under or through the Contractor, against the Owner upon any claim arising out of or based on the Agreement or the Contract Documents or by reason of any act or omission or requirements relating to the giving of notices and information, unless such action or proceeding shall be commenced within one (1) year after submission to the Owner of the final Application for Payment. As to a claim based upon money required to be retained for any period after the date of the final Application for Payment, such action must be commenced within six (6) months after such money becomes due and payable under the terms of the Contract. Notwithstanding, if the Contract is terminated by the Owner, such action by the Contractor must be commenced within six (6) months after the date of such termination. The Contractor's acceptance of final payment shall constitute a release of all claims against the Owner. This provision shall not relieve the Contractor of the obligation to comply with the provisions of the law relating to notices of claim.

§ 13.6.2 Acts or failures to act occurring during the construction of the Project or following the issuance of the final certificate for payment, which give rise to a 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 any warranty provided under Section 3.5, the date of any correction of the Work or failure to correct the Work by the Contractor under Section 12.2, or the date of actual commission of any other act or failure to perform any duty or obligation by the Contractor, whichever occurs last.

§ 13.7 No Oral Waiver or Constructive Changes

The provisions of the Contract Documents shall not be changed, amended, waived, or otherwise modified in any respect except by a writing signed by the Owner. No person is authorized on behalf of the Owner to orally change, amend, waive, or otherwise modify the terms of the Contract Documents or any of the Contractor's duties or obligations under or arising out of the Contract Documents. Any change, waiver, approval, or consent granted to the Contractor shall be limited to the specific matters stated in the writing signed by the Owner, and shall not relieve the Contractor of any other of the duties and obligations under the Contract Documents. No "constructive" changes shall be allowed.

§ 13.8 Notices Regarding Liens
The Contractor shall provide to the Owner copies of all notices of any type regarding liens received from Subcontractors, Sub-subcontractors, or suppliers to the Contractor.

§ 13.9 Wages Rates
The Contractor shall, and cause its Subcontractors to, comply with prevailing wage rate determinations as issued by the State of New York Department of Labor for the location and duration of this Project. Current wage rates for this Project are included in the Project Manual.

§ 13.10 General Provisions
Any specific requirement in this Contract that the responsibilities or obligations of the Contractor also apply to a Subcontractor is added for emphasis and is also hereby deemed to include a Subcontractor of any tier. The omission of a reference to a Subcontractor in connection with any of the Contractor's responsibilities or obligations shall not be construed to diminish, abrogate or limit any responsibilities or obligations of a Subcontractor of any tier under the Contract Documents or the applicable subcontract.

§ 13.11 Written Notice
All notices to be given hereunder shall be in writing and may be given, served, or made by (1) depositing the same in the United States mail addressed to the authorized representative (as specified below) of the party to be notified, postpaid and registered or certified, read receipt requested or (2) depositing the same for overnight delivery (prepaid by and billed to the party giving notice) with a nationally recognized overnight delivery service addressed to the authorized representative of the party being notified or (3) delivering the same in person to the authorized representative of the party being notified or (4) emails to the attention of the authorized representative of the party to be notified with the requirement of a email confirmation notices deposited in the United States mail shall be effective, unless otherwise state in the Contract Documents, from and after the fourth day next following the date deposited in a United States mail receptacle or when actually received, whichever is earlier. Notices transmitted by overnight delivery shall be effective immediately. Email notices shall be effective as of the time received, as shown on a printed email confirmation.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT
§ 14.1 Termination by the Contractor
§ 14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of 90 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, for any of the following reasons:

.1 Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped; or

.2 An act of government, such as a declaration of national emergency, that requires all Work to be stopped; or

.3 Because the Construction Manager has not certified or the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4 and 9.5, or because the Owner has not made payment after 14 days written notice of such failure to make payment provided that such failure is not due to a disputed amount, and except to the extent the Owner is excused from timely making all or part of any payment on a Certificate for Payment as per any other provisions of the Contract Documents.

Notwithstanding the preceding or anything else in the Contract Documents, the Contractor shall not cease or delay the progress of the Work for any reason other than one set forth in Section 9.7.1, it being agreed that monetary damages shall be an adequate remedy for the Contractor for any breach of this Agreement or the Contract Documents by the Owner.

§ 14.1.2 The Contractor may terminate the Contract if, through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, repeated suspensions, delays, or interruptions of the entire Work by the Owner as described in Section 14.3, constitute in the aggregate more than 100 percent of the total number of days scheduled for completion.

§ 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon 30 days' written notice and opportunity to cure to the Owner, terminate the Contract and recover from the Owner payment for such Work properly performed for which it has not otherwise been compensated, but in no event shall the Owner by liable to the Contractor for any prospective loss, including, but not limited to, termination expenses, loss of anticipated profits, impact damages, unabsorbed overhead, or the like. Notwithstanding the foregoing, any such payments to the Contractor shall be less any setoffs to which the Owner may be entitled as per any other provision of the Contract Documents.

§ 14.1.4 If the Work is stopped for a period of 90 consecutive days through no act or fault of the Contractor or a Subcontractor or their agents or employees or any other persons performing portions of the Work under contract with the Contractor because the Owner has repeatedly failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon 30 additional days' written notice to the Owner, Construction Manager and Architect (during which the Owner shall have the right and opportunity to cure), terminate the Contract and recover from the Owner as provided in Section 14.1.3.

§ 14.2 Termination by the Owner for Cause

§ 14.2.1 The Owner may terminate the Contract if the Contractor

- **.1** refuses or fails to supply enough properly skilled workers or proper materials or equipment to complete the Work in a diligent, efficient, timely, workmanlike, skillful, and careful manner;
- **.2** fails to make payment to Subcontractors or Suppliers for materials or labor in accordance with the respective agreements between the Contractor and its Subcontractors or Suppliers;
- **.3** disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority, or its health and safety plan;
- **.4** otherwise is guilty of substantial breach of or default under a provision of the Contract Documents;
- **.5** cannot complete the Work within the Contract Time or within the time to which such completion may have been extended; provided, however, that the impossibility of timely completion is, in the Owner's opinion, attributable to conditions within the Contractor's control;
- **.6** breaches any warranty made by the Contractor under or pursuant to the Contract Documents;
- **.7** is or has been unnecessarily or unreasonably or willfully delaying the performance and completion of the Work, or the award of necessary subcontracts, or the placing of necessary material and equipment orders;
- **.8** fails to furnish the Owner with assurances satisfactory to the Owner evidencing the Contractor's ability to complete the Work in compliance with all requirements of the Contract Documents;
- **.9** refuses to proceed with the Work or extra work when and as directed by the Owner, Construction Manager or Architect;
- **.10** fails after commencement of the Work to proceed continuously with the construction and completion of the Work for more than 10 days, except as permitted under the Contract Documents;
- **.11** fails or neglects to complete the Work within the Contract Time or in accordance with the Construction Schedule;
- **.12** refuses or fails to correct deficient Work performed by it;
- **.13** the Contractor's progress of the Work is such that the Owner reasonably believes that the Contractor shall not be able to achieve Substantial Completion by the Substantial Completion Date and the Contractor has not delivered and implemented a recovery plan required under the Contract or has not recovered the schedule sufficient to meet the respective Contract Time requirements as required by written notice to the Contractor by the Owner; or
- **.14** disregards the instructions of the Construction Manager, Architect or Owner (when such instructions are based on the requirements of the Contract Documents).

§ 14.2.2 When any of the above reasons exist, the Owner may without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven (7) days' written notice, terminate employment of the Contractor at the expiration of such seven (7) day period, and may, subject to any prior rights of the surety:

- **.1** Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;
- **.2** Accept assignment of subcontracts pursuant to Section 5.4; and
- **.3** Finish the Work by whatever reasonable method the Owner may deem expedient utilizing for such purpose such of the Contractor's plant, materials, equipment, tools and supplies remaining on the site,

and also such subcontractors as it may deem advisable, or if may call upon the Contractor's surety at its own expense to do so. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work. Such accounting shall be final, binding and conclusive upon the Contractor, its surety, and any person claiming under or through the Contractor, as to the amount thereof.

§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

§ 14.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Construction Manager's and Architect's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall, upon application, be certified by the Initial Decision Maker after consultation with the Construction Manager, and this obligation for payment shall survive termination of the Contract.

§ 14.2.4.1 The costs of finishing the Work also include, without limitation, all reasonable attorneys' fees incurred in responding to the default and enforcing the Owner's rights under the Contract Documents (including costs and fees incurred in dispute resolution proceedings), additional title costs, insurance, additional interest because of any delay in completing the Work, loss of State Building Aid, and all other direct and consequential damages incurred by the Owner by reason of the termination of the Contractor as stated herein.

§14.2.4.2 It is recognized that: (1) if an order for relief is entered on behalf of Contractor pursuant to Title 11 of the United States Code, (2) if any other similar order is entered under any other debtor relief laws, (3) if Contractor makes a general assignment for the benefit of its creditors, (4) if a receiver is appointed for the benefit of its creditors, or (5) if a receiver is appointed on account of its insolvency, any such event could impair or frustrate Contractor's performance of the Contract. Accordingly, it is agreed that upon the occurrence of any such event, 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 the Contract. Failure to comply with such request within ten (10) days of delivery of the request, or Owner's determination that the assurances are not adequate, shall entitle Owner to terminate the Contract and to the accompanying rights set forth in Subparagraphs 14.2.1 through 14.2.4 hereof. In all events pending receipt of adequate assurance of performance and actual performance in accordance therewith, Owner shall be entitled to proceed with the 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 Contract Sum.

§ 14.2.5 If the Owner wrongfully terminates the Contract for cause, the rights, remedies and obligations of the parties will be the same as if the Owner had terminated the Contract for convenience under Section 14.4.

§ 14.2.6 In the event that the Contractor, or the Contractor's surety, challenges the Owner's termination of the Contract for cause, and the Owner prevails in litigation in connection with such challenge, whether initiated by the Owner or by the Contractor or the Contractor's surety, the Owner shall be entitled to its costs, including reasonable attorney's fees, incurred as a result of such litigation, as part of any judgment against the Contractor or the Contractor's surety. Such costs, including reasonable attorney's fees, shall be deemed a cost of finishing the Work.

§ 14.3 Suspension by the Owner for Convenience

§ 14.3.1 The Owner may, without cause, order the Contractor in writing to suspend, delay or interrupt the Work, in whole or in part for such period of time as the Owner may determine. The Owner shall incur no liability by reason of such suspension, delay, or interruption except that the Contractor may request an extension of its time to complete its Work in accordance with Article 8 hereof.

§ 14.3.2 The Contract Time shall be adjusted for increases in time caused by suspension, delay or interruption as described in Section 14.3.1. No adjustment shall be made to the extent:

.1 that performance is, was or would have been so suspended, delayed or interrupted by another cause for which the Contractor is responsible; or

.2 that an equitable adjustment is made or denied under another provision of this Contract.

§ 14.4 Termination by the Owner for Convenience

§ 14.4.1 The Owner may, at any time, terminate the whole or any portion of the Contract for the Owner's convenience and without cause upon not less than seven (7) days' written notice to the Contractor. Notwithstanding any other provision to the contrary in the Contract, the Owner reserves the right at any time and in its absolute discretion to terminate the services of the Contractor or the Work by giving written notice to the Contractor. This termination for convenience of the Owner provision allows and authorizes the Owner to terminate this Contract at any time and for any reason whatsoever. This right may be exercised by the Owner in its complete discretion. Termination by the Owner under this Section shall be by Notice of Termination delivered to the Contractor specifying the extent of termination and the effective date.

§ 14.4.2 Upon receipt of written notice from the Owner of such termination for the Owner's convenience, the Contractor shall immediately and in accordance with instructions from the Owner:

.1 cease operations as directed by the Owner in the notice;

.2 take actions necessary, or that the Owner may direct, for the protection and preservation of the Work;

.3 except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders; and

.4 proceed to complete the performance of the Work required under portions of the Contract not terminated, if any.

§ 14.4.3 Upon receipt of written notice of the Owner's exercise of such termination, the Contractor shall, as the Contractor's sole and exclusive remedy, be paid for the Work properly executed in accordance with the Contract Documents prior to the effective date of termination and for items properly fabricated off-site, delivered and stored in accordance with the Owner's instructions or the Contract Documents before such effective date. The Contractor's entitlement to payment for all such work shall be predicated on its performance of such work in accordance with the Contract Documents as certified by the Architect and Construction Manager. The Contractor shall be entitled to no other payment and waives any claim for damages including, but not limited to, lost profits, any prospective loss, underutilization of personnel or equipment, unabsorbed overhead, and any and all items of consequential loss or damage. The Owner shall be entitled to credit against any payment to be made to the Contractor pursuant to this Section 14.4 the following: (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 Documents; and (3) the value of the materials, supplies, equipment, or other items that are to be disposed of by the Contractor, the cost of which is included in the Contract Sum. Notwithstanding the foregoing, in the event of a termination under Section 14.4.1 prior to the issuance of a Notice to Proceed, the Contractor shall not be entitled to any compensation whatsoever.

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 Claims

§ 15.1.1 Definition. A Claim is a demand or assertion by the Contractor seeking, as a matter of right, payment of money, 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. Neither a Request for Information, nor a Construction Change Directive, nor a Change Order, nor a reservation of rights, nor minutes of a meeting, nor a daily report, nor any log entry, nor an Owner's request for or the Contractor's response to a Change Order proposal, nor notice of a potential or future claim shall constitute a Claim.

§ 15.1.2 Time Limits on Claims

(Paragraph deleted)

§ 15.1.2.1 Claims by the Contractor must be initiated by written notice to the Owner and the Initial Decision Maker. Claims by the Contractor must be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the Contractor first recognizes the condition giving rise to the Claim, whichever is earlier.

§ 15.1.3 Notice of Claims

§ 15.1.3.1 Claims by the Contractor must be initiated by written notice to the Owner and to the Architect with a copy sent to the Construction Manager within the time limits set forth in Section 15.1.2.1 above. The purpose of the written notice is to give the Owner prompt opportunity: (a) to cancel or revise orders or directions, change plans, mitigate or remedy circumstances giving rise to the Claim or to take other action that may be desirable; (b) to monitor and verify the facts and circumstances as they occur; and (c) to verify any costs and expenses claimed by the Contractor contemporaneously as they are incurred. Written notice is required whether or not the Owner, Construction Manager

or Architect is aware of the facts or circumstances that constitute the basis for the Contractor's Claim, and no action or conduct of the Owner, Construction Manager, Architect or any other person will be regarded as a waiver of such notice requirement except only a written statement to such effect signed by the Owner. Failure of the Contractor to give written notice as required by this Section shall be deemed conclusively to be a waiver and release of any Claim, and such written notice shall be a condition precedent to the Contractor's right to make any Claim arising out of, under or in connection with the Contract or its performance of the Work.

§ 15.1.3.2 Written notice shall contain a heading stating "Notice of Claim" to clearly identify it as such. Such notice shall set forth in detail the circumstances that form the basis for the Claim and shall include the following: (1) a clear statement of the claim, including background and chronology; (2) documentation in support of the claim; (3) documentation in support of claimed damages; and (4) certification by responsible officer of the Contractor. The responsibility to substantiate Claims shall rest with the Contractor. An additional Claim arising from the same occurrence or condition made after the Initial Claim has been implemented by Change Order shall not be considered.

§ 15.1.3.3 The Contractor agrees that it has and will make no claim for damages against the Owner by reason of any act or failure to act by any other Contractor, Separate Contractor or Subcontractors having contracts for performance of any portion of work of the Project or in connection with the Owner's, Architect's or Construction Manager's acts or omissions to act in connection with such other Contractors, Separate Contractors or Subcontractors.

§ 15.1.4 Continuing Contract Performance

§ 15.1.4.1 Pending final resolution of a Claim by the Contractor, except as otherwise agreed in writing or as provided in Section 9.7, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments of undisputed amounts in accordance with the Contract Documents; provided, however, that the Contractor shall use its best efforts to furnish the Architect and Owner, as expeditiously as possible, with notice of any Claim including, without limitation, those in connection with concealed or unknown conditions, once such Claim is recognized, and shall cooperate with the Architect and the Owner in any effort to mitigate the alleged or potential damages, delay or other adverse consequences arising out of the condition which is the cause of such a Claim. The Construction Manager will prepare Change Orders and the Architect will issue a Certificate for Payment or Project Certificate for Payment in accordance with the decisions of the Initial Decision Maker.

(Paragraph deleted)

§ 15.1.5 Claims for Additional Cost. If the Contractor wishes to make a Claim for an increase in the Contract Sum, written notice as provided herein shall be given before proceeding to execute the Work. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.3. The Contractor agrees that an express condition precedent to the Contractor's entitlement to any increase in the Contract Sum shall be full and complete compliance to the satisfaction of the Owner with the requirements of Article 15. The Contractor acknowledges the no damages for delay provisions set forth in Sections 8.3.2 and 15.1.6.1.4 hereof.

§ 15.1.5.1 The Contractor shall not be entitled to any adjustment in the Contract Sum or Contract Time if:

- **.1** The Contractor knew of the existence of such conditions at the time Contractor made a final commitment to Owner in respect of Contract Sum and Contract Times by the submission of a bid or becoming bound under a negotiated contract; or
- **.2** The existence of such condition could reasonably have been discovered or revealed as a result of any examination, investigation, exploration, test or study of the site and contiguous areas required by the Bidding Requirements or Contract Documents to be conducted by or for the Contractor prior to Contractor's making such final commitment;
- **.3** The Contractor failed to give the written notice within the time and as required by Section 15.1.2; or
- **.4** If the Owner and the Contractor are unable to agree on entitlement to or as to the amount or length of any such equitable adjustment in the Contract Sum or Contract Times, a claim may be made therefore as provided in Article 15. However, the Owner, Construction Manager, and Architect shall not be liable to the Contractor for any claims, costs, losses or damages sustained by the Contractor on or in connection with any other project or anticipated project.

§ 15.1.6 Claims for Additional Time

§ 15.1.6.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, notice as provided in Sections 15.1.2 and 15.1.3 shall be given. The Contractor's Claim shall include an estimate of the probable effect of delay on progress of the Work. In the case of a continuing delay only one Claim is necessary.

§ 15.1.6.1.1 An application for extension of time must set forth in detail the circumstances that form the basis for the Claim, the date upon which each cause of delay began to affect the progress of the Work, the date upon which each cause of delay ceased to affect the progress of the Work and the number of days' increase in the Contract Time claimed as a consequence of each such cause of delay. The Contractor shall provide such supporting documentation as the Owner, Construction Manager or Architect may require including, where appropriate, a revised construction schedule indicating all the activities affected by the circumstances forming the basis of the Claim for an increase in the Contract Time.

§ 15.1.6.1.2 The Contractor shall not be entitled to a separate increase in the Contract Time for each one of the number of causes of delay which may have concurrent or interrelated effects on the progress of the Work, or for concurrent delays due to the fault of the Contractor.

§ 15.1.6.1.3 The Contractor agrees that an express condition precedent to the Contractor's entitlement to any extension of the Contract Time shall be full and complete compliance to the satisfaction of the Owner with the requirements of Articles 8 and 15.

§ 15.1.6.1.4 The Owner shall not be liable to the Contractor or any of its Subcontractor for claims, impact costs, extended general conditions or delay damages of any nature caused by or arising out of delay, disruption, interference, inefficiencies, impedance, hindrance, acceleration, resequencing, schedule impacts, lack of timeliness by the Owner or its Architect or Construction Manager, and lack of coordination or scheduling, cumulative impact of multiple change orders, errors or omissions in the design of the Project, delay and other performance impacts. The sole remedy against the Owner for such delays shall be the allowance of additional time for completion of the Work, the amount of which shall be subject to the Claims procedure set forth herein. Except to the extent, if any, expressly prohibited by law, the Contractor expressly agrees not to make and hereby waives any claim for damages for delay, including, but not limited to, those resulting from increased labor or material costs, extended general conditions, directions given or not given by the Owner, Construction Manager, or Architect, including scheduling and coordination of the Work; the Architect's preparation of drawings and specifications or the Construction Manager's or Architect's review of shop drawings and requests for instructions; errors or omissions in the design of the Project; or, on account of any delay, disruption, interference, impedance, inefficiency, lack of productivity, obstruction or hindrance for any cause whatsoever by the Owner, Construction Manager, Architect or any other Contractor or Separate Contractor on the Project whether or not foreseeable or anticipated. The Contractor agrees that its sole right and remedy therefore shall be an extension of time, if appropriate. It is emphasized that no monetary recovery may be obtained by the Contractor for delay against the Owner, Construction Manager, Architect, other Contractor or Separate Contractor based on any reason and that the Contractor's sole remedy, if appropriate, is additional time.

§ 15.1.6.2 If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time, could not have been reasonably anticipated and had an adverse effect on the scheduled construction. In planning his construction schedule within the agreed Contract Time, it shall be assumed that the Contractor has anticipated the amount of adverse weather conditions normal to the site of the Work for the season or seasons of the year involved. Only those weather delays attributable to other than normal weather conditions will be considered by the Architect.

§ 15.1.7 Waiver of Claims for Consequential Damages. The Contractor waives any and all claims for consequential damages of any kind and nature arising out of or relating to this Contract. This
(Paragraphs deleted)
waiver of consequential damages shall survive termination of the Contract.

§ 15.2 Initial Decision

§ 15.2.1 Claims by the Contractor, excluding those where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2 or arising under Sections 10.3, 10.4, and 11.5, shall be referred to the Initial Decision Maker for initial decision. The Architect will serve as the Initial Decision Maker, unless otherwise indicated in the Agreement. Except for those Claims by the Contractor excluded by this Section 15.2.1, an initial decision shall be required as a condition precedent to binding dispute resolution of any Claim. If an initial decision has not been rendered within 30 days after the Contractor's Claim has been referred to the Initial Decision Maker, the Contractor may proceed with binding dispute resolution without a decision having been rendered.

Unless the Initial Decision Maker and all affected parties agree, the Initial Decision Maker will not decide disputes between the Contractor and persons or entities other than the Owner.

§ 15.2.2 The Initial Decision Maker will review Claims by the Contractor and within ten days of the receipt of a Claim take one or more of the following actions: (1) request additional supporting data from the claimant or a response with supporting data from the other party, (2) reject the Claim in whole or in part, (3) approve the Claim, (4) suggest a compromise, or (5) advise the parties that the Initial Decision Maker is unable to resolve the Claim if the Initial Decision Maker lacks sufficient information to evaluate the merits of the Claim or if the Initial Decision Maker concludes that, in the Initial Decision Maker's sole discretion, it would be inappropriate for the Initial Decision Maker to resolve the Claim.

§ 15.2.3 In evaluating Claims by the Contractor, the Initial Decision Maker may, but shall not be obligated to, consult with or seek information from either party or from persons with special knowledge or expertise who may assist the Initial Decision Maker in rendering a decision. The Initial Decision Maker may request the Owner to authorize retention of such persons at the Owner's expense.

§ 15.2.4 If the Initial Decision Maker requests a party to provide a response to a Claim by the Contractor or to furnish additional supporting data, such party shall respond, within 10 days after receipt of such request, and shall either (1) provide a response on the requested supporting data, (2) advise the Initial Decision Maker when the response or supporting data will be furnished or (3) advise the Initial Decision Maker that no supporting data will be furnished. Upon receipt of the response or supporting data, if any, the Initial Decision Maker will either reject or approve the Claim by the Contractor in whole or in part.

§ 15.2.5 The Initial Decision Maker will render an initial decision approving or rejecting the Claim by the Contractor, or indicating that the Initial Decision Maker is unable to resolve the Claim. This initial decision shall (1) be in writing; (2) state the reasons therefor; and (3) notify the parties and the Architect and Construction Manager, if the Architect or Construction Manager is not serving as the Initial Decision Maker, of any change in the Contract Sum or Contract Time or both. The initial decision shall be final and binding on the parties but subject to binding dispute resolution.

§ 15.2.6 Intentionally omitted.

§ 15.2.6.1 Intentionally omitted.

§ 15.2.7 Intentionally omitted.

§ 15.2.8 If a Claim by the Contractor relates to or is the subject of a mechanic's lien, the party asserting such Claim may proceed in accordance with applicable law to comply with the lien notice or filing deadlines.

ARTICLE 16 SPECIAL CONDITIONS

§ 16.1 Equal Opportunity

§ 16.1.1 The Contractor shall maintain policies for equal employment opportunity for construction employment. During performance of the Agreement, the Contractor agrees as follows:

§ 16.1.2 The Contractor and its Subcontractors shall not discriminate against any employee or applicant for employment because of race, religion, color, sex (including trans-gender), sexual orientation, or national origin. The Contractor shall take affirmative action to ensure that all applicants are employed, and that employees are treated during employment without regard to their race, religion, color, sex, (including trans-gender), sexual orientation, 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 and on-the-job training.

§ 16.1.3 The Contractor will post and keep posted in conspicuous places, for employees and applicants for employment, notices obtained by the Contractor from the New York State Division of Human Rights as set forth in the General Regulations of that Division at 9 NYCRR 466.1(a), such conspicuous places to be as defined in 9 NYCRR 466.1(b), and such other postings as that Division may require with respect to New York State's laws, codes, rules, and regulations governing discrimination in employment.

§ 16.1.4 The Contractor will state in all solicitations or advertisements for employees placed by, or on behalf, of the Contractor, that all qualified applicants will be afforded equal employment opportunities without discrimination because of race, creed, color ,sex, (including trans-gender), sexual orientation, or national origin.

§ 16.1.5 The Contractor will comply with provisions of Sections 290-299 of the Executive Law and with the Civil Rights Law, will furnish all information and reports deemed necessary by the State Commissioner of Human Rights under these non-discrimination clauses and such sections of the Executive Law, and will permit access to the Contractor's books, records and accounts by the Owner, the State Commissioner of Human Rights, the Attorney General and the Industrial Commissioner for the purposes of investigation to ascertain compliance with these nondiscrimination clauses and such sections of the Executive Law and Civil Rights Law.

§ 16.1.6 The Contractor will send to each labor union, or representatives of workers, with which it has, or is bound by a collective bargaining or other Agreement or understanding notices obtained from the State Commissioner of Human Rights, advising such Labor Union or representative of the Contractor's Agreement under requirements of this Article. If the Contractor was directed to do so by Owner as part of the Bid, the Contractor shall request such labor union or representative to furnish him with a written statement that such labor union or representative will not discriminate because of race, creed, color, sex, (including trans-gender), sexual orientation, or national origin and that such labor union or representative either will affirmatively cooperate within the limits of its legal and contractual authority in the implementation of the policy and provisions of these non-discrimination clauses or that it consents and agrees that recruitment accordance with the purposes and provisions of these non-discrimination clauses. If such labor union or representative fails or refuses to comply with such a request that it furnish such a statement, the Contractor shall promptly notify the Owner and State Commissioner of Human Rights of such failure or refusal.

§ 16.1.7 The Agreement may be forthwith canceled, terminated or suspended in whole, or in part, by Owner upon the basis of a finding made by the State Division of Human Rights, that the Contractor has not complied with these non-discrimination clauses, and the Contractor may be declared ineligible for future Contracts made by, or in behalf of, the State, or Authority or Agency of the State, or Housing Authority or an Urban Renewal Agency, or Contracts requiring the approval of the Commissioner of Housing and Community Renewal, until it has satisfied the State Division of Human Rights, that it has established and is carrying out a program in conformity with the provisions of these non-discrimination clauses. Such findings shall be made by the State Division of Human Rights after conciliation efforts by the Division have failed to achieve compliance with these non-discrimination clauses and after a verified complaint has been filed with the Division, notice thereof has been given to the Contractor, and an opportunity has been afforded by the Contractor to be heard publicly in accordance with the Executive Law. Such sanctions may be imposed and remedies invoked immediately of, or in addition to sanction in remedies otherwise provided by law. If the Agreement is canceled or terminated under provisions of this Article, in addition to other rights of Owner provided in the Agreement upon its breach by the Contractor, the Contractor will hold Owner harmless against any additional expenses or costs incurred by Owner in completing the work or in purchasing the services, materials, equipment or supplies contemplated by Agreement and Owner may withhold payments from the Contractor in an amount sufficient for this purpose and recourse may be had against authority on the Performance Bond if necessary.

§ 16.1.8 The Contractor will include the provisions of this Article in every subcontract or purchase order in such a manner that such provisions will be binding upon each subcontractor or vendor as to operations to be performed within the State of New York. The Contractor will take such action in enforcing such provisions of such subcontractor or purchase order as the State Division of Human Rights or the Owner may direct, including sanctions or remedies for non-compliance. If the Contractor becomes involved in or is threatened with litigation with a subcontractor or a vendor, as a result of such direction by the State Division of Human Rights, the Contractor shall promptly so notify the Owner and the Attorney General, requesting the Attorney General to intervene and protect the interests of the State of New York.

§ 16.2 Waiver of Immunity

§ 16.2.1 The Contractor hereby agrees to the provisions of Paragraph 139-a and l39-b of the New York State Finance Law and Section 103-a of the New York General Municipal Law, which require that upon the refusal of a person, when called before a grand jury, head of a State department, temporary State commission or other State agency, or the organized crime task force in the Department of Law, which is empowered to compel the attendance of witnesses and examine them under oath, to testify in an investigation concerning any transaction or contract had with the State, any political subdivision thereof, a public authority or with any public department, agency or official of the State or of any

political subdivision thereof or of a public authority, to sign a waiver of immunity against subsequent criminal prosecution or to answer any relevant question concerning such transaction or contract.

§ 16.2.1.1 Such person, and any firm, partnership or corporation of which he is a member, partner, director or officer shall be disqualified from thereafter selling to or submitting bids to or receiving awards from or entering into any contracts with New York State or any public department, agency or official thereof for goods, work or services, for a period of five years after such refusal.

(Paragraph deleted)
§ 16.2.1.2 Any and all contracts made with the State of New York, or any public department, agency or official thereof since the effective date of this law, by such person, and by an firm, partnership or corporation of which he is a member, partner, director or officer may be canceled or terminated by the State of New York without incurring any penalty or damages on account of such cancellation or termination, but any moneys owning by the State of New York for goods delivered or work done prior to the cancellation or termination shall be paid.

§ 16.3 Non-Collusive Clause as Required by NYS General Municipal Law Section 103-d
(Paragraph deleted)
§ 16.3.1 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.

(Paragraph deleted)
§ 16.3.2 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, the following:

(Paragraph deleted)
§ 16.3.2.1 The prices in this bid have been arrived at independently without collusion, consultation, communication, or agreement, for the purpose of restricting competitions, as to any matter relating to such prices with any other bidder or with any competitor.

§ 16.3.2.2 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.

(Paragraph deleted)
§ 16.3.2.3 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.

§ 16.3.3 A bid shall not be considered for award nor shall any award be made where requirements of this Article have not been complied with; provided however, that in any case the bidder cannot make the foregoing certification, the bidder shall so state and shall furnish with the bid a signed statement which set forth in detail the reasons therefore. Where requirements of this Article have not been complied with, the bid shall not be considered for award nor shall any award by made unless the head of the purchasing agent 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.

(Paragraph deleted)
§ 16.3.4 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 list for such items, or (c) has sold the same items to other customers at the same prices being bids, does not constitute a disclosure within the meaning of this Article.

§ 16.3.5 Any bid hereafter made to any political subdivision of the state or any public department, agency official

thereof by a corporate bidder for work or services performed or to be performed or good sold or to be sold, where competitive bidding is required by statute, rule, regulation, or local law, and where such bid contains the certification referred to in subdivision one of this section, shall be deemed to have been authorized 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 the corporation.

(Paragraph deleted)

§ 16.4 Assignment of Public Contracts

As provided in Section 109 of the General Municipal Law, the Contractor is prohibited from assigning, transferring, conveying, subletting or otherwise disposing of the same, or of his right title, or interest therein, or his power to execute such contract or any other person or corporation without the previous consent in writing of the officer, board or agency awarding the contract. If any contractor, to whom any contract is let, granted and awarded, as required by law, by any officer, board or agency in a political subdivision, or of any district therein, shall without the previous written consent specified in subdivision one of this section, assign, transfer, convey, sublet or otherwise dispose of such contract, or his right, title or interest therein, or his power to execute such contract, to any other person or corporation, the officer, board or agency which let, made, granted, or awarded such contract shall revoke and annul such contract, and the political subdivision or district therein, as the case may be, and such officer, board or agency shall be relieved and discharged form any and all liability and obligations growing out of such contract to such contractor, and to the person or corporation to which such contract shall have been assigned, transferred, conveyed, sublet or otherwise disposed of, and such contractor, and his assignees, transferees or sublessees shall forfeit and lose all moneys, theretofore earned under such contract, except so much as may be required to pay his employees. The provisions of this section shall not hinder, prevent, or affect an assignment by any such contractor for the benefit of his creditors made pursuant to the laws of this state.

§ 16.5 Fingerprinting

Pursuant to the Safe Schools Against Violence in Education Act ("SAVE" legislation) and Part 87 of the Regulations of the Commissioner of Education, any individual who, as a result of their work on this capital project, will move (or migrate) in and out of student occupied areas for more than five (5) days a year, must be fingerprinted. The Contractor shall be responsible to ensure that it (and its employees) are in full compliance with the fingerprinting provisions New York's SAVE Legislation and Part 87 of the Regulations of the Commissioner of Education at the Contractor's sole cost and expense.

(Paragraph deleted)

ARTICLE 17 NEW YORK STATE LABOR LAW REQUIREMENTS

§ 17.1 Working Hours

(Paragraph deleted)

§ 17.1.1 The Contractor specifically agrees as required by the New York State Labor Law ("Labor Law"), Sections 220 and 220-d, as amended, that:

.1 No laborer, worker, 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 included in the Contract Documents shall be permitted or required to work more than eight hours in any one calendar day or more than five (5) days in any one week, except to the extent permitted in the case of extraordinary emergencies described in the Labor Law.

.2 The wages to be paid to each laborer, worker, or mechanic in the employ of the Contractor, Subcontractor, or other person doing or contracting to do all or any part of the work included in the Contract Documents for a legal day's work shall be not less than the prevailing rate of wages as defined by the Labor Law.

.3 Each laborer, workman or mechanic employed by the Contractor, a Subcontractor, or other person doing or contracting to do all or any part of the work included in the Contract Documents shall be provided the supplements required by Article 8 of the Labor Law.

.4 The minimum hourly rate of wage to be paid shall be not less than that stated in the General Conditions, and shall be as designated by the industrial Commissioner.

.5 The Contractor's and any Subcontractor's or other person's filing of payrolls in a manner prescribed by subdivision 3-a of Section 220 of the Labor Law shall be a condition precedent to the to the Owner's payment of any sums due and owing to the Contractor, Subcontractor or other party for work done on or with respect to the Project.

§ 17.2 Wage Rates

(Paragraph deleted)

§ 17.2.1 The Contractor specifically agrees, as required by the Labor Law, that the Contract may be forfeited and no sum paid for any work done thereunder on a second conviction for willfully paying less than:

.1 the prevailing wage rates as provided in Labor Law Section 220(3) as amended, or,

.2 the minimum wage rates as provided in Labor Law Section 220-d, as amended.

§ 17.2.2 The Contractor 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. Current wage rates for this project are included in the Project Manual as part of the Contract Documents. The Contractor is responsible to regularly review "Prevailing Wage Schedules/Updates" available on the "Prevailing Wage/Public Work" link on State of New York Department of Labor "Business in New York" web page (www.labor.state.ny.gov) to identify and implement any applicable changes to Prevailing Wage Rates during the Project.

(Paragraph deleted)

§ 17.2.3 The Contractor shall comply with all the requirements of the Labor Law Section 220-a, as amended, regarding mandatory submission of certified payroll records, which shall be included with each application for payment.

(Paragraphs deleted)

§ 17.3 Anti-Discrimination

§ 17.3.1 The Contractor specifically agrees, as required by the provisions of Section 220-e of the Labor Law, as amended, that:

.1 In the hiring of employees for the performance of work under the Contract or any subcontract hereunder, no contractor, subcontractor, nor any person acting on behalf of such contractor or subcontractor, shall be reason of race, creed, color, sex (including transgender), sexual orientation, 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, subcontractor, nor any person on its behalf, shall in any manner, discriminate or intimidate any employee hired for the performance of work under the contact on account of race, creed, color, sexual orientation, or national origin.

.3 There may be deducted from the amount payable to the Contractor by the Owner under the contract a penalty at 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; and

.4 The Contract may be canceled or terminated by the Owner, and all monies due or to become due thereunder may be forfeited for a second or any subsequent violation of the terms or conditions of this section of the Contract.

ARTICLE 18 GENERAL MUNICIPAL LAW REQUIREMENTS OF THE STATE OF NEW YORK

§ 18.1 Payment of Contractors and Subcontractors

§ 18.1.1 The Contractor specifically agrees it is bound by Section 106-b of the New York General Municipal Law.

ARTICLE 19 SPECIFIC CONFORMANCE TO THE LAWS OF THE STATE OF NEW YORK

§ 19.1 Statutory Requirements

§ 19.1.1 The parties agree that each is bound to the provisions of the laws of the State of New York governing bidding and contracting for public improvement projects, including but not limited to applicable provisions of the General Obligations Law, Labor Law, and General Municipal Law. To the extent any provisions in the Contract Documents conflict with any provisions of New York Law, the statutory provisions shall prevail and the conflicting provisions in the Contract Documents shall be deemed to conform to the statutory provisions.

§ 19.1.2 To the extent the laws of the State of New York governing bidding and contracting for public improvement projects mandate inclusion of specific terms in contracts for such improvements, but which are not already included in these General Conditions, such terms shall be deemed and hereby are incorporated into these General Conditions.

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AIA® Document G732™ – 2019

Application and Certificate for Payment, Construction Manager as Adviser Edition

TO OWNER:

PROJECT:

APPLICATION NO:

DISTRIBUTION TO:
OWNER ☐
CONSTRUCTION MANAGER ☐
ARCHITECT ☐
CONTRACTOR ☐
FIELD ☐
OTHER ☐

PERIOD TO:

FROM CONTRACTOR:

VIA CONSTRUCTION MANAGER:

CONTRACT DATE:

PROJECT NOS: / /

CONTRACT FOR:

VIA ARCHITECT:

CONTRACTOR'S APPLICATION FOR PAYMENT

Application is made for payment, as shown below, in connection with the Contract.
AIA Document G703™, Continuation Sheet, is attached.

1. ORIGINAL CONTRACT SUM ..... $

2. NET CHANGES IN THE WORK ..... $

3. CONTRACT SUM TO DATE *(Line 1 ± 2)* ..... $

4. TOTAL COMPLETED AND STORED TO DATE *(Column G on G703)* ..... $

5. RETAINAGE:

a. _____ % of Completed Work
(Column D + E on G703) $

b. _____ % of Stored Material
(Column F on G703) $

Total Retainage *(Lines 5a + 5b, or Total in Column I on G703)* ..... $

6. TOTAL EARNED LESS RETAINAGE ..... $
(Line 4 minus Line 5 Total)

7. LESS PREVIOUS CERTIFICATES FOR PAYMENT .....
(Line 6 from prior Certificate)

8. CURRENT PAYMENT DUE ..... $

9. BALANCE TO FINISH, INCLUDING RETAINAGE
(Line 3 minus Line 6) $

SUMMARY OF CHANGES IN THE WORK	ADDITIONS	DEDUCTIONS
Total changes approved in previous months by Owner	$	$
Total approved this month, including Construction Change Directives	$	$
TOTALS	$	$
NET CHANGES IN THE WORK	$	

The undersigned Contractor certifies that to the best of the Contractor's knowledge, information and belief the Work covered by this Application for Payment has been completed in accordance with the Contract Documents, that all amounts have been paid by the Contractor for Work for which previous Certificates for Payment were issued and payments received from the Owner, and that current payment shown herein is now due.

CONTRACTOR:

By: _____ Date: _____

State of:
County of:
Subscribed and sworn to before me this day of
Notary Public:
My Commission expires: _____

CERTIFICATE FOR PAYMENT

In accordance with the Contract Documents, based on evaluations of the Work and the data comprising this application, the Construction Manager and Architect certify to the Owner that to the best of their knowledge, information and belief the Work has progressed as indicated, the quality of the Work is in accordance with the Contract Documents, and the Contractor is entitled to payment of the AMOUNT CERTIFIED.

AMOUNT CERTIFIED ..... $

(Attach explanation if amount certified differs from the amount applied. Initial all figures on this Application and on the Continuation Sheet that are changed to conform with the amount certified.)

CONSTRUCTION MANAGER:

By: _____ Date: _____

ARCHITECT: *(NOTE: If multiple contractors are responsible for performating portions of the Project, the Architect's Certification is not required.)*

By: _____ Date: _____

This Certificate is not negotiable. The AMOUNT CERTIFIED is payable only to the Contractor named herein. Issuance, payment and acceptance of payment are without prejudice to any rights of the Owner or Contractor under this Contract.

DRAFT AIA® Document G703® – 1992

Continuation Sheet

AIA Document G702®, Application and Certification for Payment, or G732™, Application and Certificate for Payment, Construction Manager as Adviser Edition, containing Contractor's signed certification is attached.
Use Column I on Contracts where variable retainage for line items may apply.

APPLICATION NO:	001
APPLICATION DATE:	
PERIOD TO:	
ARCHITECT'S PROJECT NO:	

A	B	C	D	E	F	G		H	I
			WORK COMPLETED						
ITEM NO.	DESCRIPTION OF WORK	SCHEDULED VALUE	FROM PREVIOUS APPLICATION (D + E)	THIS PERIOD	MATERIALS PRESENTLY STORED (NOT IN D OR E)	TOTAL COMPLETED AND STORED TO DATE (D + E + F)	% (G ÷ C)	BALANCE TO FINISH (C - G)	RETAINAGE (IF VARIABLE RATE)
		0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
	GRAND TOTAL	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**0.00%**	**$0.00**	**$0.00**

Insurance Certification

Bid or Project No. #_____Name of Project:_____

Your insurance representative must complete the form below in order to be considered for the award of this bid or project, and it is important that you complete the Bidder's Acknowledgement section of this form. Please note that a certificate of insurance must accompany your bid submission in order for your bid to be considered.

Insurance Representative's Acknowledgement:

We have reviewed the insurance requirements set forth in the bid and are capable of providing such insurance to our insured in accordance with such requirements in the event the contract is awarded to our insured and provided our insured pays the appropriate premium.

Insurance Representative:

_____

Address:

_____

Are you an agent for the companies providing the coverage?

Yes_____No _____

Date:_____

Insurance Representative Signature:_____

Bidder's Acknowledgement:

I acknowledge that I have received the insurance requirements of this bid and have considered the costs, if any, of procuring the required insurance and will be able to supply the insurance required in accordance with the bid, if it is awarded. I understand that a certificate of insurance must be submitted with my bid: and if it is not, the Nanuet Union Free School District may reject my bid and award to the next lowest bidder.

Firm name:_____

Address:

_____

____

Date:_____ _____

Bidders Signature

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AIA® Document G716™ – 2004

Request for Information ("RFI")

TO:
Ofe Clarke:
oclarke@ksq.design
KSQ Design

FROM:

PROJECT:
Nanuet UFSD
Nanuet Bond Projects Phase 2

ISSUE DATE:

RFI No.

REQUESTED REPLY DATE:

PROJECT NUMBERS: 2111005.00 /

COPIES TO:

RFI DESCRIPTION: *(Fully describe the question or type of information requested.)*

REFERENCES/ATTACHMENTS: *(List specific documents researched when seeking the information requested.)*
SPECIFICATIONS: **DRAWINGS:** **OTHER:**

SENDER'S RECOMMENDATION: *(If RFI concerns a site or construction condition, the sender may provide a recommended solution, including cost and/or schedule considerations.)*

RECEIVER'S REPLY: *(Provide answer to RFI, including cost and/or schedule considerations.)*

BY **DATE** **COPIES TO**

Note: This reply is not an authorization to proceed with work involving additional cost, time or both. If any reply requires a change to the Contract Documents, a Change Order, Construction Change Directive or a Minor Change in the work must be executed in accordance with the Contract Documents.

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Labor Rate Sheet

PROJECT Nanuet Union Free School District – Phase 2 Projects	**DATE** **CONTRACT NO.**
KSQ PROJ. # 2111005.00	**CONTRACTOR**

LABOR RATES

DIRECTIONS
All contractors are requested to submit a schedule of labor rates to be used for the duration of this project. Please provide a separate rate for each trade classification for the work of this contract. These rates will be used to determine labor charges on any additional work of this contract. (Submit a separate sheet for each wage period).

WAGE PERIOD

LABOR CLASSIFICATION

	Straight Time	Over Time	Double Time
Base Rate	$		
'Benefits	$		
Subtotal	$		
All Payroll Taxes _____ % of Base Rate	$		
Total Straight Time (Rate/Hour)	$		

LABOR RATE WORKSHEET

Contractor Name: _____ Date: _____
Address: _____ DASNY Project No.: _____
_____ Project Name: _____
Telephone Number: _____ County: _____

LABOR RATE BREAKDOWN (Use a separate worksheet for each trade and classification) Trade/Classification: _____

Check One Box Only: Union Shop: ☐ Local: _____
Open Shop: ☐

Effective Dates for Wage Rates: From: _____ To: _____

				REGULAR BASE RATE	PREMIUM TIME (only when directed)
A. BASE RATE PER HOUR					
BENEFITS (check all taxable benefits that apply)	Taxable Benefits	% per hour	$ per hour		
Vacation and Holiday	No		$0.00		
Health and Welfare	No		$0.00		
Pension	No		$0.00		
Annuity	No		$0.00		
Education / Apprentice Training	No		$0.00		
Supplemental Unemployment	No		$0.00		
Security Fund	No		$0.00		
	No		$0.00		
	No		$0.00		
	No		$0.00		
(Identify Taxable Benefits)	No		$0.00		
B. TOTAL BENEFITS PER HOUR			$0.00	**$0.00**	**$0.00**
PAYROLL TAXES AND INSURANCE					
FICA					
Medicare					
Federal Unemployment					
State Unemployment					
Disability					
Workers' Compensation Code:					
Liability					
C. TOTAL TAXES AND INSURANCE PER HOUR					
○ All benefits are paid directly to Employee.					
◉ Only benefits identified above are Taxable.		**$0.00** X	**0.0000** % =	**$0.00**	**$0.00**
D. TOTAL LABOR RATE			(A + B + C) =	**$0.00**	**$0.00**

E. CONTRACTOR'S CERTIFICATION

I certify that the labor rates, insurance enumerations, labor fringe enumerations and expenses are correct and in accordance with actual and true cost incurred.

_____
Signature of Authorized Representative

_____
Print Name

_____
Print Title

Sworn before me this _____ day

of _____ , 20 _____.

_____
Notary Public

Labor Rate Worksheet (04/04)

AIA® Document A312™ – 2010

Performance Bond

CONTRACTOR:
(Name, legal status and address)

SURETY:
(Name, legal status and principal place of business)

OWNER:
(Name, legal status and address)
Nanuet Union Free School District
101 Church Street
Nanuet, NY 10954

CONSTRUCTION CONTRACT
Date:
Amount: $
Description:
(Name and location)
Contractor to input below information
Project Name: NANUET BOND PROJECTS PHASE 2
Nanuet HS School: 50-01-08-03-0-003-034
Barr Middle School: 50-01-08-03-0-004-019
G.W. Miller Elementary School: 50-01-08-03-0-001-023
Highview Elementary School: 50-01-08-03-0-002-019

Project Address:
Various

BOND
Date:
(Not earlier than Construction Contract Date)

Amount: $
Modifications to this Bond: [X] None [ ] See Section 16

CONTRACTOR AS PRINCIPAL		**SURETY**	
Company:	*(Corporate Seal)*	Company:	*(Corporate Seal)*
Signature:		Signature:	
Name and Title:		Name and Title:	

(Any additional signatures appear on the last page of this Performance Bond.)

(FOR INFORMATION ONLY — Name, address and telephone)
AGENT or **BROKER:** **OWNER'S REPRESENTATIVE:**

ADDITIONS AND DELETIONS:
The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

Init.
/

(Architect, Engineer or other party:)

§ 1 The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner for the performance of the Construction Contract, which is incorporated herein by reference.

§ 2 If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except when applicable to participate in a conference as provided in Section 3.

§ 3 If there is no Owner Default under the Construction Contract, the Surety's obligation under this Bond shall arise after

.1 the Owner first provides notice to the Contractor and the Surety that the Owner is considering declaring a Contractor Default. Such notice shall indicate whether the Owner is requesting a conference among the Owner, Contractor and Surety to discuss the Contractor's performance. If the Owner does not request a conference, the Surety may, within five (5) business days after receipt of the Owner's notice, request such a conference. If the Surety timely requests a conference, the Owner shall attend. Unless the Owner agrees otherwise, any conference requested under this Section 3.1 shall be held within ten (10) business days of the Surety's receipt of the Owner's notice. If the Owner, the Contractor and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement shall not waive the Owner's right, if any, subsequently to declare a Contractor Default;

.2 the Owner declares a Contractor Default, terminates the Construction Contract and notifies the Surety; and

.3 the Owner has agreed to pay the Balance of the Contract Price in accordance with the terms of the Construction Contract to the Surety or to a contractor selected to perform the Construction Contract.

§ 4 Failure on the part of the Owner to comply with the notice requirement in Section 3.1 shall not constitute a failure to comply with a condition precedent to the Surety's obligations, or release the Surety from its obligations, except to the extent the Surety demonstrates actual prejudice.

§ 5 When the Owner has satisfied the conditions of Section 3, the Surety shall promptly and at the Surety's expense take one of the following actions:

§ 5.1 Arrange for the Contractor, with the consent of the Owner, to perform and complete the Construction Contract;

§ 5.2 Undertake to perform and complete the Construction Contract itself, through its agents or independent contractors;

§ 5.3 Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and a contractor selected with the Owner's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Section 7 in excess of the Balance of the Contract Price incurred by the Owner as a result of the Contractor Default; or

§ 5.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor and with reasonable promptness under the circumstances:

.1 After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, make payment to the Owner; or

.2 Deny liability in whole or in part and notify the Owner, citing the reasons for denial.

§ 6 If the Surety does not proceed as provided in Section 5 with reasonable promptness, the Surety shall be deemed to be in default on this Bond seven days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Section 5.4, and the Owner refuses the payment

or the Surety has denied liability, in whole or in part, without further notice the Owner shall be entitled to enforce any remedy available to the Owner.

§ 7 If the Surety elects to act under Section 5.1, 5.2 or 5.3, then the responsibilities of the Surety to the Owner shall not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety shall not be greater than those of the Owner under the Construction Contract. Subject to the commitment by the Owner to pay the Balance of the Contract Price, the Surety is obligated, without duplication, for

.1 the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;

.2 additional legal, design professional and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Section 5; and

.3 liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.

§ 8 If the Surety elects to act under Section 5.1, 5.3 or 5.4, the Surety's liability is limited to the amount of this Bond.

§ 9 The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators, successors and assigns.

§ 10 The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.

§ 11 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 two years after a declaration of Contractor Default or within two years after the Contractor ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

§ 12 Notice to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears.

§ 13 When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

§ 14 Definitions

§ 14.1 Balance of the Contract Price. The total amount payable by the Owner to the Contractor under the Construction Contract after all proper adjustments have been made, including allowance to the Contractor of any amounts received or to be received by the Owner in settlement of insurance or other claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Construction Contract.

§ 14.2 Construction Contract. The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and changes made to the agreement and the Contract Documents.

§ 14.3 Contractor Default. Failure of the Contractor, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Construction Contract.

§ 14.4 Owner Default. Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

§ 14.5 Contract Documents. All the documents that comprise the agreement between the Owner and Contractor.

§ 15 If this Bond is issued for an agreement between a Contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

§ 16 Modifications to this bond are as follows:

(Space is provided below for additional signatures of added parties, other than those appearing on the cover page.)

CONTRACTOR AS PRINCIPAL		**SURETY**	
Company:	*(Corporate Seal)*	Company:	*(Corporate Seal)*
Signature:		Signature:	
Name and Title:		Name and Title:	
Address:		Address:	

Payment Bond

CONTRACTOR *(Name and Address)*:

SURETY *(Name and Principal Place of Business)*:

OWNER *(Name and Address)*:

CONSTRUCTION CONTRACT
Date:
Amount:
Description *(Name and Location)*:

BOND
Date *(Not earlier than Construction Contract Date)*:
Amount:
Modifications to this Bond: [X] None [ ] See Last Page

CONTRACTOR AS PRINCIPAL		**SURETY**	
Company:	*(Corporate Seal)*	Company:	*(Corporate Seal)*
Signature:		Signature:	
Name and Title:		Name and Title:	

(Any additional signatures appear on the last page)

(FOR INFORMATION ONLY - Name, Address and Telephone)

AGENT or **BROKER**:

OWNER'S REPRESENTATIVE *(Architect, Engineer or other party)*:

§ 1 The Contractor and the Surety, jointly and severally bind themselves, their heirs, executors, administrators, successors and assigns to the Owner to pay for labor, materials and equipment furnished for use in the performance of the Construction Contract, which is incorporated herein by reference.

§ 2 With respect to the Owner, this obligation shall be null and void if the Contractor:
§ 2.1 Promptly makes payment, directly or indirectly, for all sums due Claimants, and

§ 2.2 Defends, indemnifies and holds harmless the Owner from claims, demands, liens or suits by any person or entity whose claim, demand, lien or suit is for the payment for labor, materials or equipment furnished for use in the performance of the Construction Contract, provided the Owner has promptly notified the Contractor and the Surety (at the address described in Section 12) of any claims, demands, liens or suits and tendered defense of such claims, demands, liens or suits to the Contractor and the Surety, and provided there is no Owner Default.

§ 3 With respect to Claimants, this obligation shall be null and void if the Contractor promptly makes payment, directly or indirectly, for all sums due.

§ 4 The Surety shall have no obligation to Claimants under this Bond until:
§ 4.1 Claimants who are employed by or have a direct contract with the Contractor have given notice to the Surety (at the address described in Section 12) and sent a copy, or notice thereof, to the Owner, stating that a claim is being made under this Bond and, with substantial accuracy, the amount of the claim.

§ 4.2 Claimants who do not have a direct contract with the Contractor:

.1 Have furnished written notice to the Contractor and sent a copy, or notice thereof, to the Owner, within 90 days after having last performed labor or last furnished materials or equipment included in the claim stating, with substantial accuracy, the amount of the claim and the name of the party to whom the materials were furnished or supplied or for whom the labor was done or performed; and

.2 Have either received a rejection in whole or in part from the Contractor, or not received within 30 days of furnishing the above notice any communication from the Contractor by which the Contractor has indicated the claim will be paid directly or indirectly; and

.3 Not having been paid within the above 30 days, have sent a written notice to the Surety (at the address described in Section 12) and sent a copy, or notice thereof, to the Owner, stating that a claim is being made under this Bond and enclosing a copy of the previous written notice furnished to the Contractor.

§ 5 If a notice required by Section 4 is given by the Owner to the Contractor or to the Surety, that is sufficient compliance.

§ 6 When the Claimant has satisfied the conditions of Section 4, the Surety shall promptly and at the Surety's expense take the following actions:
§ 6.1 Send an answer to the Claimant, with a copy to the Owner, within 45 days after receipt of the claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed.

§ 6.2 Pay or arrange for payment of any undisputed amounts.

§ 7 The Surety's total obligation shall not exceed the amount of this Bond, and the amount of this Bond shall be credited for any payments made in good faith by the Surety.

§ 8 Amounts owed by the Owner to the Contractor under the Construction Contract shall be used for the performance of the Construction Contract and to satisfy claims, if any, under any Construction Performance Bond. By the Contractor furnishing and the Owner accepting this Bond, they agree that all funds earned by the Contractor in the performance of the Construction Contract are dedicated to satisfy obligations of the Contractor and the Surety under this Bond, subject to the Owner's priority to use the funds for the completion of the work.

§ 9 The Surety shall not be liable to the Owner, Claimants or others for obligations of the Contractor that are unrelated to the Construction Contract. The Owner shall not be liable for payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligations to make payments to, give notices on behalf of, or otherwise have obligations to Claimants under this Bond.

§ 10 The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.

§ 11 No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the location in which the work or part of the work is located or after the expiration of one year from the date (1) on which the Claimant gave the notice required by Section 4.1 or Section 4.2.3, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

§ 12 Notice to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the signature page. Actual receipt of notice by Surety, the Owner or the Contractor, however accomplished, shall be sufficient compliance as of the date received at the address shown on the signature page.

§ 13 When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. The intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

§ 14 Upon request by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor shall promptly furnish a copy of this Bond or shall permit a copy to be made.

§ 15 DEFINITIONS

§ 15.1 Claimant: An individual or entity having a direct contract with the Contractor or with a subcontractor of the Contractor to furnish labor, materials or equipment for use in the performance of the Contract. The intent of this Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental equipment used in the Construction Contract, architectural and engineering services required for performance of the work of the Contractor and the Contractor's subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials or equipment were furnished.

§ 15.2 Construction Contract: The agreement between the Owner and the Contractor identified on the signature page, including all Contract Documents and changes thereto.

§ 15.3 Owner Default: Failure of the Owner, which has neither been remedied nor waived, to pay the Contractor as required by the Construction Contract or to perform and complete or comply with the other terms thereof.

§ 16 MODIFICATIONS TO THIS BOND ARE AS FOLLOWS:

(Space is provided below for additional signatures of added parties, other than those appearing on the cover page.)

CONTRACTOR AS PRINCIPAL		**SURETY**	
Company:	*(Corporate Seal)*	Company:	*(Corporate Seal)*
Signature:		Signature:	
Name and Title:		Name and Title:	
Address:		Address:	

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SECTION 00 90 00 - NY SED REGULATIONS 155.5

PART 1 - GENERAL

1.1 NYSSED 155.5 REGULATIONS - Uniform Safety Standards for School Construction and Maintenance Projects

A. These regulations are the responsibility of each contractor and his/her subcontractor(s)

PART 2 - Section 155.5 Uniform Safety Standards for School Construction and Maintenance Projects

PART 3 - (a) Monitoring of construction and maintenance activities.

PART 4 - The occupied portion of any school building shall always comply with the minimum requirements necessary to maintain a certificate of occupancy and shall be monitored during construction or maintenance activities for safety violations by school district personnel. It is the responsibility of the board of education or board of cooperative educational services to assure that these standards are continuously maintained when the building or any portion thereof is occupied.

PART 5 - (b) Investigation and disposition of complaints relating to health and safety received as a result of construction and maintenance activities.

PART 6 - Boards of education and boards of cooperative educational services shall follow procedures established under section 155.4(d)(7) of this Part.(c) Pre-construction testing and planning for construction projects.

PART 7 - (1) Boards of education and boards of cooperative educational services shall assure that proper planning is made for safety of building occupants during construction. For all construction projects for which bids are issued on or after September 30, 1999, such boards shall assure that safety is addressed in the bid specifications and contract documents before contract documents are advertised for bid. All school areas to be disturbed during renovation or demolition shall be tested for lead and asbestos. Appropriate procedures to protect the health of building occupants shall be included in the final construction documents for bidding.

PART 8 - (2) Boards of education and boards of cooperative educational services shall establish procedures for involvement of the health and safety committee to monitor safety during school construction projects. The health and safety committees in school districts other than in cities with one million inhabitants or more shall be expanded during construction projects to include the project architect, construction manager, and the contractors. Such committee shall meet periodically to review issues and address complaints related to health and safety resulting from the construction project. In the case of a city school district in a city of one million inhabitants or

more, the board of education shall submit procedures for protecting health and safety during construction to the commissioner for approval. Such procedures shall outline methods for compliance with this section.

PART 9 - (3) The district emergency management plan shall be updated to reflect any changes necessary to accommodate the construction process, including an updated emergency exit plan indicating temporary exits required due to construction. Provisions shall be made for the emergency evacuation and relocation or release of students and staff in the event of a construction incident.

PART 10 - (4) Fire drills shall be held to familiarize students and staff with temporary exits and revised emergency procedures whenever such temporary exits and revised emergency procedures are required.

PART 11 - (d) Pre-construction notification of construction projects.

PART 12 - The board of education or board of cooperative educational services shall establish procedures for notification of parents, staff and the community in advance of a construction project of $10,000 or more to be conducted in a school building while the building is occupied. Such procedures shall provide notice at least two months prior to the date on which construction is scheduled to begin, provided that in the case of emergency construction projects, such notice shall be provided as far in advance of the start of construction as is practicable. Such notice shall include information on the district's obligations under this section to provide a safe school environment during construction projects. Such notice requirement may be met by publication in district newsletters, direct mailings, or holding a public hearing on the project to inform parents, students, school personnel and community members.

PART 13 - (e) General safety and security standards for construction projects.

PART 14 - (1) All construction materials shall be stored in a safe and secure manner.

PART 15 - (2) Fences around construction supplies or debris shall be maintained.

PART 16 - (3) Gates shall always be locked unless a worker is in attendance to prevent unauthorized entry.

PART 17 - (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.

PART 18 - (5) Workers shall be required to wear photo identification badges at all times for identification and security purposes while working at occupied sites.

PART 19 - (f) Separation of construction areas from occupied spaces.

PART 20 - 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.

PART 21 - (1) 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.

PART 22 - (2) 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.

PART 23 - (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.

PART 24 - (g) Maintaining exiting and ventilation during school construction projects.

PART 25 - The following information shall be included in all plans and specifications for school building projects:

PART 26 - (1) A plan detailing how exiting required by the applicable building code will be maintained during construction. The plan shall indicate temporary construction required to isolate construction equipment, materials, people, dust, fumes, odors, and noise during the construction period. Temporary construction details shall meet code-required fire ratings for separation and corridor enclosure. At a minimum, required exits, temporary stairs, ramps, exit signs, and door hardware shall be provided at all times.

PART 27 - A plan detailing how adequate ventilation will 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.

PART 28 - (h) Fire and hazard prevention.

PART 29 - Areas of buildings under construction that are to remain occupied shall maintain a certificate of occupancy. In addition, the following shall be strictly enforced:

PART 30 - (1) No smoking is allowed on public school property, including construction areas.

PART 31 - (2) During construction daily inspections of district occupied areas shall be conducted by school district personnel to assure that construction materials, equipment or debris not block fire exits or emergency egress windows.

PART 32 - (3) Proper operation of fire extinguishers, fire alarm, and smoke/fire detection systems shall be maintained throughout the project.

PART 33 - (i) Noise abatement during construction and maintenance activities.

PART 34 - 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. Noise level measurements (dba) shall be taken with a type 2 sound level meter in the occupied space in a location closest to the source of the noise. Complaints regarding excessive noise shall be addressed through the health and safety committee. The district should anticipate those times when construction noise is unacceptable and incorporate “no work” periods into the bid specifications.

PART 35 - (j) Control of chemical fumes, gases, and other contaminants during construction and maintenance projects.

PART 36 - The bid specifications and construction contracts for each construction project shall indicate how and where welding, gasoline engine, roofing, paving, painting or other fumes will be exhausted. Care must be taken to assure fresh air intakes do not draw in such fumes.

PART 37 - (1) The bid specifications shall require schedules of work on construction and maintenance projects which include time for off-gassing of volatile organic compounds introduced during construction before occupancy is allowed. Specific attention is warranted for activities including glues, paint, furniture, carpeting, wall coverings, and drapery. Manufacturers shall be contacted to obtain information regarding appropriate temperatures and times needed to cure or ventilate the product during use and before safe occupancy of a space can be assured. Building materials or furnishings which off-gas chemical fumes, gases, or other contaminants shall be aired out in a well ventilated heated warehouse before it is brought to the project for installation or the manufacturer's recommended off-gassing periods must be scheduled between installation and use of the space. If the work will generate toxic gases that cannot be contained in an isolated area, the work must be done when school classes and programs are not in session. The building must be properly ventilated and the material must be given proper time to cure or off-gas before re-occupancy.

PART 38 - (2) Manufacturer's material safety data sheets (MSD) shall be maintained at the site for all products used in the project. MSDS must be provided to anyone who requests them. MSDS indicate chemicals used in the product, product toxicity, typical side effects of exposure to the product and safe procedures for use of the product.

PART 39 - (k) Asbestos abatement protocols.

PART 40 - All asbestos abatement projects shall comply with all applicable Federal and State laws including but not limited to the New York State Department of Labor industrial code rule 56 (12 NYCRR 56), and the Federal Asbestos Hazard Emergency Response Act (AHERA), 40 CFR part 763 (Code of Federal Regulations, 1998 Edition, Superintendent of Public Documents, U.S. Government Printing Office, Washington, DC 20402; 1998; available at the Office of Facilities Planning, Education Building Annex, Room 1060, State Education Department, Albany, NY 12234). Large and small asbestos projects as defined by 12 NYCRR 56 shall not be performed while the building is occupied. Minor asbestos projects defined by 12 NYCRR 56 as an asbestos project involving the removal, disturbance, repair, encapsulation, enclosure or handling of 10 square feet or less of asbestos or asbestos material, or 25 linear feet or less of asbestos or asbestos material may be performed in unoccupied areas of an occupied building in accordance with the above referenced regulations.

PART 41 - (l) Lead paint.

PART 42 - Any construction or maintenance operations which will disturb lead based paint will require abatement of those areas pursuant to protocols detailed in the "Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing" (June 1995; U.S. Department of Housing and Urban Development, Washington, D.C. 20410; available at the Office of Facilities Planning, Education Building Annex, Room 1060, State Education Department, Albany, NY 12234). All areas scheduled for construction as well as areas of flaking and peeling paint shall be tested for the presence of lead and abated or encapsulated in accordance with the above noted guidelines.

PART 43 - (m) Radon.

PART 44 - Districts shall take responsibility to be aware of the geological potential for high levels of radon and to test and mitigate as appropriate. This information is available from the New York State Department of Health Radon Measurement Database.

PART 45 - (n) Post construction inspection.

PART 46 - The school district or board of cooperative educational services shall provide the opportunity for a walk-through inspection by the health and safety committee members to confirm that the area is ready to be reopened for use.

END OF SECTION 00 90 00

SECTION 00 90 01 - RESCUE REGULATIONS (EXCERPT OF CONTRACTORS RESPONSIBILITIES)

PART 1 - GENERAL

1.1 NYSSED RESCUE REGULATIONS - Uniform Safety Standards for School Construction and Maintenance Projects

A. These regulations are the responsibility of each contractor and his/her subcontractor(s)

1. The occupied portion of any school building shall always comply with the minimum requirements necessary to maintain a certificate of occupancy."
2. All building areas to be disturbed during this construction project have been tested for lead and asbestos. All pertinent information has been included in this project specification and/or in the drawings
3. General safety and security standards for construction projects.

    a. All construction materials shall be stored in a safe and secure manner.
    b. Fences around construction supplies or debris shall be maintained.
    c. Gates shall always be locked unless a worker is in attendance to prevent unauthorized entry.
    d. 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.
    e. Workers shall be required to wear photo-identification badges at all times for identification and security purposes while working at occupied sites."

4. 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.

    a. 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.
    b. 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.
    c. 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."

5. Each prime contractor shall develop a plan detailing how exiting required by the applicable building code will be maintained throughout the duration of the construction project. Refer to Summary of Work for scheduling and phasing. Provide site logistics plan indicating temporary partitions separating areas of work from the rest of the school

building. Temporary partitions affecting building egress and exiting shall be submitted to the architect for review and approval.

6. Each prime contractor shall develop a plan detailing how adequate ventilation will be maintained throughout the duration of the construction project.

7. 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."

8. The contractor shall be responsible for the control of chemical fumes, gases, and other contaminates 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."

9. 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."

10. 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.

11. 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.

12. All areas scheduled for work have been examined for lead-containing materials. Results of these tests are available by contacting Croton Harmon Union Free School District, Paul Gibbons, Director of School Facilities, Operations & Maintenance, at 914.271-6109. No work of this contract anticipates disturbance to any surrounding materials that may have been identified as “lead-containing”.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 00 90 01

SECTION 01 10 00 - MULTIPLE PRIME CONTRACT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 PROJECT/WORK IDENTIFICATION

A. Building Envelope – BE-01 – Project name is Nanuet Phase 2 Projects in the Nanuet Union Free School District as shown in Contract Documents prepared by KSQ Architects. The site locations for this contract are: Nanuet High School and Barr Middle School.

B. Site Work – SW-01 – Project name is Nanuet Phase 2 Projects in the Nanuet Union Free School District as shown in Contract Documents prepared by KSQ Architects. The site locations for this contract are: Nanuet High School, Barr Middle School, Miller Elementary School, and Highview Elementary School.

C. General – GC-01 - Project name is Nanuet Phase 2 Projects in the Nanuet Union Free School District as shown in Contract Documents prepared by KSQ Architects. The site location for this contract is: Nanuet High School

D. General – GC-02 - Project name is Nanuet Phase 2 Projects in the Nanuet Union Free School District as shown in Contract Documents prepared by KSQ Architects. The site location for this contract is: Barr Middle School

E. General – GC-03 - Project name is Nanuet Phase 2 Projects in the Nanuet Union Free School District as shown in Contract Documents prepared by KSQ Architects. The location for this contract is: Miller Elementary School

F. Electrical – EC-01 - Project name is Nanuet Phase 2 Projects in the Nanuet Union Free School District as shown in Contract Documents prepared by KSQ Architects. The site location for this contract is: Nanuet High School, Barr Middle School, & Miller Elementary School.

G. Mechanical– MC-01 - Project name is Nanuet Phase 2 Projects in the Nanuet Union Free School District as shown in Contract Documents prepared by KSQ Architects. The site location for this contract is: Nanuet High School

H. Mechanical– MC-02 - Project name is Nanuet Phase 2 Projects in the Nanuet Union Free School District as shown in Contract Documents prepared by KSQ Architects. The site location for this contract are: Barr Middle School and Miller Elementary School.

I. Plumbing– PC-01 - Project name is Nanuet Phase 2 Projects in the Nanuet Union Free School District as shown in Contract Documents prepared by KSQ Architects. The site location for this contract are: Nanuet High School, Barr Middle School, & Miller Elementary School

J. Prime Contracts, in the context used in this Section, are separate contracts that represent significant elements of work that are performed concurrently with and in close coordination with work performed on the project under other Prime Contracts and Owner. Each is recognized to be a major part of the project (See Section 01 12 XX).

1.3 CONTRACT DOCUMENTS

A. Contract Documents indicate the work of each Prime Contract and related requirements and conditions that have an impact on the project. Related requirements and conditions that are indicated on the Contract Documents include, but are not necessarily limited to the following:

1. Existing site conditions and restrictions on use of the site.
2. Work performed prior to work under these Prime Contracts.
3. Alterations and coordination with existing work.
4. Other work to be performed concurrently by the Owner.
5. Work to be performed subsequent to work under these Prime Contracts.
6. Alternates.
7. Allowances.

1.4 SUMMARY, PRIME CONTRACT WORK

A. The work of each Prime Contract, as defined in greater detail by other provisions of the Contract Documents, is summarized in Section 01 12 XX.

B. Definition of the extent of Prime Contract Work

1. The extent of the work of each Contract is indicated in the Contract Documents. General names and terminology on the drawings and in the specification, sections controls the determination of which Contract includes a specific element of required work, except where no other more specific definition is contained in the Contract Documents.
2. Local custom and trade-union jurisdictional settlements do not control the scope-of-work in each Contract. When a potential jurisdictional dispute or similar potential work interruption is first identified or threatened, affected parties of the Contracts shall promptly negotiate a reasonable settlement which will avoid or minimize such pending interruption and its delays or losses.

1.5 SCHEDULE

A. Within Ten (10) calendar days of award of its Contract by the Owner, the Prime Contractor shall submit a construction schedule to the Construction Manager for the work to be performed under its Contract with the Owner. The construction schedule shall be in a detailed precedence style critical path (CPM) of Primavera type format satisfactory to the Owner, Construction Manager, which shall also:

1. Provide a graphic representation of all activities and events that will occur during the performance of the work.
2. Identify each phase of construction and occupancy.
3. Set forth dates that are critical in ensuring the timely and orderly completion of the Work in accordance with the requirements of the Contract Documents (hereinafter referred to as Milestone Dates).
4. Conform to the Construction Schedule included in the Drawings for each Prime Contractor's Work.
5. Coordinate with and include other primes milestone dates in relation to their portion of work.

B. The Construction Manager & Architect shall review such schedule and shall advise the Prime Contractor if its schedule is acceptable for incorporation into the Master Schedule of work to be performed by the Prime Contractor engaged by the Owner. If the schedule is unacceptable, the Construction Manager will advise the Prime Contractor that its schedule will be revised in the Master Schedule. The Prime Contractor shall monitor the progress of its work for conformance with the requirements of the Construction Schedule and shall promptly advise the Owner and Construction Manager of any delays or potential delays. In the event any progress

report indicates any delays, each Prime Contractor shall propose an affirmative plan to correct the delay, including overtime and/or additional labor, if necessary. In no event shall any progress report constitute an adjustment in the Contract Time, the Milestone Dates, or the Contract Sum unless any such adjustment is agreed to by the Owner and authorized pursuant to a Change Order.

C. If the Schedule is not submitted by the Prime Contractor in a timely fashion, such Prime Contractor shall accept the Master Schedule prepared by the Construction Manager as the Construction Schedule to be used in carrying out its work and that prime Contractor shall waiver its rights to claim damage or delay associated with the time requirements set forth in the Master Schedule. Such schedule will become the product and ownership of that Prime Contractor and that Prime Contractor will be back-charged all costs pertaining to the service of producing the schedule.

D. The Prime Contractor shall provide revised schedules at appropriate intervals as required by the conditions of the work and Project or as directed by the Construction Manager.

E. The Prime Contractor will perform all work in the existing building in the evening or on weekends, except during summer breaks, or when the school is closed. Contractor shall obtain approval from the Construction Manager prior to performing the work.

1.6 **PROOF OF ORDERS, DELIVERY DATES AND SUPPLY CHAIN TRACKING**

A. Within 2 weeks after the approval of shop drawings, samples, product data, and any other documents requiring approval before purchasing. The contractor shall provide copies of purchase orders for all equipment and materials which are not available in local stock. The contractor shall submit written statements from suppliers confirming the orders and stating promised delivery dates. Failure to provide this critical information will result in owner holding monthly requisition payments until received or liquidated damages for delay.

Due to ongoing supply chain disruptions, the contractors are required to obtain all materials for the project and store them onsite in their individually provided Conex boxes. This includes general material items typically readily available (piping, conduits, wire, metal studs, CMU, drainage structures, light fixtures, etc.) The owner will pay for these stored items delivered to the jobsite in accordance with section 012900.

END OF SECTION 011200

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SECTION 01 11 00 - MILESTONE SCHEDULE

PART 1 - GENERAL

1.1 Milestone

The following milestone schedule serves as a basis for bidding. A Master Schedule will be developed at a general meeting of all successful bidders within 21 days of Letter of Intent to Award the Contracts. This sequence and time frame has been coordinated with the school program, no acceleration or changes will be permitted. Each prime contractor will coordinate activities, forward submittals, deliver materials and provide necessary manpower to meet the milestones listed below.

1.2 Milestone Schedule - Building Envelope Projects: BE-01

Start of Construction:	April 3, 2023
Equipment Submittals & Approvals:	February – March 2023
Substantial Completion All Schools:	August 11, 2023

1.3 Milestone Schedule - Site Work Projects: SW-01

Start of Construction:	April 3, 2023
Equipment Submittals & Approvals:	February – March 2023
Substantial Completion Miller:	June 12, 2023
Substantial Completion Barr:	July 18, 2023
Substantial Completion HS Parking:	September 13, 2023
Substantial Completion HS Vestibule:	August 25, 2023

1.4 Milestone Schedule - High School Projects: GC-01,MC-01, EC-01,PC-01

Start of Construction Security Vestibule:	April 3, 2023
Start of Construction Science Labs:	June 26, 2023
Equipment Submittals & Approvals:	February – April 2023
Substantial Completion Vestibule:	August 14, 2023
Substantial Completion Science Labs:	January 1, 2024

1.4 Milestone Schedule - Barr Middle School Projects: GC-02,MC-02, EC-01,PC-01

Start of Construction:	June 26, 2023
Equipment Submittals & Approvals:	February – April 2023
Substantial Completion Vestibule:	August 31, 2023
Substantial Completion STEM Labs:	September 27, 2023

1.5 Milestone Schedule - Miller Elementary School Projects: GC-03,MC-02, EC-01,PC-01

Start of Construction:	June 23, 2023
Equipment Submittals & Approvals:	February – April 2023
Substantial Completion Toilet Rooms:	August 31, 2023

Substantial Completion Switch Gear: August 7, 2024

Note: Second shift/double shift work could be required to meet substantial completion dates. Second shift/ double shift work is expected to take place as required to meet the milestone schedule if necessary. The contractor will have blackout dates during school days where work may not take place. It is the contractor's responsibility to request in writing any blackout dates prior to commencement of work to coordinate schedule.
Second shift hours are before 6AM or after 3:30 pm.
Failure to meet the milestone schedule will result in a per day financial penalty as indicated in the AIA A232/A132

All work required by any of the Owner's representatives and consultants, including the Architect, Construction Manager and their consultants, Owner's Attorneys, etc., to execute final close-out of contract after 60 days beyond Milestone dates if determined to be caused by contractor, shall result in payment(s) to the Owner's representatives and consultants, including the Architect, Architect's consultants, Owner's Attorneys, etc., in the form of a change order deduct to the base contract.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 011100

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6. PROVIDE UL-1 HOUR FIRE RATED WALL ASSEMBLY AS INDICATED BY LOGISTICS PLANS.

7. ALL FLOORING TO REMAIN TO RECEIVE MASONITE FLOOR COVERING OR EQUAL.

8. SEE SPEC SECTIONS 00 31 13 FOR SCHEDULE

STAGING NOTES

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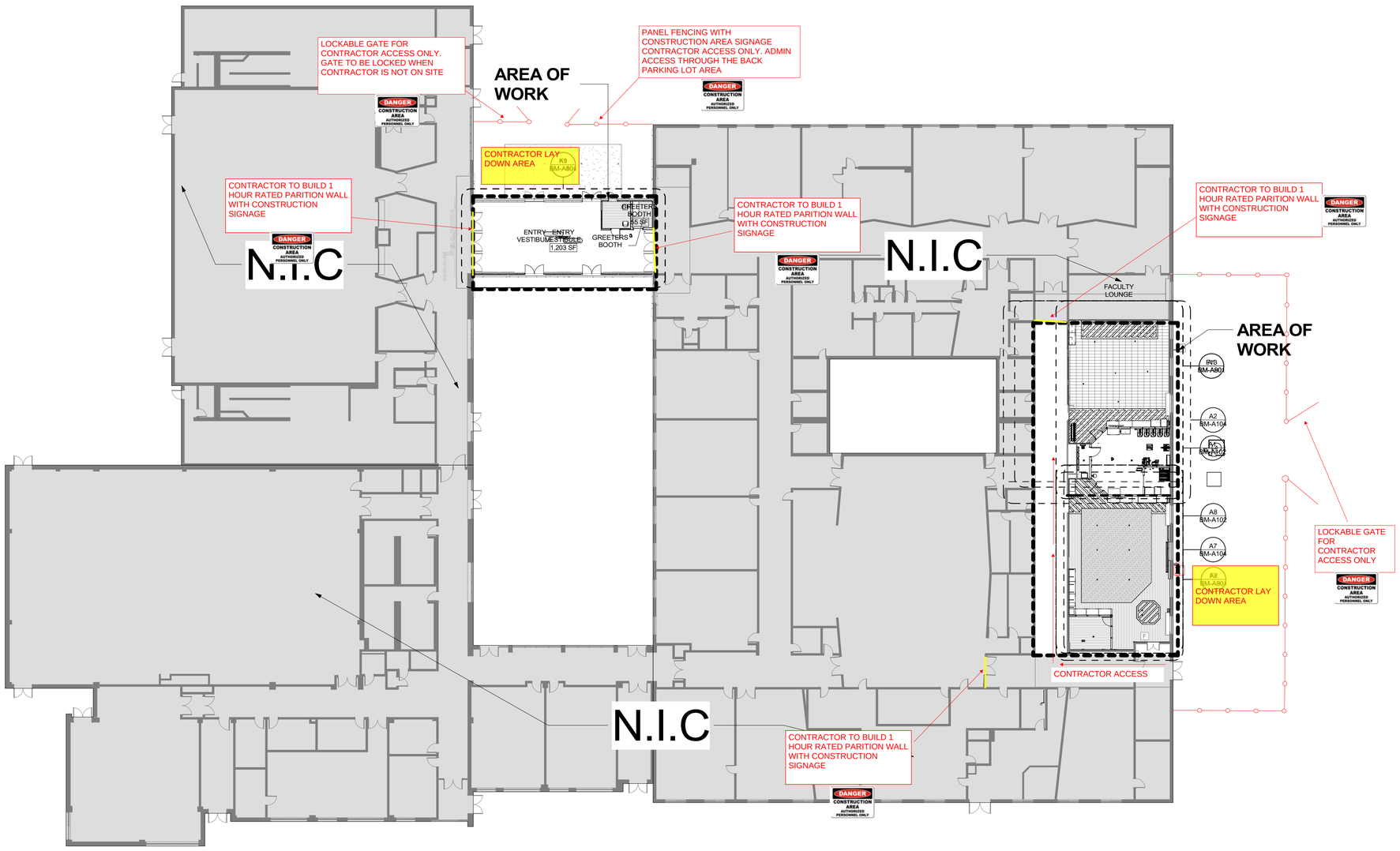

ARCHITECT

NEW YORK OKLAHOMA

KSQ Design
215 W 40th Street 15th Floor
New York, NY 10018
646.435.0660 office
www.ksq.design

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Nanuet Union Free School District
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http://www.nanuetsd.org/

Structural Engineer

Clapper Structural Engineering
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NUFSD BOND PROJECTS PH 2-BARR MS

SED #: 50-01-08-03-0-004-019

143 Church Street
Nanuet, NY 10954

N

REVISIONS

No.	Description	Date

ISSUED: BID SET ISSUANCE

DATE: DECEMBER 15, 2022

SCALE:

SHEET NAME:
BARR SECURITY VESTIBULE & STEM LABS LOGISTICS PLAN

SHEET NUMBER:

BM-PH01

ISSUE FOR BID SET

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6. CONTRACTOR TO RESEED AND RESTORE DAMAGED GRASS AREAS

7. CONTRACTOR RO FOLLOW PHASING PLAN OF WORK AS NOTED ON THE DRAWING

8. SEE SPEC SECTION 00 31 13 FOR SCHEDULE

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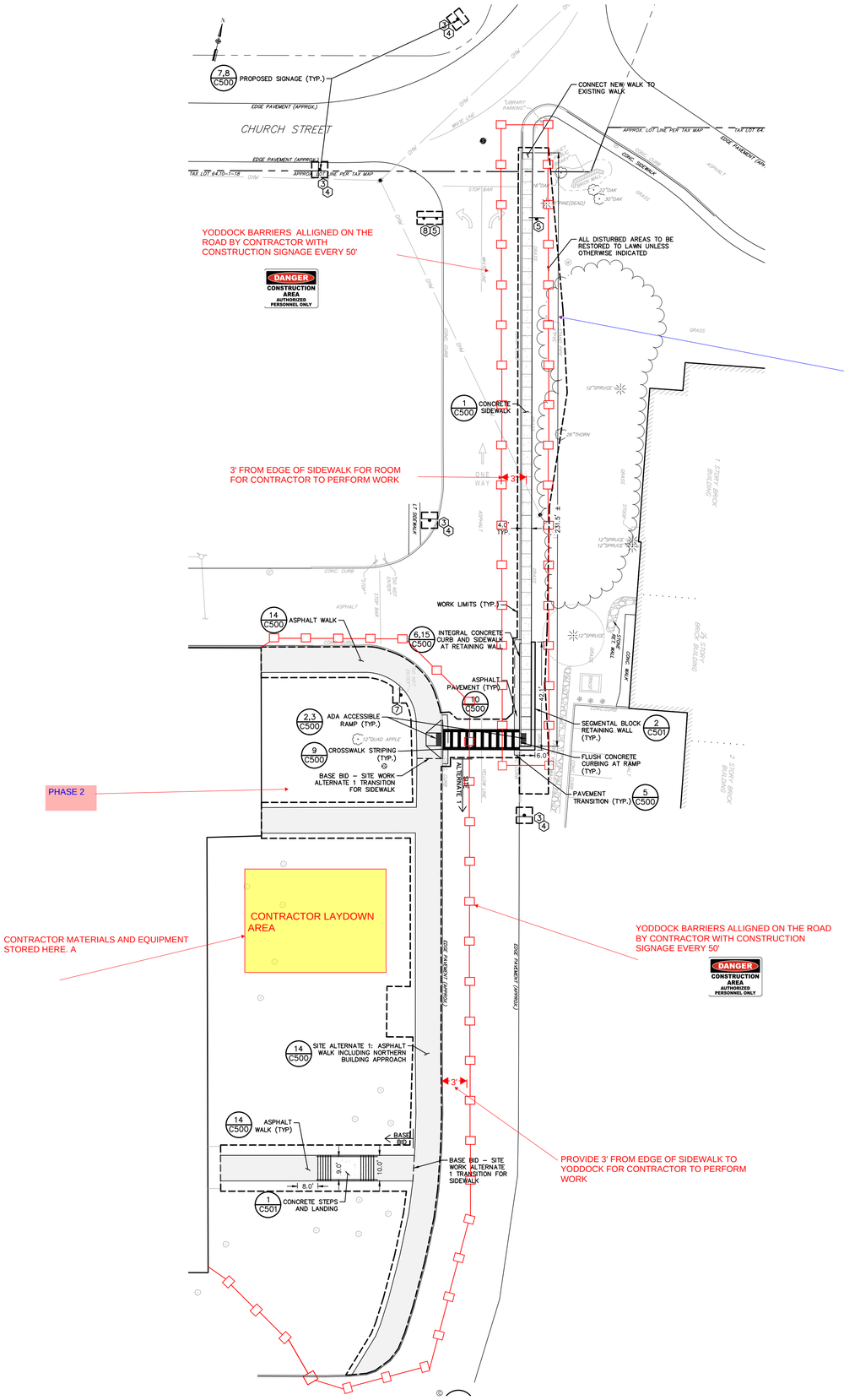

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NUFSD BOND PROJECTS PH 2-BARR MS

SED #: 50-01-08-03-0-004-019

143 Church Street
Nanuet, NY 10954

REVISIONS

No.	Description	Date

ISSUED: BID SET ISSUANCE

DATE: DECEMBER 15, 2022

SCALE:

SHEET NAME:
BARR SITE WORK LOGISTICS PLAN

SHEET NUMBER:

BM-PH02

ISSUE FOR BID SET

5/11/2022 5:28:29 PM

PROJECT NUMBER: 2111006.00

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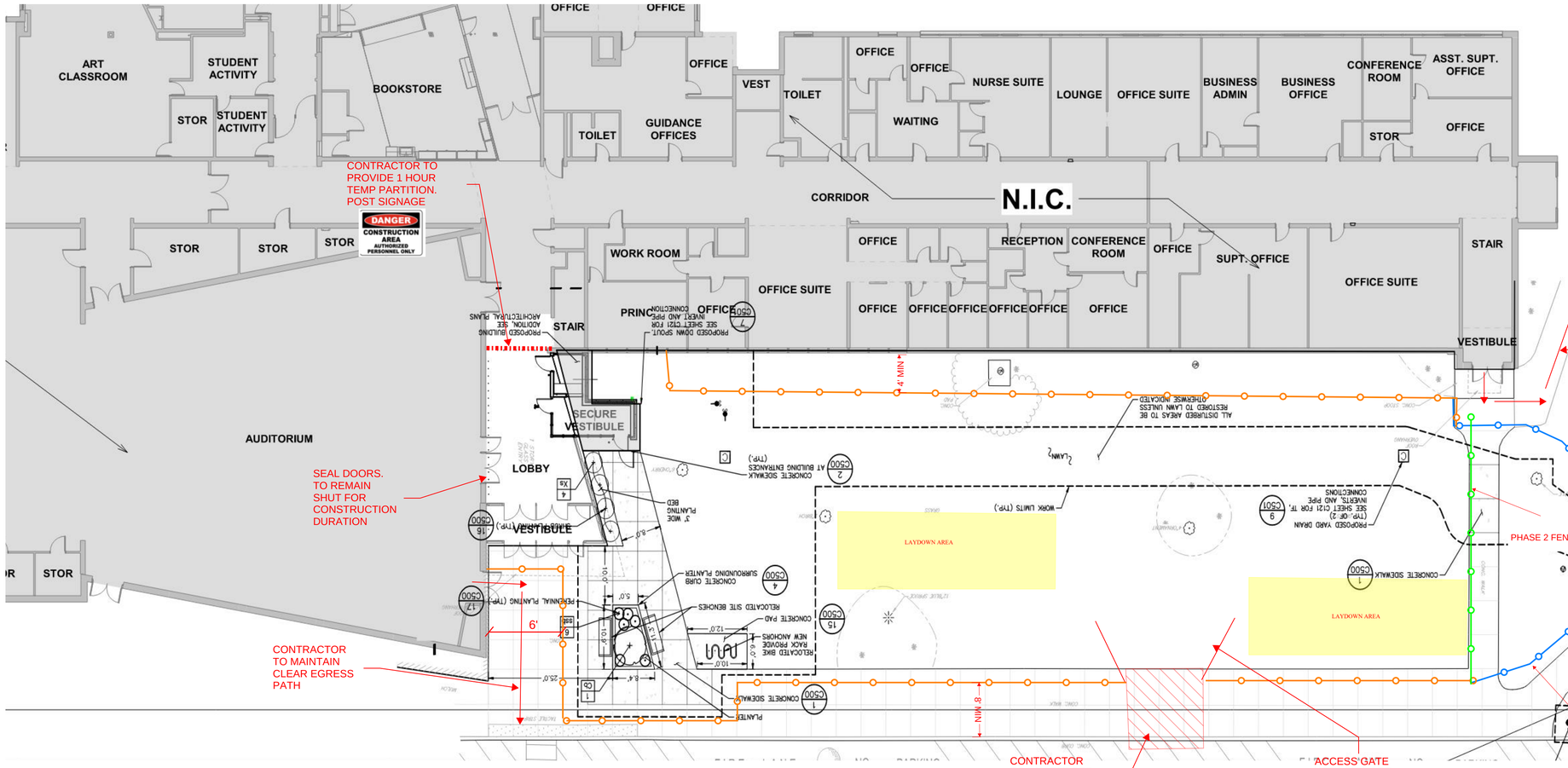

1 OVERALL PHASING PLAN - HS VESTIBULE
1/8" = 1'-0"

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KSQ Design
215 W 40th Street 15th Floor
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646.435.0660 office
www.ksq.design

Owner
Nanuet Union Free School District
Nanuet High School Global Learning Commons
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NUFSD BOND PROJECTS PH 2-HS

SED #: 50-01-08-03-0-003-034

103 Church St, Nanuet, NY 10954

N

REVISIONS

No.	Description	Date

ISSUED: BID SET ISSUANCE

DATE: DECEMBER 15, 2022

SCALE:

SHEET NAME:
HS SECURITY VESTIBULE LOGISTICS PLAN

SHEET NUMBER:
HS-PH01

ISSUE FOR BID SET

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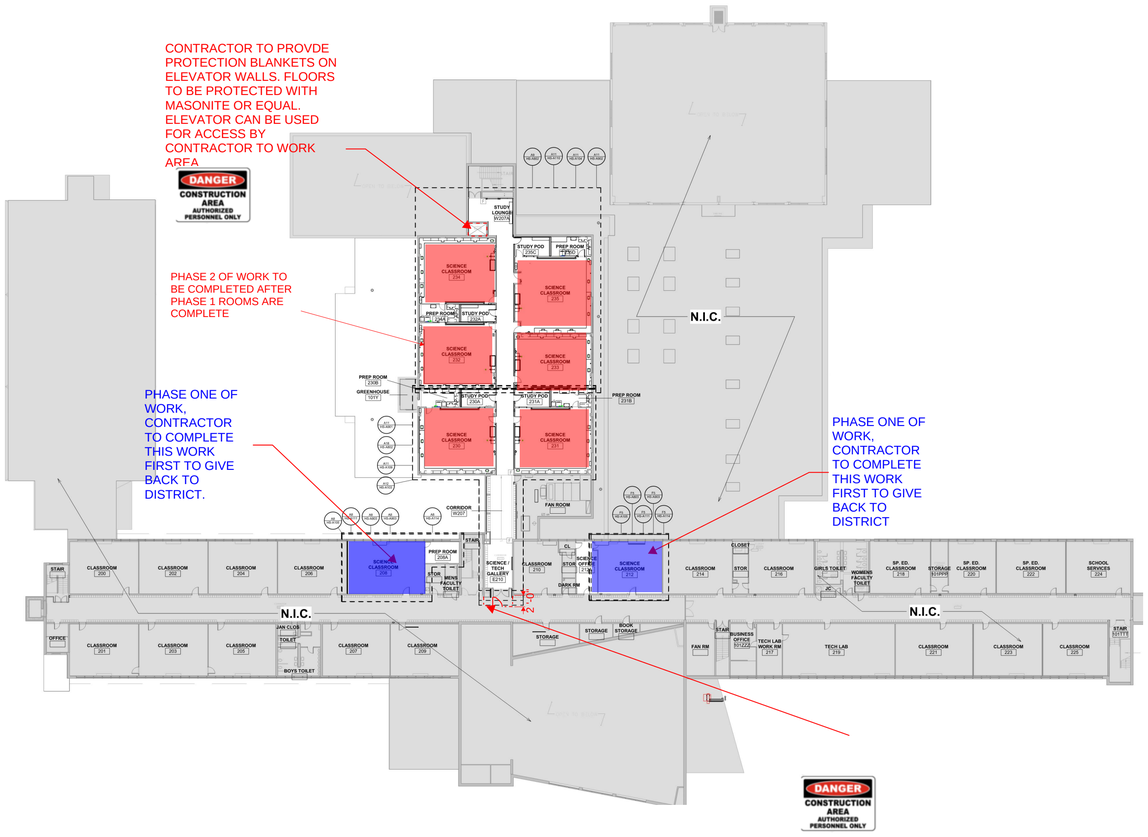

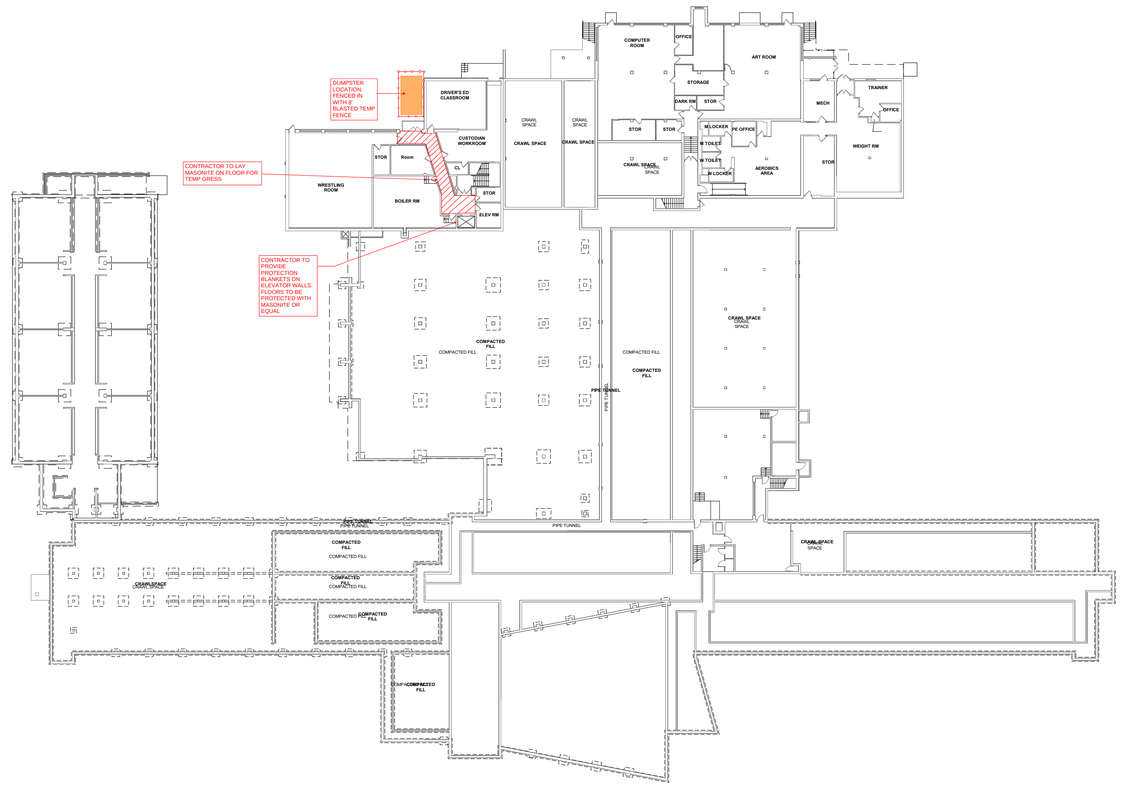

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2-HS

-08-03-0-003-034

h St, Nanuet,
10954

ription	Date

ISSUED: BID SET ISSUANCE

DATE: DECEMBER 15, 2022

SCALE:

SHEET NAME:
HS SCIENCE LABS LOGISTICS PLAN

SHEET NUMBER:
HS-PH02

ISSUE FOR BID SET

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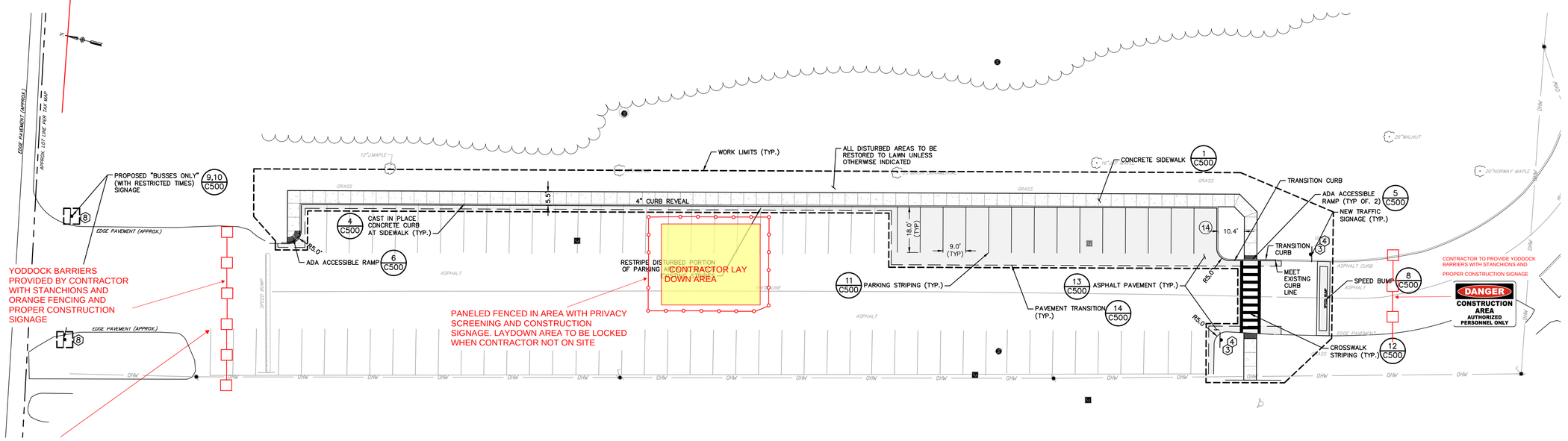
NOTE: ALL DUMPSTERS MUST BE ENCLOSED WITH TEMP FENCING

CONTRACTOR TO POST SIGNAGE AT BARR ENTRANCE TO READ "DETOUR ENTRANCE TO HIGHSCHOOL"



CONTRACTOR TO POST SIGNAGE AT ENTRANCE TO READ "DETOUR ENTRANCE TO HIGHSCHOOL AT BARR MIDDLE SCHOOL ENTRANCE:

ARCHITECT

NEW YORK OKLAHOMA

KSQ Design
215 W 40th Street 15th Floor
New York, NY 10018
646.435.0660 office
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Owner

Nanuet Union Free School District
Nanuet High School Global Learning Commons
103 Church St. Nanuet, NY 10954
845.627.9880 office
845.624.5338 fax
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Construction Manager

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One Penn Plaza
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646.908.6550
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NUFSD BOND PROJECTS PH 2-HS

SED #: 50-01-08-03-0-003-034

103 Church St, Nanuet, NY 10954

N

REVISIONS

No.	Description	Date

ISSUED: BID SET ISSUANCE

DATE: DECEMBER 15, 2022

SCALE:

SHEET NAME:
HS SITE WORK LOGISTICS PLAN

SHEET NUMBER:
HS-PH03

ISSUE FOR BID SET

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6. CONTRACTOR TO RESEED AND RESTORE DAMAGED GRASS AREAS

7. CONTRACTOR TO USE LORAN COURT FOR ACCESS TO JOBSITE

8. SEE SPEC SECTION 00 31 13 FOR SCHEDULE

STAGING NOTES

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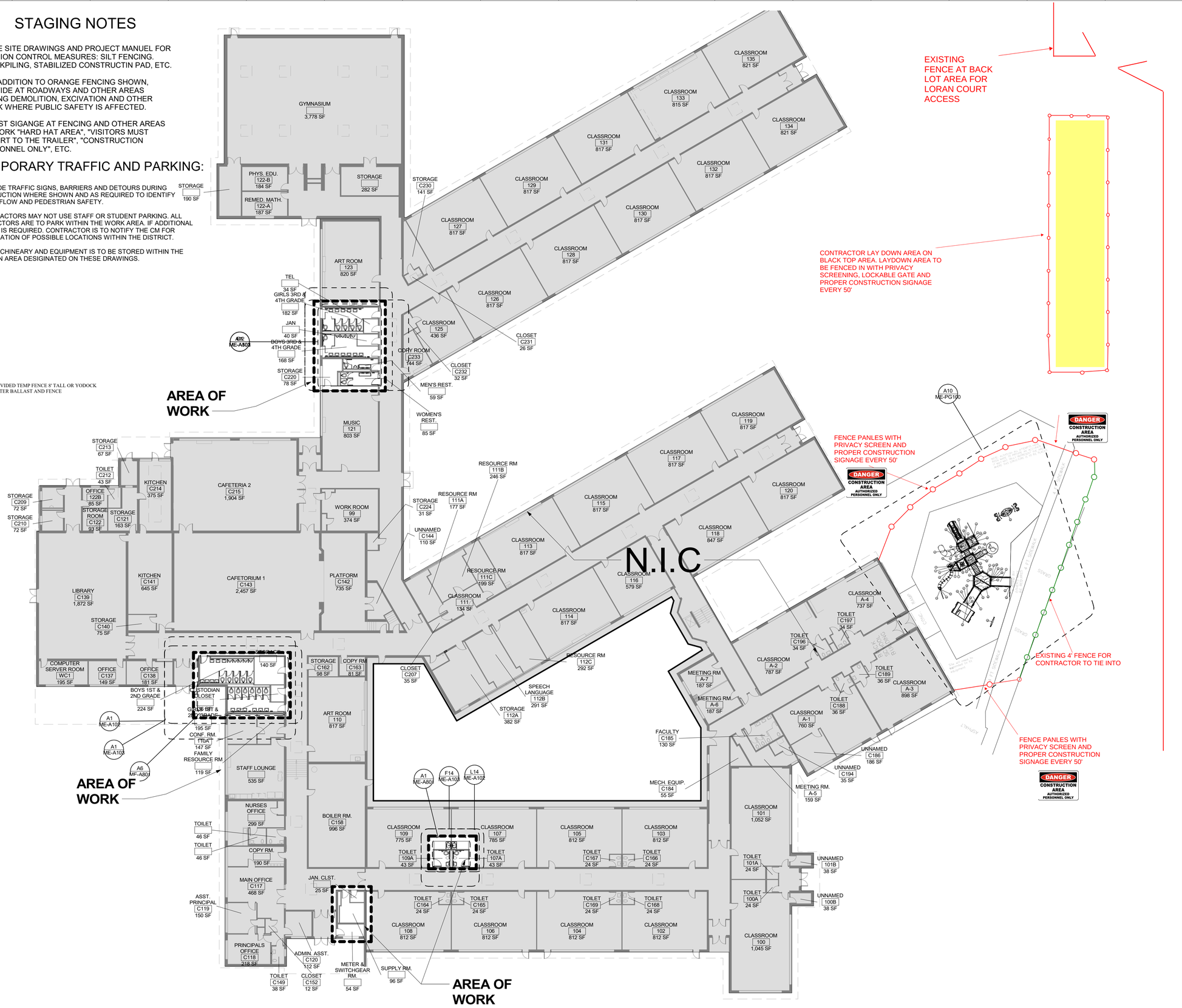
NOTE: ALL DUMPSTERS MUST BE ENCLOSE WITH TEMP FENCING



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NUFSD BOND PROJECTS PH 2- G.W MILLER ES

SED #: 50-01-08-03-0-001-023

50 Blauvelt Rd #1
Nanuet, NY 10954

REVISIONS

No.	Description	Date

ISSUED: BID SET ISSUANCE

DATE: DECEMBER 15, 2022

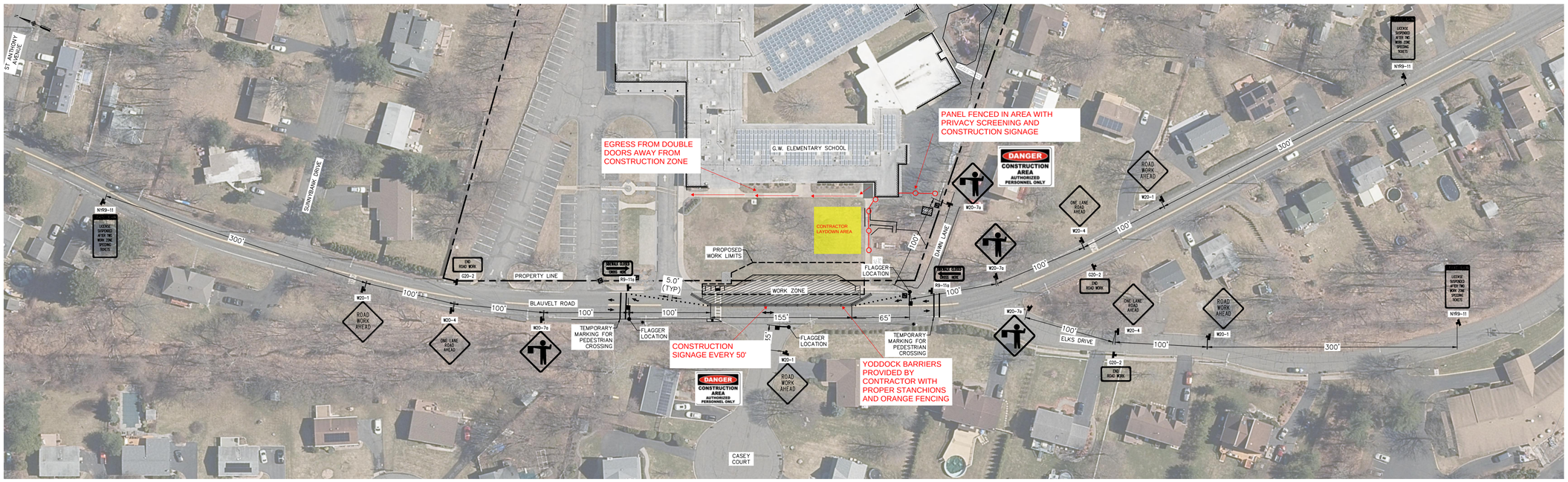
SCALE:

SHEET NAME:
MILLER PLAYGROUNDS LOGISTICS PLAN

SHEET NUMBER:

ME-PH01

ISSUE FOR BID SET



WORK ZONE TRAFFIC CONTROL NOTES:

GENERAL NOTES:

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE WORK ZONE TRAFFIC CONTROL (WZTC) FOR THE DURATION OF THE CONTRACT. COORDINATE WITH THE TOWN OF CLARKSTOWN FOR ALL TRAFFIC ALTERATIONS. WZTC SHALL BE PROVIDED IN ACCORDANCE WITH THE FOLLOWING DOCUMENTS:
   A. THE TRAFFIC CONTROL PLAN AND REQUIREMENTS SET FORTH IN THE PLANS AND/OR PROPOSAL OF THIS CONTRACT.
   B. THE MOST CURRENT EDITION OF THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (MUTCD).
2. THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) IS DEFINED AS THE NATIONAL MUTCD FOR STREETS AND HIGHWAYS (US DEPARTMENT OF TRANSPORTATION/FEDERAL HIGHWAY ADMINISTRATION) AS MODIFIED BY THE NEW YORK STATE SUPPLEMENT TO THE NATIONAL MUTCD. WHEN MUTCD IS NOTED IT REFERS TO THE MOST CURRENT EDITION.
3. THE TYPICAL DETAILS PRESENTED IN MUTCD AND NYSDOT STANDARD SHEETS REFLECT MINIMUM REQUIREMENTS. ADDITIONAL DEVICES AND/OR METHODS OF TRAFFIC CONTROL MAY BE ORDERED BY THE ENGINEER TO MEET FIELD CONDITIONS.
4. PROPOSED REVISIONS TO THE TRAFFIC CONTROL PLAN MUST BE SUBMITTED FOR APPROVAL BY THE CONTRACTOR TO THE ENGINEER. PROPOSED REVISIONS MUST BE SUBMITTED FIVE (5) WORK DAYS PRIOR TO THE PLANNED IMPLEMENTATION OF THE PROPOSED REVISIONS.
5. THE CONTRACTOR SHALL PROVIDE A TENTATIVE SCHEDULE OF OPERATIONS TO THE ENGINEER AND EMERGENCY SERVICE PROVIDERS TWO WEEKS BEFORE BEGINNING CONSTRUCTION ACTIVITIES. DURING CONSTRUCTION, THE CONTRACTOR SHALL BE REQUIRED TO PROVIDE NOTIFICATION TO THE ENGINEER, LOCAL AUTHORITIES, AND EMERGENCY SERVICE PROVIDERS OF CHANGES TO THE PREVIOUS WORK PLAN/WORK LOCATIONS. PROVISIONS SHALL BE MADE AT THE PRE-CONSTRUCTION MEETING OR OTHER MEETING PRIOR TO THE START OF WORK BETWEEN THE CONTRACTOR, LOCAL AUTHORITIES AND EMERGENCY SERVICE PROVIDERS TO ADDRESS A SITUATION WHEN EMERGENCY ACCESS IS NEED THROUGH A CONSTRUCTION OPERATION OF CONTRACT LIMITS.

LANE CLOSURES:
1. LANE CLOSURES SHALL BE INCLUDED IN THE CONTRACTORS WRITTEN PHASING PLAN.
2. THE CONTRACTOR MAY BE REQUIRED TO RE-OPEN ALL TRAVEL LANES AT ANY TIME IF THE ROUTE IS NEEDED FOR EMERGENCY PURPOSES, INCLUDING INCIDENTS OUTSIDE THE CONTRACT LIMITS.
3. LANE CLOSURES MUST CONFORM TO THE TIME REQUIREMENTS OF THE CONTRACT DOCUMENTS.
4. TEMPORARY LANE CLOSURES MAY NOT BE PERMITTED DURING THE PEAK TRAVEL PERIODS OF 7:00 TO 9:00 AM AND 3:30 TO 6:00 PM UNLESS APPROVED BY THE ENGINEER.

WORK ZONE TRAVEL LANES:
1. THE MINIMUM LANE WIDTH FOR WORK ZONE TRAVEL LANES SHALL 10'.
2. WRITTEN NOTICE SHALL BE PROVIDED BY THE CONTRACTOR TO THE ENGINEER AT LEAST 7 DAYS IN ADVANCE OF PERFORMING ANY WORK THAT RESULTS IN THE REDUCED WIDTH OF AN EXISTING ROADWAY.

CHANNELIZING DEVICES:
1. WHERE POSSIBLE ALL CHANNELIZING AND GUIDING DEVICES ARE TO BE PLACED SO AS TO PROVIDE A MINIMUM 2' LATERAL CLEARANCE TO THE TRAVELED WAY. A MINIMUM 10' TRAVEL WAY IS REQUIRED IN EACH DIRECTION OF TRAFFIC FLOW.

SIGNS:
1. ALL SIGNS SHALL BE AS SPECIFIED BY THE CURRENT MUTCD, SIGNS GENERALLY SHALL BE LOCATED ALONG THE SIDE OF THE ROADWAY FACING ONCOMING TRAFFIC AT RIGHT ANGLES.
2. THE LOCATIONS OF SIGNS MAY BE ADJUSTED FROM THAT SHOWN IN THE WORK ZONE TRAFFIC CONTROL PLANS BASED ON SIGHT DISTANCE AND OTHER CONSIDERATIONS. THE FINAL LOCATIONS OF SIGNS ARE SUBJECT TO THE ENGINEER'S APPROVAL.
3. SIGNS AT OR NEAR INTERSECTIONS SHALL BE PLACED SO THAT THEY DO NOT OBSTRUCT A MOTORIST'S LINE OF SIGHT.

② TEMPORARY LANE CLOSURE FOR PAVING ACTIVITIES PLAN

SCALE: 1"=50'

GENERAL NOTES:

4. THE DIMENSIONS OF WORK ZONE TRAFFIC CONTROL SIGNS ARE DESCRIBED IN THE MUTCD. ANY CHANGES TO THE DIMENSIONS SHALL BE APPROVED BY THE ENGINEER.
5. THE CONTRACTOR SHALL KEEP SIGNS CLEANED AND CLEARED AT ALL TIMES. ALL SIGNS ARE THE PROPERTY OF THE CONTRACTOR AND SHALL BE MAINTAINED IN GOOD CONDITION FOR THE DURATION OF THE CONTRACT. ALL SIGNS SHALL BE REMOVED FROM THE WORK SITE WHEN THE CONTRACT WORK IS ACCEPTED.

1. MAINTENANCE AND TRAFFIC CONTROL MEASURES AS SHOWN HEREON TO REMAIN IN PLACE FOR ALL SITE WORK. FULL LANE CLOSURE TO ONLY BE UTILIZED FOR PAVING OPERATIONS ONLY. CONTRACTOR TO SUBMIT ALL OTHER REQUESTS FOR FULL LANE CLOSURE TO ENGINEER FOR REVIEW AND APPROVAL.
2. CONTRACTOR SHALL PROVIDE SAFE ROUTE AROUND PHASE OF WORK UNDER CONSTRUCTION INCLUDING BUT NOT LIMITED TO TRAFFIC CONES, SIGNAGE, ETC. CONTRACTOR TO MAINTAIN TEMPORARY PAVEMENT MARKINGS AT PROPOSED PEDESTRIAN CROSSINGS AT ALL TIMES.
3. WORK HOURS FOR THE CONTRACTOR AND UTILITY COMPANIES SHALL BE MONDAY THRU FRIDAY BETWEEN 9 AM AND 4 PM. NO WEEKEND WORK IS ALLOWED. ALL WORK MUST BE COMPLETED ON NON-SCHOOL DAYS.
4. CONES, BARRIERS, AND ADVANCED SIGNAGE SHALL NOT BE CONSIDERED PERMANENT. AFTER EACH WORK DAY, CONTRACTOR SHALL MOVE ALL CONES AND BARRIERS OFF OF THE EDGE OF PAVEMENT, TAKE DOWN ANY ADVANCED SIGNAGE, AND CLOSED LANE OF TRAVEL.
5. CONTRACTOR IS RESPONSIBLE FOR NOTIFYING RESIDENTS OF CONSTRUCTION ACTIVITIES PRIOR TO START OF WORK.

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6. CONTRACTOR TO RESEED AND RESTORE DAMAGED GRASS AREAS
7. SEE SPEC SECTION 00 31 13 FOR SCHEDULE

STAGING NOTES

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WORK ZONE TRAFFIC CONTROL LEGEND:

SYMBOL	DESCRIPTION
■	CHANNELIZING DEVICE
	TEMPORARY BARRIER
	WORK ZONE
	- CONTRACTOR PROVIDED TEMP FENCE 8' TALL OR YODOCK BARRIERS WITH WATER BALLAST AND FENCE

NOTE: ALL DUMPSTERS MUST BE ENCLOSED WITH TEMP FENCE

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NUFSD BOND PROJECTS PH 2- G.W MILLER ES

SED #: 50-01-08-03-0-001-023

50 Blauvelt Rd #1
Nanuet, NY 10954

N

REVISIONS

No.	Description	Date

ISSUED: BID SET ISSUANCE

DATE: DECEMBER 15, 2022

SCALE:

SHEET NAME:
MILLER SITE WORK LOGISTICS PLAN

SHEET NUMBER:
ME-PH02

ISSUE FOR BID SET

GENERAL NOTES

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6. SEE SPEC SECTION 00 31 13 FOR SCHEDULE

7. ALL FLOORING TO REMAIN TO RECEIVE MASONITE FLOOR COVERING OR EQUAL.

8. PROVIDE PRIVACY SCREENING FOR ALL EXTERIOR FENCING PANELS.

9. CONTRACTOR ACCESS THROUGH LORAN COURT GATE

10. CONTRACTORS MAY NOT USE STAFF OR STUDENT PARKING. ALL CONTRACTORS ARE TO PARK WITHIN THE WORK AREA. IF ADDITIONAL PARKING IS REQUIRED. CONTRACTOR IS TO NOTIFY THE CM FOR COORDINATION OF POSSIBLE LOCATIONS WITHIN THE DISTRICT.

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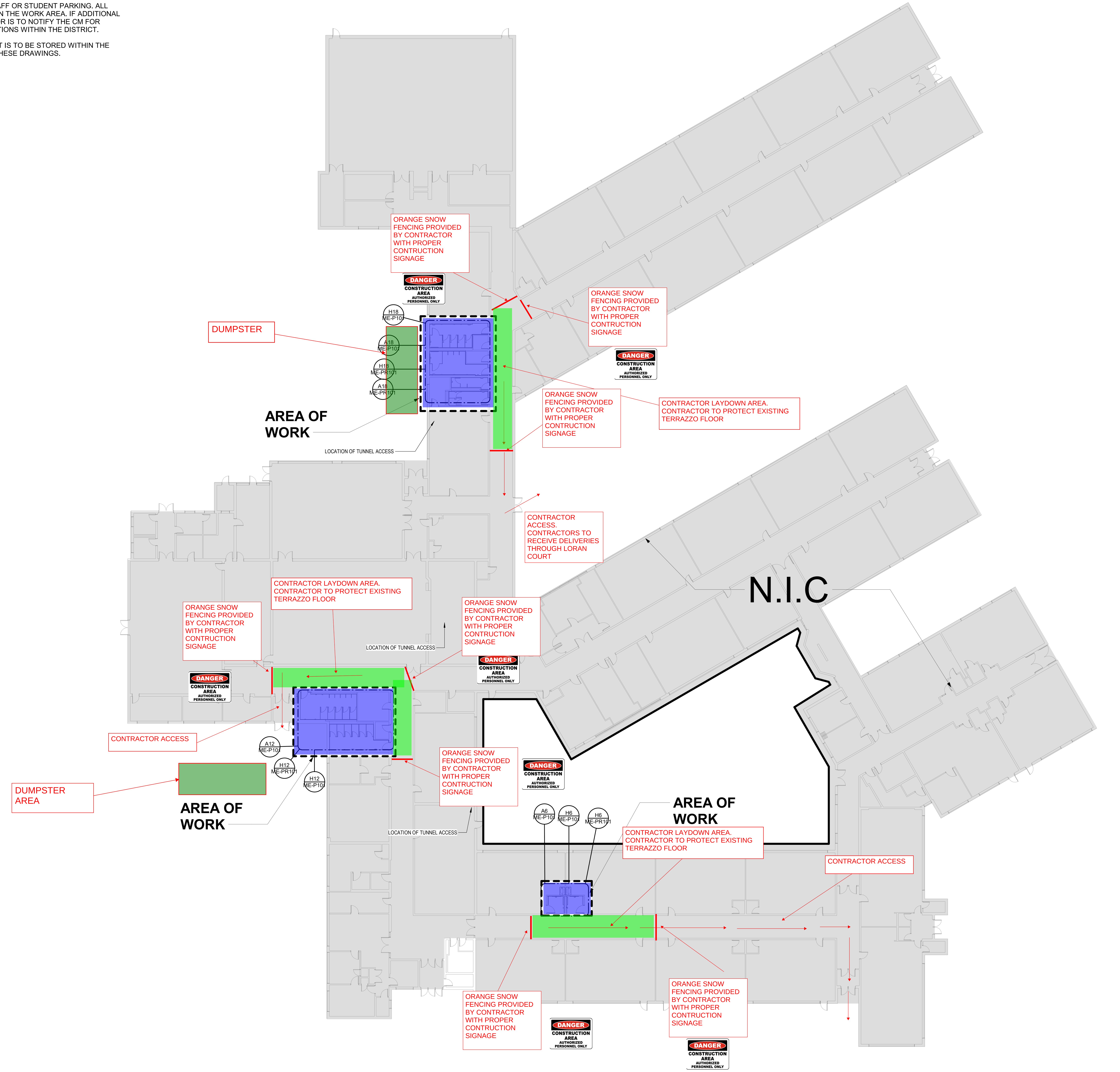

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NUFSD BOND PROJECTS PH 2- G.W MILLER ES

SED #: 50-01-08-03-0-001-023

50 Blauvelt Rd #1
Nanuet, NY 10954

N

REVISIONS

No.	Description	Date

ISSUED: BID SET ISSUANCE

DATE: DECEMBER 15, 2022

SCALE:

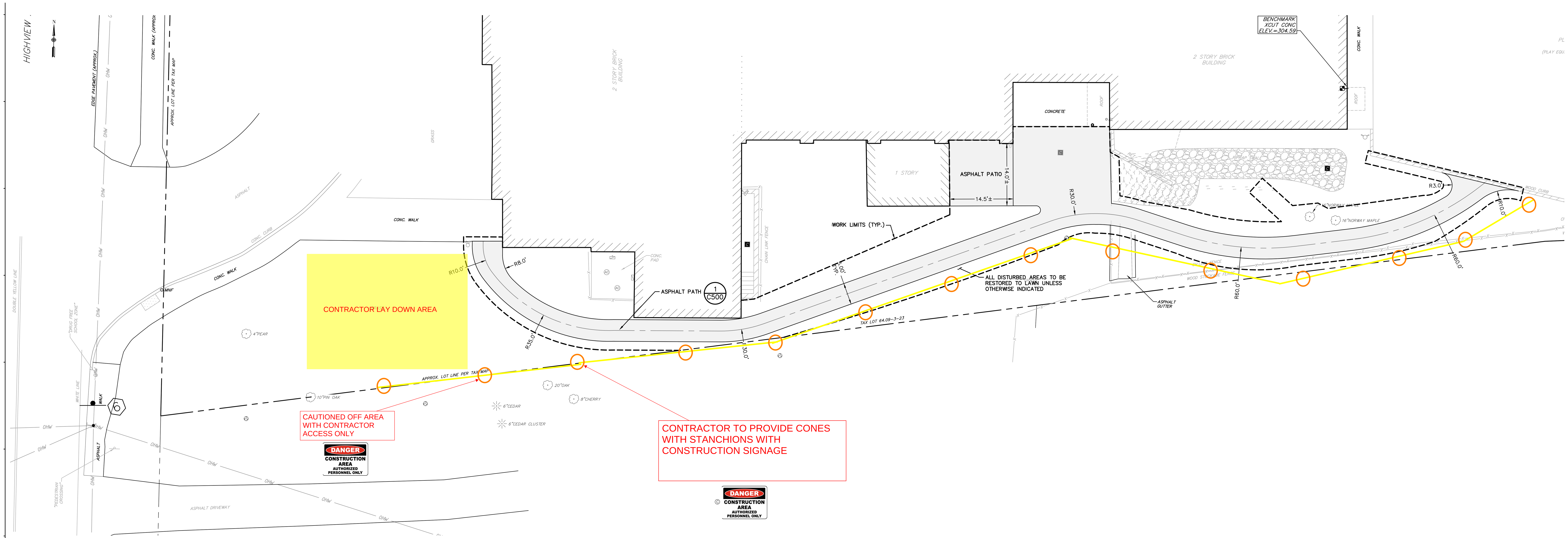
SHEET NAME:
MILLER TOILET ROOMS LOGISTICS PLANS

SHEET NUMBER:
ME-PH03

ISSUE FOR BID SET

PROJECT NUMBER: 2111006.00

5/11/2022 5:17:15 PM



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Construction Manager
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646.908.6550
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NUFSD BOND PROJECTS PH 2-HIGHVIEW ELEMENTARY SCHOOL

SED #: 50-01-08-03-0-003-036

103 Church St, Nanuet, NY 10954

N

REVISIONS

No.	Description	Date

ISSUED: BID SET ISSUANCE

DATE: DECEMBER 15, 2022

SCALE:

SHEET NAME: HIGHVIEW SITEWORK LOGISTICS PLAN

SHEET NUMBER: HV-PH01

ISSUE FOR BID SET

SECTION 01 12 01 – CONTRACT SUMMARY -SW-01

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 Contract includes Nanuet Senior High School, Barr Middle School, Miller Elementary School, and Highview Elementary School

B. If awarded multiple contracts, the Contractor shall mobilize and start the work at each project simultaneously.

C. The Contractor shall provide independent on site supervision at each property by providing one (1) Superintendent to supervise the Work at each location. Superintendent's shall have a minimum of eight (8) years' experience as a superintendent on projects of a similar size and scope. Personnel resumes must be submitted and approved by the District/CM prior to mobilization.

D. The Contractor shall progress the Work at each project independently. Work activities at each project shall not be dependent upon the start, progression or completion of Work activities on another project. This may require the use of multiple subcontractors, multiple work crews and multiple suppliers. Use of the same work crews, whether provided by the Contactor or it's Subcontractor, for similar or the same types of Work at each location shall be considered not providing a sufficient number of properly skilled labor to meet the needs of the Project.

E. This Section includes a summary of each Prime Contract, including responsibilities for coordination and temporary facilities and controls. One set of Construction Documents is issued covering the Work of multiple Prime Contracts. Each Prime Contract is responsible to review all drawings and specifications for specific requirements indicated, and for a general understanding and knowledge of the work of other Prime Contracts. All Prime Contracts are responsible for all Work of their Contract no matter what drawing on which

the Work appears. All Prime Contracts are responsible to coordinate their work related to the complete set of drawings and specifications, not limited to each prime contractor scope. **All Bidders should acknowledge that for each contract listed below, each contractor is their own General Contractor and subject to all General Contractor requirements.**

F.

1. **Site Work Contract-01:** The Site Work Contractor shall be selected based on the bid procedure as described in the Bid Documents. Contract Bidders are responsible for (a) trade work coordination, (b) the scope contained in drawings listed below and (c) any and all additional scope specifically identified to be performed by the Site Work Contractor in other Bid Packages in the Contract.
    a. Bid Package Contract No. 01 - Site Work 01: All work related to Site Work construction includes but is not limited to the following items: (Refer to the Contract Documents for full scope of work.)
        1) Permits (as required by the town of Clarkstown), railing, stairs, nosing's, temporary protection and barriers, concrete, asphalt, demolition as noted on the drawings, excavations, drainage, miscellaneous steel, handrails, fencing and masonry work, but not limited to and as noted in the contract documents.
        2) All work related to drawings; (In addition to these drawings, the contractor is required to review all specifications included in the overall contract that may contain related scope or detail for this specific contract.)
            a) Nanuet UFSD Civil Drawings Related to Nanuet High School, Barr Middle School, Miller Elementary School, and Highview Elementary School site work.

1.3 All "C" drawings related to the above mentioned schools are the responsibility of this contract. It is the SW Contractors responsibility to review the GC drawings to coordinate with the GC's portion of the work. This includes connections for footing drains by GC into SW contracts storm structures.

1.4 DEFINITIONS

A. Building Site: The Building Site shall be defined in the Construction Documents, as the building footprint, and all related construction within a five-foot (5'0") distance of the building's exterior face, unless noted or assigned otherwise. Coordinate with specific exceptions to the 5'0" limit indicated within each Scope of Work outline.

B. Permanent Enclosure: As determined by the Architect: all openings are to be closed with permanent construction or substantial temporary closures. All cost associated with failure to maintain described installations that result in any damage or contamination to the Owner's property, shall be borne by the Prime Contract responsible for the installation.

1.5 MANAGEMENT AND COORDINATION

A. The Owner shall provide a Construction Manager.

1. The Construction Manager shall provide a full time construction site representative recognized as the Construction Manager.

1.6 CONSTRUCTION MANAGER

A. The construction manager shall provide on-site administration of the Contracts for Construction in cooperation with the Architect as set in AIA Document A232 ™ – 2019, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition, as modified.

B. The Construction Manager shall provide administrative, management and related services to coordinate scheduled activities and responsibilities of the Multiple Prime Contractors with each other and with those of the Construction Manager, the Owner and the Architect. The Construction Manager shall coordinate the activities of the Multiple Prime Contractors in accordance with the latest approved Project Schedule and the Contract Documents.

C. Utilizing the construction schedules provided by the Multiple Prime Contractors, the Construction Manager shall update the Project schedule, incorporating the activities of the Owner, Architect, and Multiple Prime Contractors on the Projects, including activity sequences and durations, allocation of labor and materials, processing of Shop Drawings, Product Data and Samples, and delivery and procurement of products, including those that must be ordered will in advance of construction. The Project schedule shall include the Owner's occupancy requirements showing portions of the Project having occupancy priority.

D. Utilizing information from the Multiple Prime Contractors, the Construction Manager shall schedule and coordinate the sequence of construction and assignment of space in

areas where the Multiple Prime Contractors are performing Work, in accordance with the Contract Documents and the latest approved Project Schedule.

1.7 GENERAL REQUIREMENTS OF PRIME CONTRACTS

A. Prime Contracts: The context used in this Section are separate Prime Contracts that represent significant elements of work that is to be performed concurrently and in close coordination with the work of other Prime Contracts for the benefits of the Owner. Each Prime Contract is recognized to be a major part of the Work.

B. Assignment of Work: Should a conflict be indicated, Section 01 12 00 shall take precedence over all scope of work assignments that may be indicated elsewhere within the Construction Documents.

C. Seismic Requirements: Prime Contracts are to be aware that the building(s) is located within a Seismic Zone indicated in the documents and shall provide installations in compliance with all related code requirements.

D. Layout and Installation: Each Prime Contractor shall schedule, layout and install their Work in such manner as not to delay or interfere with, but to compliment the execution of the work of other Prime Contracts, utility companies and Owner's operations.

E. Extent of Contract: The Contract Documents, drawings and specifications each contain more specific descriptions of the Work facilitating which Prime Contract includes specific elements of the Project.

1. Work provided by each Prime Contract shall mean complete and operable systems and assemblies, including products, components, accessories and installations required by the Construction Documents or indicated otherwise.
2. Prime Contractors shall exercise good judgment and perform all work according to related industry standards.
3. The Owner is **exempt** from payment of Federal, State and local taxes, including sales and compensating use taxes on all materials and supplies incorporated in completing the Work; these taxes are not to be included in the Bid. This exemption does not apply to tools, machinery, equipment or other property leased by, or to, the Contractor or sub-contractor, or to supplies and materials, which even though consumed are not incorporated into the completed work. Prime Contractors, and their sub-contractors, shall be responsible for paying any and all applicable taxes on said tools, machinery, equipment or property, and upon all said unincorporated supplies and materials, whether purchased or leased.
4. Prime Contracts shall understand that time is of the essence, and will adequately staff the Project by employing the appropriate trade's people to perform the Work; these people shall be experienced in their respective trades. A shortage of labor in

the industry shall not be accepted as an excuse for not properly staffing the Project; all efforts shall be made to meet or exceed the schedule, including additional staff and/or labor hours necessary. All cost associated with this item shall be included within the Bid.

5. Local custom and trade union jurisdictional settlements will not control the scope of the Work of each Prime Contract.
   a. When a potential jurisdictional dispute or similar interruption of Work is first identified, or threatened, the affected Prime Contracts shall promptly negotiate a reasonable settlement to avoid or minimize the pending interruption and delays.
   b. Contractor's trade-related issues shall not be grounds for modification or extension of scheduled completion date(s).
6. The Work of all Prime Contracts requires close coordination with other Prime Contracts and construction personnel. Maintain flexibility and cooperation through the Project. "Out of Sequence" and "Delay" claims will only be considered when requirements of Division 01 "Administrative Requirements" have been adhered to. Delay claims must be in writing and forwarded to the Architect, per the requirements of the General Conditions of the Contract. Claims not submitted per these requirements will be rejected and/or denied.
7. The intention of the Work is to follow a logical sequence, however, a Prime Contractor may be required by the Architect or Construction Manager, to temporarily install, omit or leave out a section(s) of Work, out of sequence. All such out of sequence work, and come back time, at these areas shall be performed at no additional cost to the Owner.

F. Substitutions: Per Division 01 Section "Substitution Procedures", each Prime Contractor shall cooperate with the other Prime Contractors involved, to coordinate approved substitutions with remainder of the Work. Contractors shall submit all "Substitutions" at least ten (10) days prior to the date for receipt of Bids as specified in the Instructions to Bidders 00 10 00 Section 3.3 Equivalents or bid will be considered per "basis of design".

G. Construction Schedules: Refer to Divisions 01 Section "Construction Progress Documentation", "Preliminary Schedule" and "Project Management and Coordination" for requirements related to meetings and schedules.

H. Construction Sequencing and Phasing: Prime Contractor shall understand that Sequencing and/or Phasing Plans are contingent upon the work areas being complete/occupied, prior to the next area of Work beginning. Should an area of construction not be complete per the Project Preliminary Schedule, the Project Master Construction Schedule/Sequencing Plans will be adjusted accordingly. The Owner will not be responsible for delay claims due to adjustments being no fault of their own.

1. Prime Contracts may be required to re-sequence the phasing of the project as a result of changes to the schedule. Prime Contracts shall provide these adjustments at no additional cost to the Owner.

I. Testing and Inspections by Owner: The Owner shall employ an independent qualified testing and inspection agency for monitoring on-site soils analysis (excluding top soil analysis), soils compaction, cast-in-place concrete, asbestos and lead abatement monitoring and Special Inspections indicated in the Construction Documents (refer to Division 01 "Quality Requirements" and/or Statement of Special Inspections" for additional specific information)

1. Prime Contractor shall give one week notice as to commencement for these requirements. Once underway, Prime Contractor shall coordinate with the Construction Manager and give 48 hours' notice as to test(s) required, by Owner's Agency, and further verify the need 24 hours in advance. Full cooperation and coordination is expected of all Contractors and their personnel with the Owner's Testing Agency in fulfilling test requirements; provide all data and materials requested for required reports.
2. Other than with regard to compliance with state and federal laws, the testing agency holds no execution authority other than to provide test results. Should testing indicate a discrepancy or non-compliance during execution of the Work, the Testing and Inspection Agent shall promptly notify the Construction Manager and Project Superintendent of such; however, the Prime Contract shall bear full responsibility for making any decision with regard to proceeding with, or stopping, the Work.
3. This assignment of Testing and Inspection responsibilities shall take precedence over any respective responsibilities that are indicated otherwise in the Construction Documents.

J. Testing by Others: All testing requirements not listed in preceding "Testing & Inspections by Owner" or otherwise identified in Division 01 "Quality Requirements" and/or "Statement of Special Inspections" shall be the responsibility of the Prime Contract providing the respective Work as indicated in the Construction Documents.

1. The respective Prime Contract shall have performed testing requirements indicated in individual Specification Sections which may inadvertently indicate "Owner to provide," which are not identified in preceding paragraph "Testing & Inspections by Owner".
2. Prime Contractor shall submit their Testing Agency qualifications to the Architect for approval prior to any test being performed. Construction Manager shall be given 48 hours' notice of any test/inspections to be performed by Prime Contractor's Testing Agency. 24- hour notification shall be given to the Construction Manager

for test/inspections requiring his/her presence; 72-hour notification shall be given to the Architect for test/inspections requiring his/her presence.

3. Determinations required of the Architect shall be anticipated by the Prime Contractor to allow ample time for inspection, investigation and reporting.

K. Dewatering: Site Work contractor is responsible for their own dewatering as it pertains to their Work. Excavations: Site Work Contractor is responsible for excavation and backfill as required for installation of their work unless noted or assigned otherwise. Prime Contractor shall notify the Construction Manager of any test/inspection requirements required of the Owner's Testing Agency prior to start of excavation.

1. Prime Contractor shall secure a Dig-Safe (UFPO) clearance prior to start of any UG installation work; coordinate with and advise Construction Manager.

L. Existing Conditions: Each Prime Contract shall verify existing conditions in the field prior to work commencing in that area and immediately report conditions to the Architect that are not represented correctly by the Construction Documents.

1. Prime Contractor is to required to request in writing the school district to identify location(s) of underground sprinkler piping and control wiring within area of proposed excavation.
2. Each Prime Contract is responsible for familiarizing himself with Project Site Logistics and provide a "site logistics plan locating storage area, scaffolds, rubbish areas, stock piles and egress related to all work, included phased construction within 30 days of award.
3. Located in Specification Section 01 11 01 are construction logistics and phasing plans that the contractor is to use as a minimum standard for planning purposes. The contractor is required to provide these indicated protections, but is not relieved of responsibility of providing additional site protections as required for field conditions and as indicated by OSHA standards or local code.
4. Each Prime Contract has been given ample opportunity to review Existing Conditions related to the Project. Existing Conditions not noted in the Construction Documents that could be easily recognized during pre-bid review that interfere with the respective Prime Contract's work, shall be the responsibility of the respective Prime Contract. This includes all costs associated with removal, patching, relocation or re-fabrication of installations.

M. Hazardous Materials: Each Prime Contract shall familiarize themselves with the Hazardous Materials Sections/Drawings of the Construction Documents and follow DOL/OSHA/EPA/SED regulations while performing their respective Work in these areas. Discovery of non-identified or concealed hazardous materials shall be reported to the Construction Manager immediately and followed up with written documentation of the event.

N. Protection of Installations: Each Prime Contract is responsible for protecting their installations at all times. All costs incurred to repair, replace or clean insufficiently protected materials/installations shall be the responsibility of the installing Prime Contract.

1. Architect shall be notified, in writing, immediately upon material/installation being damaged; notification shall indicate responsible party.
2. Owner will not be liable for damaged materials and/or installations by "others", when "others" cannot be identified.
3. Repair damaged work, clean exposed surfaces or replace construction installations that cannot be repaired.
4. Each Prime Contract shall be responsible for removing all labels not required to remain from their installations.
5. Installations shall be wiped clean and proper protection then installed.
6. Each Prime Contract is responsible to protect another primes work in the event that prime has to work over or on top of that other primes work being complete. The prime working over the completed work takes full responsibility of that other primes completed work both in condition and operation.

O. Daily Cleaning: All Prime Contracts are responsible for any and all debris caused by their Work, including the Work of their subcontractors. A daily clean up and disposal is required by each Prime Contract for the periods which that Prime Contract, or its sub-contractors, are performing Work on site. Each prime contractor is to provide dust mitigation to prevent the spread of dust and debris on property. Any cleaning required by the owner due to dust or debris from the work area will be back charged to the prime contractor.

1. Assign at least one person for a daily clean and sweep of the work area(s). Prime Contractor shall allot sufficient manpower and time for this to be completed by the end of each shift. Submit name of this person(s) to Construction Manager.
    a. Construction Manager shall have the authority to give direction to person(s) on the Project Site identified by the Prime Contract as designated for cleanup tasks. This shall include the safety review/securing of the site-work zone after each shift.
    b. This person is to ensure that no construction debris is dumped in any district dumpers during this end of shift site review, if found the contractor must remove immediately the next morning to avoid back charges costs of $1500 per day not removed.
2. Any Prime Contract not providing personnel for Daily Cleaning will be Back Charged for labor provided by the Owner to complete this task.
3. Contractor working solely in an area shall be responsible for clean/sweep of that area.

4. Daily cleaning will not mean any one Prime Contract is responsible for assisting another Prime Contract with removing major quantities of debris created by a particular Prime Contract's Work.
5. Daily cleaning will be mandated to remove any debris created by day-to-day activities. All Prime shall assist in removing dust and debris from shared areas while working on site or as required by the Owner.
6. All prime contractors and subcontractors are required to provide sweeping compound for daily cleaning in their respective exterior work areas. Each Prime Contract shall provide a sufficient number of brooms or other necessary tools, for use by their personnel to adequately fulfill their obligations.
7. All prime contractors shall provide and maintain garbage cans/refuse containers with liners for each construction area of their respective contracts as directed by the Construction Manager and shall be responsible for disposing of these materials to a dumpster.
8. All prime contractors provide the necessary equipment/containers (lull/skip-box) to move daily clean/sweep debris from the building to a dumpster on a daily basis, for each construction area of their respective contracts. Skip-box shall be emptied to a dumpster by 9:00 a.m. the following day.
9. Cleaning shall be deemed a Safety & Health issue, with Prime Contracts being held accountable for fulfilling their contractual obligations.

P. Final Cleaning: At Substantial Completion of each area of construction, each Prime Contract shall clean all of their respective installations. Each area of construction shall be wiped clean of all construction dust and debris prior to turnover to the Owner.

Q. Use of Premises
    1. Limit use of premises to work in areas indicated. Confine operations areas within contract limits indicated. Do not disturb portions of the site beyond the areas in which the work is indicated.
    2. Driveways and Entrances: Keep driveways and entrances serving the premises clear and available to the Owner, the Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on site.
    3. Existing building spaced may not be used for storage unless approved by the CM and Owner.
    4. After equipment is no longer required for the work, it shall be promptly removed from the project site. Protection of construction materials and equipment stored at the project site from weather, theft, damage and all other adversity is solely the responsibility of the contractors.

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

1.8 Project Schedule. The nature of this project is to complete all the work listed as Phase 2 Civil/Sitework in the schedule by **the Project Closeout Dates specific to each Prime Contract as listed below**. Each Prime Contractor shall include in their bid proper allowances for foul weather.

A. Bids Received: 1/19/2023

B. Anticipated Notice to Proceed: 2/8/2023

C. Submittals: The following items are to be submitted within 30 business days after Notice to Proceed:
   1. Submittal List and Submission Schedule– **15 days after NTP**
   2. Field Investigations
   3. Shop Drawings
   4. Long Lead Items– **30 days after NTP**
   5. Schedule of Values and Key Submittal List – **15 days after NTP**

D. Mobilization: 04/03/2023

E. Substantial Completion and Project Closeout

   1. **Site Work Contract – 01**
      a. Substantial Completion: See 01 11 00 – Milestone Schedule
      b. Project Closeout: November 30, 2023

1.9 TEMPORARY FACILITIES AND CONTROLS OF PRIME CONTRACTS

A. Conditions of Use: Keep temporary services or conditions clean and neat in appearance. Operate in a safe and efficient manner. Relocate temporary facilities as required as work progresses; do not overload facilities or permit them to interfere with progress. Take necessary fire prevention measures; do not allow hazardous, dangerous, or unsanitary conditions to develop or persist on the Project site.

   1. Installation, operation, maintenance, and removal of each temporary service or condition are considered part of the respective Prime Contract's own construction activity, as are costs and use charges associated with each facility.

2. Locate service or condition where they will serve the Project adequately and with minimum interference of the Work, coordinate with the Construction Manager and the other Prime Contracts prior to installation.

B. Temporary Use of Permanent Facilities: Prime Contract, as installer of each permanent service or condition, shall assume responsibility for its operation, maintenance and protection during use as a construction facility prior to the Owner's acceptance, regardless of previously assigned temporary facilities and controls responsibility.

C. Owner's Facilities: Contractors are not allowed to use the Owner's facilities (toilets, telephones, food service, etc.) for their own benefit or convenience. Prime Contract Superintendents shall enforce this policy with their respective work forces.

1. Construction personnel parking will be restricted to area as directed and agreed to by the Owner, and to facilitate the completion of the work. Owner reserves the right to remove from their property, unauthorized vehicles occupying unauthorized areas, at respective vehicle owner's expense.

D. Storage on the Project Site: Each Prime Contract shall provide sufficient, secure, weather-tight storage facilities for their materials and equipment. These storage containers are required to be located on the "site logistics plan." The Owner's facilities and the Project's building areas shall not be used for storage unless agreed upon, in writing, with the Owner via the Construction Manager.

1. Until permanently incorporated into the Work, all materials on the Project site are considered to be the Prime Contract's responsibility for security and protection.
2. Prime contractor is required to check on their onsite stored material periodically to ensure that all material continues to be located in the stored location and that it remains protected from all damage, theft, and endangerment to others and ready to be used on notice for coordination with other contractors. Failure to arrange for materials to be on site to complete coordinated work with other Prime Contractors will result in back charges for delays resulting therefrom.
3. Temporary long-term storage facilities are not available to Prime Contracts by the Owner.
4. Prime Contractors and their subcontractors, shall coordinate deliveries with the Construction Manager to ensure that disruptions and Owner inconvenience are avoided.

E. Tools and Equipment: Each Prime Contractor shall provide all tools and equipment necessary for its own activities; this includes secure lock-up and storage for all items on the Project Site.

1. Provide all construction aids and miscellaneous services and facilities necessary exclusively for its own construction activities; this shall include any additional supplementary power, ventilation, lighting requirements and weather protection.

F. Project Site Communication: Each Prime Contractor shall provide their Project a full time on site at all times Superintendent with a mobile phone for the duration of the Project, as indicated in their Scope of Work. Construction Manager shall be furnished with contact numbers associated with each phone.

G. Safety: Prime Contracts, not the Architect or Construction Manager, are responsible for Project Site Safety, as related to their operations (refer to Section 013150 "Special Procedures" for further requirements).

1. Each Prime Contract shall correct safety hazards and violations immediately. If safety issues are not immediately rectified, the Owner shall secure outside sources to correct the deficiency and back charge the responsible Prime Contract.
2. Maintain unobstructed access/egress to fire extinguishers, fire hydrants, stairways, corridors, ladders and other safety routes/devices.

H. Fire Extinguishers: All Prime Contracts provide and maintain "general use" fire extinguishers for each construction area of their respective contracts; comply with applicable codes for quantities required. Use of the Owner's fire extinguishers to meet this requirement is not permitted. Comply with NFPA for recommended classes for exposure; extinguishers shall be inspected and appropriately tagged prior to being brought on site. Provide stands, painted bright orange, sturdy enough to carry the extinguisher, and built as not to create a tipping hazard.

1. Each Prime Contract shall supplement this requirement by providing additional fire extinguishers specifically related to their work activity (e.g., welding, soldering, abrasive cutting, etc.).
2. Each Prime Contract shall provide and maintain proper fire extinguishers at/in their respective on site office and storage facilities.
3. Store combustible materials in approved containers in fire-safe locations.

I. Welding: Any Prime Contract performing welding, cutting or other activities with open flames or producing sparks shall at a minimum:

1. Coordinate interruption/shutdown of detection system(s) to avoid creating false alarms.
2. Protect the area and surrounding areas from fire and damage.
3. Maintain fire extinguishers, compatible with activity, at the location of the activity.
4. Provide a continuous Fire Watch during the activity and one-half hour beyond the completion of the activity.

5. Provide all necessary fans and ventilation required for the activity.
6. Any welding, burning and or use of flame the contractor is required to provide all required "hot work permit" to use such equipment prior to start of work. Its mandatory that no "hot work" shall start without these permits issued to the CM and Owner. Failure to this requirement will result to the removal of the project super of that company from all district projects.

J. Temporary YODOCK Barriers – **filled with water**: Provide new materials whenever possible; undamaged, previously used materials, in serviceable condition, may be used if approved by the Construction Manager. Refer to the respective Specification Section when selecting materials and provide similar materials suitable for intended use.

K. Relocation of YODOCK Temporary Barrier: In the event a Prime Contractor requires relocation of a temporary barrier, Prime Contractor requiring relocation shall do so and shall protect all personnel in the work area during the relocation.

1. Initial installing Prime Contractor shall coordinate the location of barriers with other Prime Contracts, prior to placement of the barrier.
2. If a barrier must be located such that it will interfere with another's work, the Contractor requiring the work now interfered with shall relocate the barrier as required to install his work.
3. Coordinate with Construction Manager.

L. Termination and Removal of YODOCK Barriers: Remove each temporary facility when it can be replaced by the authorized permanent facility no later than Substantial Completion, or as directed by the Architect and/or Construction Manager. Complete or restore permanent facilities that may have been delayed due to interim use of a temporary barrier or condition.

M. Temporary Power: Each Prime Contractor is to use solely their own temporary power unless authorized by the district. Each Prime Contractor shall provide for their own temporary generators, power cords and temporary lighting as needed during these periods to continue to perform their work and maintain adherence to the Preliminary Schedule and approved Project Master Schedules. All temporary power equipment shall comply with all applicable codes and regulations.

N. Waste Disposal Facilities:

1. General debris/refuse/construction waste containers (dumpsters) shall be provided by each prime contractor and secured as specified herein this contract.
2. It shall be the responsibility/requirement of each Prime Contract to bring their waste to the dumpsters, including but not limited to all equipment, demolition debris, discarded materials with further identification including the following;

construction and demolition debris refers to discarded materials generally considered non-hazardous in nature, including but not limited to steel, glass, brick, concrete, asphalt material, pipe, gypsum wallboard, and lumber, from the construction or destruction of a structure as part of a construction or demolition project or from the renovation of a structure, including such debris from construction of structures at a site remote from the construction or demolition project site.

3. It shall be the responsibility and requirement of each Prime Contract to recycle metals generated by its Work, and the Work of its subcontracts.
4. Joint-effort recycling by all Prime Contracts is encouraged.

O. Temporary Sanitary Facilities: Provide temporary self-contained toilets units for duration of the project.
    1. Temporary Sanitary Facilities:
        a. Each prime contractor is required to provide their own Temporary Sanitary Facilities and secured behind fencing and/or locked after work hours and weekends.
    2. Comply with regulations and health codes for type, number, location, operation, and maintenance of fixtures and facilities.
    3. Provide separate facilities (minimum of one ea.) for male and female personnel in proportion required by OSHA.
    4. Shield toilets to ensure privacy.
    5. Coordinate mobilization and demobilization of units with Construction Manager.
    6. Toilets shall be cleaned at least once per week, with additional facilities or cleanings provided if requested by Construction Manager.
    7. Provide and maintain adequate supply of toilet tissue and hand sanitizer for each facility.

P. Security Provisions
    1. All Contractors employees shall use a single means of access and egress at one time as shown on the logistics plans, except in case of emergency, to be designated by the Construction Manager.
    2. Each Contractor and each Subcontractor shall require his employees, while on the job site, to wear, in a conspicuous location, a photo I.D. badge bearing the name of the employee and contractor. The badges of each contractor shall be numbered consecutively. An up-to-date list of all I.D. badges, indicating the name and number for each employee, shall be furnished to the Construction Manager.

1.10 WORK HOURS & SEQUENCE

A. Summer work starts June 28th, 2022 and through August 27th, 2022. All other dates are considered part of the normal school year. Normal Working Hours during summer months are from 7:30 am to 3:30pm Monday through Friday. Normal Working Hours during the school year are also 7:30am to 3:30pm unless otherwise directed by the construction manager. At times the contractor will be required to work 3:30pm to 10:00pm Monday through Friday in order to provide quite conditions for the owner.

Contractors will be required to work additional Work Hours from 3:30pm to 9:00pm (second shift) to meet the milestone schedule as indicated in spec section 01 11 00 at no additional cost to the Owner (pending school district approval from the town of Clarkstown). If Contractors are required to coordinate and perform work simultaneously with other Contractors, such work shall be performed during the Normal Working Hours. Contractors are required to work these hours as part of the base bid in order the complete their contract work by the designated Substantial Completion and Final Completion end dates as indicated on the Invitation to Bid. Saturday and Sunday work hours are available from 8am to 9pm upon request for make-up time only (see section C below - pending school district approval from the town of Clarkstown).

B. Mandatory clean up period. From August 27th to Labor Day contractors shall clean up all interior and exterior areas for school commencement.

C. Contractors are required per contract to fully staff the project during the work shifts stated above with the required manpower to complete their work within the allowed scheduled time frame. Contractors are required to provide a 72-hour advanced request to the Owner via the Construction Manager for any Saturday and Sunday work.

D. If a contractor is delayed per fault of their own and is required to work Saturdays and Sundays for makeup time during the month of August and beyond, to maintain project schedule. All costs for CM, Architect and district personal related to this 3rd shift request will be charged to the contractor at a combined rate for all at $3,000 per 8hr shift. Sundays and holiday work to make up time will also be charged to the contractor for CM, Architect and Owner coverage at combined rate of $4,500 per 8hr shift. The Contractor will be back charged fees for the District, Architect, and CM related to these additional work hours.

E. The shifts noted above are not considered overtime or premium time hours.

F. Contract summaries will provide start and end date for each contractor.

G. Additional requirements:

1. Multiple Crews: Each Prime Contract shall provide multiple crews, supervision,

cranes, scaffold and other means necessary to perform the Work, and maintain the Project Master Schedules.

2. Interruption of any utility and/or power must be coordinated with the Owner, via the Construction Manager.
3. Any and all -3rd shift, overtime, weekend and/or holiday work required to meet the Project Master Schedules shall be incorporated in the respective Prime Contract's bid.
4. Should a Contractor's progress fall behind, as to schedule, Prime Contractor shall employ additional – 3rd shift and/or overtime and/or weekend workforce until situation is rectified, to the satisfaction of the Architect and Construction Manager, at no additional cost to the Owner, however subject to charges as stated in section 1.9 D for lack of maintaining schedule
5. Should a Prime Contract feel another Prime Contract is delaying them sufficient time to complete their installations, per the schedule, the Architect and Construction Manager shall be notified in writing immediately of the situation (refer to Conditions of the Contract for protocol). A Prime Contract creating such a delay, that causes a proven burden upon another Prime Contract to maintain schedule, shall bear all costs incurred by the delayed Prime Contract to maintain the schedule.
6. The Architect and Construction Manager shall not be overburdened as to overtime cost, to monitor the work, due to no cause of his or her own. Owner will compensate the Architect and Construction Manager for all additional cost related to the issue of a Prime Contractor's failing to execute the Contract by fully staffing per the work hours and days noted herein. The Owner reserves the right to back charge the responsible Prime Contract for these fees if incurred.
7. All Asbestos and/or Lead Abatement shall take place to meet the requirements of the Preliminary Schedule and Project Master Schedules and shall be coordinated with the other Prime Contractors prior to commencement.

H. The Work shall be conducted to provide the least possible interference to the activities of the Owner's personnel and the surrounding property owners (neighbors).

1. Prime Contracts are hereby notified that: All Prime Contractors and their subcontractors shall limit excessive noise during 2nd shift known as work extending to 8PM weekdays upon approval by owner and city work hour restrictions (per school). These operations shall not create a disturbance to neighboring properties.

I. Construction access to the site shall be limited to personnel, equipment and deliveries by suppliers relative to the Work of Prime Contractors and their subcontractors. Prime Contracts shall keep the Construction Manager advised of persons accessing the site and shall seek assistance with coordinating parking and storage facility locations for all

Prime Contracts.

1. Where applicable, Contractors shall provide Building Site perimeter barricades as described herein the project and all temporary exit doors/lockable gates on the Project, securing these doors, fencing and/or gates at the end of each work shift. **Contractor is to use the provided site logistics plans as a minimum standard. The contractor is required to provide their own coordinated site logistics plan and update as required throughout construction.**
2. When a Prime Contract engages in overtime, weekend or 2nd shift work, during the summer months and or during the normal school year, the respective Prime Contract shall notify Construction Manager of such and be responsible for securing the Project Site at the end of that work shift and perform site walk around the outside of construction area/work zone ensuring all debris is pickup up and there are no construction related hazards of any kind present once the responsible person leaves the site for the evening or weekend. This includes that all materials and equipment are fenced in and keys are removed. All interior projects have the same requirement to ensure that outside the work zone is clean from dust-dirt and that no materials are left outside the work area at any time.

1.11 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.

1.12 DRAWINGS AND SPECIFICATIONS

A. Construction Documents indicate the sum total of the Contract that make up the complete work for the Project. Through this Section "Summary of Work", the intent of the Contractor's scope of Work and responsibility is generally described. Related requirements and conditions that are indicated in the Contract Documents include but are not limited to the following:

1. General Conditions and Requirements.
2. Referenced and applicable Codes, Regulations and Standards.
3. Scheduling and phasing requirements.
4. Existing conditions and restrictions on use of the site and facilities.

B. Drawings and Specifications are cooperative and supplementary. Portions of the Work, which can best be illustrated by Drawings, are not included in the Specifications and portions best described by Specifications are not depicted on Drawings. If a discrepancy is founds between the contract drawings and

specifications, the more costly assembly shall take precedent unless otherwise directed by the architect.

1. All items necessary to complete the work shall be furnished whether written or illustrated.
2. All primes shall exercise good judgment and perform all work according to related industry standards.

PART 2 - SCOPE OF WORK

2.1 PRIME CONTRACTS

A. Scope of Work: Work includes but is not limited to, the following:
   1. Provide all work identified in the Contract Documents.
   2. Applicable Specification Sections, including, but not limited to: Specification Divisions 00 through 34 inclusive.

2.2 SPECIAL NOTES

1. The Site work contractor shall employ an independent Land Surveyor, licensed to practice in the state of New York, for the duration of the work, to certify the accuracy of the survey work. At Mobilization the SW-01 Contractor shall employ their land surveyor to collect control points (benchmarks) and furnish a survey to the construction manager for coordination with the owners' vendors and other prime trades.

2. Site work contractor is responsible for all rock removal, cuts/fills to bring the site to the correct elevation.

3. All Trenching is by the SW-01 contractor. If required EC shall install all conduit and warning tape for underground electrical utilities. SW-01 to coordinate with EC-01 for trenching scope.

4. Site work contractor is to provide warning tape for all new buried water, gas, storm water, or sewer line utilities. Only warning tape of electrical utilities is by EC-01. Construction manager is to inspect installation of warning tape before backfilling of utilities.

5. The Site Work Contractor is responsible for all existing subgrade cuts and import as required to achieve specified elevations. Any surplus material, clearing debris, tree pruning debris, etc. are required to be removed from the site and legally disposed.

6. No import recycled materials will be allowed.

7. All stormwater protection, silt fence, erosion control, SWPPP maintenance/compliance etc. is by the site contractor. The engineer will perform weekly SWPPP inspections and issue reports on their findings. Should any SWPPP non conformances be identified. The site contractor will be required to correct said non conformances within the day of notification.

8. All Staging area work necessary (laydown areas, access roads, parking areas, site fence enclosure, etc.) is by the site work contractor. Site work contractor is to reference the logistics plans located in the contract drawings as a minimum standard. Site work contractor will be required to provide a logistics plan for approval prior to commencing work. **The contractor is to include in their bid for all fencing around the work are to receive temporary privacy fence screens. This includes existing fence to remain during construction. See logistics plan.**

9. Site work contractor to hire a utility survey company to map out all onsite utilities (both public and private) at locations of new work and locate on map/drawing by NYS licensed Surveyor to be provided to construction manager.

10. As-built drawings showing underground drain structures/basins, water lines, electrical, conduits/boxes, will be completed by the site contractor and digital USB copy provided to the owner at the conclusion of the project. Contractor will be required to turn over 2 hard copies of these documents as well.

3 EXECUTION

3.1.1.1 WORK SEQUENCE

A. The Work shall be conducted to provide the least possible interference to the activities of the Owner's personnel, per the Project Preliminary Schedule.

B. Work required during overtime, extended shifts or holidays due to failure of contractor to maintain schedule, will be monitored by Architect/Construction Site representative, and may be monitored by Owners' personnel. Additional costs for Architect/Construction Site Representative and/or Owner personnel will be borne by the Contractor.

C. Coordination of any utility and power interruption must be done with approval of the Architect/Construction Site Representative. Shutdowns must occur during non-occupied timeframes only. Contractor is to submit request for shutdown form located in the contract specifications.

D. Construction access to the site shall be limited to those designated for personnel, equipment and deliveries by the Owner. All contractor staging, parking and storage shall be coordinated with the Construction Site Representative and subject to change.

E. Payments: Each bid that covers more than one school (i.e. one SED project) shall provide completed AIA G732 & G703 by building (for each SED project).

F. No work shall be installed without approved shop drawings. Any work in place without approved shop drawings will be rejected and removed by that contractor at their expense and backed charge all other costs related to.

G. Any work deemed by CM, Architect and District not properly installed by a contractor per the contract drawings and specifications shall be removed immediately and corrected, with all associated costs to be borne solely by that contractor.

H. All prime contractors are to review other prime contractors' scope shown in the REVplans and specifications in the online plan room to completely understand their responsibility to coordinate their contract work with other primes in efforts to meet the project schedule and for a complete operational system or area or work.

I. All contractors are to provide within 3 weeks of award a "base line" construction schedule for their work from commencement to completion including all phasing. This schedule is to be updated monthly to show percentage progress of each item listed. This schedule shall be revised to provide a recovery schedule in the event of a delay for any reason. The recovery schedule shall include the "base line" item and the recovery to show how the delay is affecting the overall project schedule. This schedule is to be provided in MS Project or Primavera. Excel schedules are not accepted.

J. Prime contractor "base line" schedules are to be reviewed by each prime contractor and coordinated where work is related and that each prime's work shall be included in each "base line" contractor's schedule as necessary for coordination.

K. All contractors are to provide 2-week look ahead schedules showing work related to the base line and shall be coordinated with other prime 2-week look ahead schedules. These schedules will be Excel format. Format will be provided by the CM.
L. Contractors to provide a full-time supervisor on site 100% of the time. This is not a working foreman. Supervisors are not working with tools they are supervising their workers and coordinating with other contractors and district/ CM. Failure to provide will be default of your contract and subject costs related to and termination.
M. All prime contractors are the provide a project manpower structure showing names and telephone numbers of each responsible person on the project. This shall be updated as needed if personal changes are made.
N. Each prime contractor is responsible to provide and install temporary chain link fence around their own stored equipment and dumpsters on site per spec section 013150-1.7A
O. No equipment, panels or any services shall be turned off for any reason without written request and approval by the district. Project form shall be used for all shutdowns and required a 3-day notice. Other shutdowns may require more time.

3.1.1.2 CONTRACT **No.1 SITE WORK (SW-01)** – PRIME CONTRACT FOR SITE WORK AT

B. Nanuet High School - Sitework
C. Barr Middle School – Sitework
D. Miller Elementary School – Sitework
E. Highview Elementary School – Sitework

1. Project Site Superintendent: Site work contractor shall provide one (1) full time, non-working Project Site Superintendent while any work related to this Contract is being performed. Superintendent shall be responsible for the daily activities of this Contract and work closely with the Construction Manager and the other Prime Contract Superintendents/Foremen, in a manner that best promotes the objectives of the Project.
    a. Superintendent shall be on-site while Contractor's own forces, and/or subcontractors are performing work on the Project Site; also, while other Prime Contracts are installing work, or require the coordination of work related to this Prime Contract, and/or as requested by the Construction Manager.
    b. Superintendent shall be the same individual throughout the duration of the Project.
    c. Project Site Superintendent shall be an individual with minimum of five (5) years' experience in this field of work.
    d. Refer to Section 013100 "Project Management and Coordination" for further requirements.

2. Project Foreman: Site work contractor shall provide at least one (1) full time Project Foreman during each shift of work at each school; Foreman shall be able to make binding decisions, as they relate to the daily activities of their crew, as related to achieving the goals of the Project.

3. Site Communications: Site work contractor shall provide Project Superintendent with a mobile phone, all costs and service charges shall be paid for by Site work contractor; provide Construction Manager with contact number(s).

4. SW Contractor shall confirm all invert elevations shown on contract drawings prior to submitting shop drawings for approval. All shop drawings shall show the proper invert elevations for a complete and operational drainage system.

5. Project Site Field Office: Provide site office facilities for this Contract's Project Superintendent. Site Office shall be equipped with telephone with answering machine, fax and e-mail. Contact information shall be provided to the Construction Manager.
    a. The Owner reserves the right to seek reimbursement for temporary facilities not provided by this Prime Contract.

6. Scope of Work: Work of the SW Contractor includes, but is not limited to, the following:
    a. Coordination with other Prime Contracts, Owner and Construction Manager as required to adhere to and maintain approved Project Master Schedules.
    b. There is work shown on the drawings for the utilities scope to be installed by this contractor during this phase.
    c. A
    ll demolition and new site work scope indicated in Contract Documents, including removal and legal disposal off site. Including but not limited to all trees, shrubbery, rocks, unsuitable soil, pavement/asphalt, waterproofing, parking, tennis courts, and accessories at no cost to the owner and as indicated in the construction documents.
    d. All necessary site work scope to accommodate the work of others related to the completion of the site work scope.
    e. All site concrete repair included in the base contract as indicated in Contract Documents.
    f. The SW Contractor shall provide and install adequate protection to adjacent areas of construction work.
    g. SW Contractor shall conform to phasing and sequencing of site work as shown on phasing drawings. Any deviation shall be clearly indicated and defined in the bid proposal. See the Preliminary Schedule. coordinated with the Construction Manager. See Preliminary Schedule.
    h. Work delineation between building and site is indicated on the Contract Drawings.

i. For work performed between June 28, 2023 and August 27, 2023, SW Contractor shall do the following:

j. At the start of each work day, SW Contractor shall maintain access to the building at all times. Coordinate with Construction Manager for any changes to building access due to site work.

k. For work performed from August 27, 2023 to September 3, 2023, SW Contractor shall do the following:

l. Maintain clear and debris free access to the building. Remove any tripping hazards.

m. Prime Contract shall understand that Site Work may require work to proceed while school will be session; all cost associated with this sequence shall be incorporated into the Bid.

n. Environmental Protection: Provide protection, and conduct construction in ways and by methods that comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.

o. Restrict use of noisemaking tools and equipment to hours that will minimize complaints from persons or firms on or near the Project site.

p. Provide dust control while the Work of this Contract is being performed. Means and methods are not limited to water tank trucks and other water dust control measures to control airborne particles. Limit situations that may create dust contamination while Work of this Contract is idle. Provide all demolition as indicated in the Construction Documents, or required for Work of this Prime Contract:

q. Coordinate all demolition with Hazardous Materials documents. Coordinate with all other Prime Contracts regarding removals required for the Project. Demolition of a system shall mean any and all components removed in their entirety, to the point of origin, source or substrate

r. Provide cut and patch work related to that of this Prime Contract, and at those areas specifically identified in the Construction Documents, regardless of trade creating the area to be patched.

s. Each Prime Contract is responsible for all other respective cutting and patching required of their installations (refer to Section 017329 for further information).

t. Provide all miscellaneous supports for items or equipment installed under this Prime Contract, and as coordinated with other Prime Contracts for metal strapping and/or wood blocking for installation of EC and PC Work related to site work.

u. Final connection of utilities to equipment provided by this Prime Contract, are by EC, MC and/or PC, unless noted or assigned otherwise.

v. SW Contractor shall coordinate with Site Work MEP and shall provide all necessary work required to complete the MEP Site Work. The work includes but not limited to trenching for conduit, concreting, light pole concrete bases, back filling etc.

w. Substantial Completion: Clean all SW Contractor installations and provided equipment at the time of Substantial Completion or as directed by Construction Manager.
x. Refer to Division 00 Section "Project Forms" and make use of these forms for the installation and coordination of the Work. These forms are included to assist this Prime Contract with coordinating the installation of Work by others prior to enclosing and/or finishing work. Owner will not compensate Prime Contract for work not properly coordinated that result in added work, or removal of work. Secure the proper signatures or acknowledgements, as indicated, prior to installing/completing the Work.
y. Coordinate all the preceding requirements, accordingly, with all applicable Alternates indicated in Section 012300 "Alternates".
z. Submission of all required closeout documentation and final application for payment no later than November 26, 2023.
aa. Provide all pavement striping shown.

bb. Applicable Specification Sections: All specification Sections itemized below are to be provided complete by this Prime Contract, unless noted otherwise. In addition to these specifications, the contractor is required to review all specifications included in the overall contract that may contain related scope or detail for this specific contract.

1. **All Division 00 and 01 – Procurement and Contracting Requirements & General Requirements.**
2. **Division 02 – Existing Conditions**
3. **Division 03 – Concrete**
4. **Division 05 – Metals**
5. **Division 31 – Earthwork**
6. **Division 32 – Exterior Improvements**
7. **Division 33 - Utilities**
8. **Division 34 - Transportation**

F. Applicable Drawings : All drawings itemized below are to be provided complete by this Prime Contract, unless noted otherwise. In addition to these drawings, the contractor is required to review all drawings included in the overall contract that may contain related scope or detail for this specific contract.
    1. **All "HS-C, MES-C, BMS-C, HES-C", drawings.**

7. Supplemental Temporary Facilities and Controls by SW Contractor include, but are not limited to:

a. Waste Disposal Facilities: See Subparagraph 1.7.N of this Section
b. Snow and Ice Removal: Provide removal of snow and ice until Substantial Completion of the Project, or as required to avoid delays in the Schedule.
c. Removal includes temporary roadways, Owner provided contractor parking areas, staging areas, remote staging areas, sidewalks, exterior temporary ramps and stairs within the construction and staging area.
d. Removal shall include open areas of the Project building that is under construction, including, but not limited to: SOG, SOD and roof deck areas.
e. Temporary Barricades: Provide, maintain and eventually remove all temporary barricades per OSHA Regulations, Industry Standards, or as indicated in the Construction Documents. These include, but are not limited to, the following areas:
f. isolate site renovation areas.
g. Temporary Sanitary Facilities: Provided by each contractor.
h. Provide all shoring required for Work of this Prime Contract, including but not limited to;
i. Cutting or altering of existing construction.
j. Provide protection of all new and existing surfaces during the Work. Do not stand, walk, or work off of any unprotected finished surface above the floor.
k. Maintain temporary chain link fencing with driven posts in the ground and Yodock or approved equal barricading to keep unauthorized persons away from excavations and hazardous areas for which this Prime Contract is responsible.
l. Traffic Controls: Provide flagman while any operations of this Prime Contract interfere with traffic flow on adjacent roadways, active parking lots and while any pedestrian traffic is entering the area or parking lots.
m. See Specification 013150 Safety & Health for further detailed information.

END OF SECTION 01 12 01

SECTION 01 12 02 – CONTRACT SUMMARY – BE-01

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 includes a summary of each Prime Contract, including responsibilities for coordination and temporary facilities and controls. One set of Construction Documents is issued covering the Work of multiple Prime Contracts. Each Prime Contract is responsible to review all drawings and specifications for specific requirements indicated, and for a general understanding and knowledge of the work of other Prime Contracts. All Prime Contracts are responsible for all Work of their Contract no matter what drawing on which the Work appears. All Prime Contracts are responsible to coordinate their work related to the complete set of drawings and specifications, not limited to each prime contractor scope. **All Bidders should acknowledge that for each contract listed below, each contractor is their own General Contractor and subject to all General Contractor requirements.**

B.

1. **Building Envelope Contract BE # 01:** The Building Envelope Contractor shall be selected based on the bid procedure as described in the Bid Documents.

C.

1) Work related to drawings: (*In addition to these drawings, the contractor is required to review all specifications included in the overall contract that may contain related scope or detail for this specific contract.)*
   a) Nanuet High School
   b) Barr Middle School

D.

1. Contract Bidders are responsible for trade work coordination and are not limited to the drawings listed below.

a. Bid Package Contract No. 01 - Building Envelope: All work related to building envelope construction includes but is not limited the following items: (Refer to the Contract Documents for full scope of work.)
   1) Exterior abatement, temporary protection, barriers, scaffolding, structural steel; masonry work, including but not limited to brick pointing, stitching, scrape and paint existing lintels, stone caps, stone repair and joint sealing, and new window screens at existing, work applies to all schools as described in the contract documents.
   2) Abatement: All Asbestos and Lead Abatement on Abatement Drawings (ASB Series) associated with the contract scope, and all abatement associated with roofing scope. The work shall be performed by a qualified Abatement Contractor, as per specification 028200 and ASB Series drawings. There is no separate Abatement Contract.
   3) All work related to drawings; (In addition to these drawings, the contractor is required to review all specifications included in the overall contract that may contain related scope or detail for this specific contract.)

1.3 Related Sections include, but are not limited to, the following:

A. Division 01 Section "Work Restrictions" for use of the Project site and for requirements for continued Owner occupancy of premises.

B. Division 01 Section "Project Management and Coordination" for general coordination requirements.

C. Division 01 Section "Project Forms" for documents required for Testing and Coordination.

D. Division 01 Section "Temporary Facilities and Controls" for specific requirements for temporary facilities and controls

DEFINITIONS

E. Building Site: The Building Site shall be defined in the Construction Documents, as the building footprint, and all related construction within a five-foot (5'0") distance of the building's exterior face, unless noted or assigned otherwise. Coordinate with specific exceptions to the 5'0" limit indicated within each Scope of Work outline.

F. Permanent Enclosure: As determined by the Architect: permanent or temporary roofing is complete, insulated, and weathertight; and all openings are closed with permanent construction or substantial temporary closures. All cost associated with failure to

maintain described installations that result in any damage or contamination to the Owner's property, shall be borne by the Prime Contract responsible for the installation.

1.4 MANAGEMENT AND COORDINATION

A. The Owner shall provide a Construction Manager.

1. The Construction Manager shall provide a full time construction site representative recognized as the Construction Manager.

1.5 CONSTRUCTION MANAGER

A. The construction manager shall provide on-site administration of the Contracts for Construction in cooperation with the Architect as set in AIA Document A232 ™ – 2009, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition, as modified.

B. The Construction Manager shall provide administrative, management and related services to coordinate scheduled activities and responsibilities of the Multiple Prime Contractors with each other and with those of the Construction Manager, the Owner and the Architect. The Construction Manager shall coordinate the activities of the Multiple Prime Contractors in accordance with the latest approved Project Schedule and the Contract Documents.

C. Utilizing the construction schedules provided by the Multiple Prime Contractors, the Construction Manager shall update the Project schedule, incorporating the activities of the Owner, Architect, and Multiple Prime Contractors on the Projects, including activity sequences and durations, allocation of labor and materials, processing of Shop Drawings, Product Data and Samples, and delivery and procurement of products, including those that must be ordered will in advance of construction. The Project schedule shall include the Owner's occupancy requirements showing portions of the Project having occupancy priority.

D. Utilizing information from the Multiple Prime Contractors, the Construction Manager shall schedule and coordinate the sequence of construction and assignment of space in areas where the Multiple Prime Contractors are performing Work, in accordance with the Contract Documents and the latest approved Project Schedule.

1.6 GENERAL REQUIREMENTS OF PRIME CONTRACTS

A. Prime Contracts: The context used in this Section are separate Prime Contracts that represent significant elements of work that is to be performed concurrently and in close coordination with the work of other Prime Contracts for the benefits of the Owner. Each Prime Contract is recognized to be a major part of the Work.

B. Assignment of Work: Should a conflict be indicated, Section 011200 shall take precedence over all scope of work assignments that may be indicated elsewhere within the Construction Documents.

C. Seismic Requirements: Prime Contracts are to be aware that the building(s) is located within a Seismic Zone indicated in the documents and shall provide installations in compliance with all related code requirements.

D. Layout and Installation: Each Prime Contractor shall schedule, layout and install their Work in such manner as not to delay or interfere with, but to compliment the execution of the work of other Prime Contracts, utility companies and Owner's operations.

E. Extent of Contract: The Contract Documents, drawings and specifications each contain more specific descriptions of the Work facilitating which Prime Contract includes specific elements of the Project.

1. Work provided by each Prime Contract shall mean complete and operable systems and assemblies, including products, components, accessories and installations required by the Construction Documents or indicated otherwise.
2. Prime Contractors shall exercise good judgment and perform all work according to related industry standards.
3. The Owner is exempt from payment of Federal, State and local taxes, including sales and compensating use taxes on all materials and supplies incorporated in completing the Work; these taxes are not to be included in the Bid. This exemption does not apply to tools, machinery, equipment or other property leased by, or to, the Contractor or sub-contractor, or to supplies and materials, which even though consumed are not incorporated into the completed work. Prime Contractors, and their sub-contractors, shall be responsible for paying any and all applicable taxes on said tools, machinery, equipment or property, and upon all said unincorporated supplies and materials, whether purchased or leased.
4. Prime Contracts shall understand that time is of the essence, and will adequately staff the Project by employing the appropriate trade's people to perform the Work; these people shall be experienced in their respective trades. A shortage of labor in the industry shall not be accepted as an excuse for not properly staffing the Project; all efforts shall be made to meet or exceed the schedule, including additional staff and/or labor hours necessary. All cost associated with this item shall be included within the Bid.
5. Local custom and trade union jurisdictional settlements will not control the scope of the Work of each Prime Contract.
    a. When a potential jurisdictional dispute or similar interruption of Work is first identified, or threatened, the affected Prime Contracts shall promptly negotiate a reasonable settlement to avoid or minimize the pending interruption and delays.

b. Contractor's trade-related issues shall not be grounds for modification or extension of scheduled completion date(s).

6. The Work of all Prime Contracts requires close coordination with other Prime Contracts and construction personnel. Maintain flexibility and cooperation through the Project. "Out of Sequence" and "Delay" claims will only be considered when requirements of Division 01 "Administrative Requirements" have been adhered to. Delay claims must be in writing and forwarded to the Architect, per the requirements of the General Conditions of the Contract. Claims not submitted per these requirements will be rejected and/or denied.
7. The intention of the Work is to follow a logical sequence, however, a Prime Contractor may be required by the Architect or Construction Manager, to temporarily install, omit or leave out a section(s) of Work, out of sequence. All such out of sequence work, and come back time, at these areas shall be performed at no additional cost to the Owner.

F. Substitutions: Per Division 01 Section "Substitution Procedures", each Prime Contractor shall cooperate with the other Prime Contractors involved, to coordinate approved substitutions with remainder of the Work. Contractors shall submit all "Substitutions" at least ten (10) days prior to the date for receipt of Bids as specified in the Instructions to Bidders 002113 Section 3.3 Equivalents or bid will be considered per "basis of design".

G. Construction Schedules: Refer to Divisions 01 Section "Construction Progress Documentation", "Preliminary Schedule" and "Project Management and Coordination" for requirements related to meetings and schedules.

H. Construction Sequencing and Phasing: Prime Contractor shall understand that Sequencing and/or Phasing Plans are contingent upon the work areas being complete/occupied, prior to the next area of Work beginning. Should an area of construction not be complete per the Project Preliminary Schedule, the Project Master Construction Schedule/Sequencing Plans will be adjusted accordingly. The Owner will not be responsible for delay claims due to adjustments being no fault of their own.

1. Prime Contracts may be required to re-sequence the phasing of the project as a result of changes to the schedule. Prime Contracts shall provide these adjustments at no additional cost to the Owner.

I. Testing and Inspections by Owner: The Owner shall employ an independent qualified testing and inspection agency for monitoring on-site soils analysis (excluding top soil analysis), soils compaction, cast-in-place concrete, asbestos and lead abatement monitoring and Special Inspections indicated in the Construction Documents (refer to Division 01 "Quality Requirements" and/or Statement of Special Inspections" for additional specific information)

1. Prime Contractor shall give one week notice as to commencement for these requirements. Once underway, Prime Contractor shall coordinate with the Construction Manager and give 48 hours' notice as to test(s) required, by Owner's Agency, and further verify the need 24 hours in advance. Full cooperation and coordination is expected of all Contractors and their personnel with the Owner's Testing Agency in fulfilling test requirements; provide all data and materials requested for required reports.
2. Other than with regard to compliance with state and federal laws, the testing agency holds no execution authority other than to provide test results. Should testing indicate a discrepancy or non-compliance during execution of the Work, the Testing and Inspection Agent shall promptly notify the Construction Manager and Project Superintendent of such; however, the Prime Contract shall bear full responsibility for making any decision with regard to proceeding with, or stopping, the Work.
3. This assignment of Testing and Inspection responsibilities shall take precedence over any respective responsibilities that are indicated otherwise in the Construction Documents.

J. Testing by Others: All testing requirements not listed in preceding "Testing & Inspections by Owner" or otherwise identified in Division 01 "Quality Requirements" and/or "Statement of Special Inspections" shall be the responsibility of the Prime Contract providing the respective Work as indicated in the Construction Documents.

1. The respective Prime Contract shall have performed testing requirements indicated in individual Specification Sections which may inadvertently indicate "Owner to provide," which are not identified in preceding paragraph "Testing & Inspections by Owner".
2. Prime Contractor shall submit their Testing Agency qualifications to the Architect for approval prior to any test being performed. Construction Manager shall be given 48 hours' notice of any test/inspections to be performed by Prime Contractor's Testing Agency. 24- hour notification shall be given to the Construction Manager for test/inspections requiring his/her presence; 72-hour notification shall be given to the Architect for test/inspections requiring his/her presence.
3. Determinations required of the Architect shall be anticipated by the Prime Contractor to allow ample time for inspection, investigation and reporting.

K. Existing Conditions: Each Prime Contract shall verify existing conditions in the field prior to work commencing in that area and immediately report conditions to the Architect that are not represented correctly by the Construction Documents.

1. Each Prime Contract is responsible for familiarizing himself with Project Site Logistics and provide a "site logistics plan locating storage area, scaffolds, rubbish

areas, stock piles and egress related to all work, included phased construction within 30 days of award.

2. Each Prime Contract has been given ample opportunity to review Existing Conditions related to the Project. Existing Conditions not noted in the Construction Documents that could be easily recognized during pre-bid review that interfere with the respective Prime Contract's work, shall be the responsibility of the respective Prime Contract. This includes all costs associated with removal, patching, relocation or re-fabrication of installations.

L. Hazardous Materials: Each Prime Contract shall familiarize themselves with the Hazardous Materials Sections/Drawings of the Construction Documents and follow DOL/OSHA/EPA/SED regulations while performing their respective Work in these areas. Discovery of non-identified or concealed hazardous materials shall be reported to the Construction Manager immediately and followed up with written documentation of the event.

M. Protection of Installations: Each Prime Contract is responsible for protecting their installations at all times. All costs incurred to repair, replace or clean insufficiently protected materials/installations shall be the responsibility of the installing Prime Contract.

1. Architect shall be notified, in writing, immediately upon material/installation being damaged; notification shall indicate responsible party.
2. Owner will not be liable for damaged materials and/or installations by "others", when "others" cannot be identified.
3. Repair damaged work, clean exposed surfaces or replace construction installations that cannot be repaired.
4. Each Prime Contract shall be responsible for removing all labels not required to remain from their installations.
5. Installations shall be wiped clean and proper protection then installed.
6. Each Prime Contract is responsible to protect another primes work in the event that prime has to work over or on top of that other primes work being complete. The prime working over the completed work takes full responsibility of that other primes completed work both in condition and operation.

N. Daily Cleaning: All Prime Contracts are responsible for any and all debris caused by their Work, including the Work of their subcontractors. A daily clean up and disposal is required by each Prime Contract for the periods which that Prime Contract, or its sub-contractors, are performing Work on site.

1. Assign at least one person for a daily clean and sweep of the work area(s). Prime Contractor shall allot sufficient manpower and time for this to be completed by the end of each shift. Submit name of this person(s) to Construction Manager.

a. Construction Manager shall have the authority to give direction to person(s) on the Project Site identified by the Prime Contract as designated for cleanup tasks. This shall include the safety review/securing of the site-work zone after each shift.
b. This person has check that no construction debris was dumped in any district dumpers during this end of shift site review, if found the contractor must remove immediately the next morning to avoid back charges costs of $1500 per day not removed.

2. Any Prime Contract not providing personnel for Daily Cleaning will be Back Charged for labor provided by the Owner to complete this task.
3. Contractor working solely in an area shall be responsible for clean/sweep of that area.
4. Daily cleaning will not mean any one Prime Contract is responsible for assisting another Prime Contract with removing major quantities of debris created by a particular Prime Contract's Work.
5. Daily cleaning will be mandated to remove from the building any debris created by day-to-day activities. All Prime shall assist in sweeping shared work areas and shared corridors while working on site. Each Prime shall assist in mopping of shared corridors while working on site or as required by the Owner.
6. All prime contractors and subcontractors are required to provide sweeping compound for daily cleaning in their respective exterior and interior work areas. Each Prime Contract shall provide a sufficient number of brooms or other necessary tools, for use by their personnel to adequately fulfill their obligations.
7. All prime contractors shall provide and maintain garbage cans/refuse containers with liners for each construction area of their respective contracts as directed by the Construction Manager and shall be responsible for disposing of these materials to a dumpster.
8. All prime contractors provide the necessary equipment/containers (lull/skip-box) to move daily clean/sweep debris from the building to a dumpster on a daily basis, for each construction area of their respective contracts. Skip-box shall be emptied to a dumpster by 9:00 a.m. the following day.
9. Cleaning shall be deemed a Safety & Health issue, with Prime Contracts being held accountable for fulfilling their contractual obligations.

O. Final Cleaning: At Substantial Completion of each area of construction, each Prime Contract shall wipe/vacuum clean all of their respective installations; All interior contracts performing work inside the buildings shall mop clean all building surrounding areas and finish flooring and remove all marks/blemishes to the finish, for each construction area of their respective contracts. Each area of construction shall be wiped clean of all construction dust and debris prior to turnover to the Owner.

P. Cutting and Patching: All Primes are responsible for cutting and patching required to complete their Work. All repair of existing finish Work (including finish floors) shall be performed by contract requiring work, meeting or exceeding minimum contract requirements for that particular section, specification, or type of work. All concealed openings (piping, ductwork, conduit, etc.) must be repaired to comply with specified wall or deck conditions as well as required fire and sound ratings. All corridor penetrations require fire safing. If contractor elects to install their new work in an existing unrated wall or floor opening, whereas the wall/floor is a fire rated condition, that contractor is responsible to fire rate that opening to match the wall/floor fire rating with new and all other existing wire, piping, ducts etc. Other areas are noted in drawings and specifications.

1.7 Project Schedule. The nature of this project is to complete all the work listed as Phase 3 in the schedule by **the Project Closeout Dates specific to each Prime Contract as listed below**. Each Prime Contractor shall include in their bid proper allowances for foul weather.

A. Bids Received: 1/19/2023

B. Anticipated Notice to Proceed: 2/8/2023

C. Submittals: The following items are to be submitted within 60 business days after Notice to Proceed unless otherwise noted:
   1. Submittal List and Submission Schedule – **15 days after NTP**
   2. Field Investigations
   3. Shop Drawings
   4. Long Lead Items – **30 days after NTP**
   5. Schedule of Values and Key Submittal List – **15 days after NTP**

D. Mobilization: 4/3/2023

E. Substantial Completion and Project Closeout: 8/11/2023

1. **Building Envelope**
   a. Façade
      1) Substantial Completion: August 11, 2023.
      2) Project Closeout: October 31, 2023.

1.8 TEMPORARY FACILITIES AND CONTROLS OF PRIME CONTRACTS

A. Conditions of Use: Keep temporary services or conditions clean and neat in appearance. Operate in a safe and efficient manner. Relocate temporary facilities as required as work progresses; do not overload facilities or permit them to interfere with progress. Take necessary fire prevention measures; do not allow hazardous, dangerous, or unsanitary conditions to develop or persist on the Project site.

1. Installation, operation, maintenance, and removal of each temporary service or condition are considered part of the respective Prime Contract's own construction activity, as are costs and use charges associated with each facility.
2. Locate service or condition where they will serve the Project adequately and with minimum interference of the Work, coordinate with the Construction Manager and the other Prime Contracts prior to installation.

B. Temporary Use of Permanent Facilities: Prime Contract, as installer of each permanent service or condition, shall assume responsibility for its operation, maintenance and protection during use as a construction facility prior to the Owner's acceptance, regardless of previously assigned temporary facilities and controls responsibility.

C. Owner's Facilities: Contractors are not allowed to use the Owner's facilities (toilets, telephones, food service, etc.) for their own benefit or convenience. Prime Contract Superintendents shall enforce this policy with their respective work forces.

1. Construction personnel parking will be restricted to area as directed and agreed to by the Owner, and to facilitate the completion of the work. Owner reserves the right to remove from their property, unauthorized vehicles occupying unauthorized areas, at respective vehicle owner's expense.

D. Storage on the Project Site: Each Prime Contract shall provide sufficient secure weather-tight storage facilities for their materials and equipment. These storage containers are required to be located on the "site logistics plan." The Owner's facilities and the Project's building areas shall <u>not</u> be used for storage unless agreed upon, in writing, with the Owner via the Construction Manager.

1. Until permanently incorporated into the Work, all materials on the Project site are considered to be the Prime Contract's responsibility for security and protection.
2. Prime contractor is required to check on their onsite stored material periodically to ensure that all material continues to be located in the stored location and that it remains protected from all damage, theft, and endangerment to others and ready to be used on notice for coordination with other contractors. Failure to arrange for materials to be on site to complete coordinated work with other Prime Contractors will result in back charges for delays resulting therefrom.
3. Temporary long-term storage facilities are not available to Prime Contracts by the Owner.

4. Prime Contractors and their subcontractors, shall coordinate deliveries with the Construction Manager to ensure that disruptions and Owner inconvenience are avoided.

E. Tools and Equipment: Each Prime Contractor shall provide all tools and equipment necessary for its own activities; this includes secure lock-up and storage for all items on the Project Site.

1. Provide all construction aids and miscellaneous services and facilities necessary exclusively for its own construction activities; this shall include any additional supplementary power, ventilation, lighting requirements and weather protection.

F. Project Site Communication: Each Prime Contractor shall provide their Project a full time on site at all times Superintendent with a mobile phone for the duration of the Project, as indicated in their Scope of Work. Construction Manager shall be furnished with contact numbers associated with each phone.

G. Safety: Prime Contracts, not the Architect or Construction Manager, are responsible for Project Site Safety, as related to their operations (refer to Section 013150 "Special Procedures" for further requirements).

1. Each Prime Contract shall correct safety hazards and violations immediately. If safety issues are not immediately rectified, the Owner shall secure outside sources to correct the deficiency and back charge the responsible Prime Contract.
2. Maintain unobstructed access/egress to fire extinguishers, fire hydrants, stairways, corridors, ladders and other safety routes/devices.

H. Fire Extinguishers: All Prime Contracts provide and maintain "general use" fire extinguishers for each construction area of their respective contracts; comply with applicable codes for quantities required. Use of the Owner's fire extinguishers to meet this requirement is not permitted. Comply with NFPA for recommended classes for exposure; extinguishers shall be inspected and appropriately tagged prior to being brought on site. Provide stands, painted bright orange, sturdy enough to carry the extinguisher, and built as not to create a tipping hazard.

1. Each Prime Contract shall supplement this requirement by providing additional fire extinguishers specifically related to their work activity (e.g., welding, soldering, abrasive cutting, etc.).
2. Each Prime Contract shall provide and maintain proper fire extinguishers at/in their respective on site office and storage facilities.
3. Store combustible materials in approved containers in fire-safe locations.

I. Welding: Any Prime Contract performing welding, cutting or other activities with open flames or producing sparks shall at a minimum:

1. Coordinate interruption/shutdown of detection system(s) to avoid creating false alarms.
2. Protect the area and surrounding areas from fire and damage.
3. Maintain fire extinguishers, compatible with activity, at the location of the activity.
4. Provide a continuous Fire Watch during the activity and one-half hour beyond the completion of the activity.
5. Provide all necessary fans and ventilation required for the activity.
6. Any welding, burning and or use of flame the contractor is required to provide all required "hot work permit" to use such equipment prior to start of work. Its mandatory that no "hot work" shall start without these permits issued to the CM and Owner. Failure to this requirement will result to the removal of the project super of that company from all district projects.

J. Temporary YODOCK Barriers: Provide new materials whenever possible; undamaged, previously used materials, in serviceable condition, may be used if approved by the Construction Manager. Refer to the respective Specification Section when selecting materials and provide similar materials suitable for intended use.

K. Relocation of YODOCK Temporary Barrier: In the event a Prime Contractor requires relocation of a temporary barrier, Prime Contractor requiring relocation shall do so and shall protect all personnel in the work area during the relocation.

1. Initial installing Prime Contractor shall coordinate the location of barriers with other Prime Contracts, prior to placement of the barrier.
2. If a barrier must be located such that it will interfere with another's work, the Contractor requiring the work now interfered with shall relocate the barrier as required to install his work.
3. Coordinate with Construction Manager.

L. Termination and Removal of YODOCK Barriers: Remove each temporary facility when it can be replaced by the authorized permanent facility no later than Substantial Completion, or as directed by the Architect and/or Construction Manager. Complete or restore permanent facilities that may have been delayed due to interim use of a temporary barrier or condition.

M. Temporary Power: Each Prime Contractor shall provide for their own temporary power needs for any scheduled electrical utility shut downs. Each Prime Contractor shall provide for their own temporary generators, power cords and temporary lighting as needed during these periods to continue to perform their work and maintain adherence to the Preliminary Schedule and approved Project Master Schedules. All temporary power equipment shall comply with all applicable codes and regulations.

1. In all other schools in this phase 2, known as NHS & BMS have local electrical panel replacements, therefore each prime contractor and their sub-contractors

are required to provide their own generator power for equipment and lighting to perform their work during these times with no additional cost to the owner.

N. Waste Disposal Facilities:

1. General debris/refuse/construction waste containers (dumpsters) shall be provided by each prime contractor and secured as specified herein this contract.
2. It shall be the responsibility/requirement of each Prime Contract to bring their waste to the dumpsters, including but not limited to all equipment, demolition debris, discarded materials with further identification including the following; construction and demolition debris refers to discarded materials generally considered non-hazardous in nature, including but not limited to steel, glass, brick, concrete, asphalt material, pipe, gypsum wallboard, and lumber, from the construction or destruction of a structure as part of a construction or demolition project or from the renovation of a structure, including such debris from construction of structures at a site remote from the construction or demolition project site.
3. It shall be the responsibility and requirement of each Prime Contract to recycle metals generated by its Work, and the Work of its subcontracts.
4. Joint-effort recycling by all Prime Contracts is encouraged.

O. Temporary Sanitary Facilities: Provide temporary self-contained toilets units for duration of the project.
    1. Temporary Sanitary Facilities:
        a. Each prime contractor is required to provide their own Temporary Sanitary Facilities and secured behind fencing and/or locked after work hours and weekends.
    2. Comply with regulations and health codes for type, number, location, operation, and maintenance of fixtures and facilities.
    3. Provide separate facilities (minimum of one ea.) for male and female personnel in proportion required by OSHA.
    4. Shield toilets to ensure privacy.
    5. Coordinate mobilization and demobilization of units with Construction Manager.
    6. Toilets shall be cleaned at least once per week, with additional facilities or cleanings provided if requested by Construction Manager.
    7. Provide and maintain adequate supply of toilet tissue and hand sanitizer for each facility.

1.9 WORK HOURS & SEQUENCE

A. Summer work starts June 27th through August 23rd for 2023. The Summer working hours are from 7:00am to 9:30pm. There is no additional cost to the owner for working

the hours of 3:30pm through 9:30pm or on Saturdays and holidays during the Summer.

B. **NOTE: Masonry Projects may commence during the school year. Working hours are to be 7:00AM – 4:00PM. There will be black-out periods for testing where work cannot commence. The contractor is expected to request these dates from the CM and integrate into their milestone schedule.**

C. Work performed during cold weather shall follow cold weather masonry procedures as outlined in Division 03 of the contract specifications.

D. Building Envelope Contractor (BE) may not perform any abatement, grinding of masonry joints, saw cutting, or otherwise high noise level disruptive work during school hours. This work must be performed second shift and shall be incorporated in to the contractor's bid. Non-disruptive work such as masonry repointing, lintel installation, re-flashing, etc. may be performed during the school day. BE contractor is required to submit a schedule and work plan to the CM for approval of work to be performed during the school day. All work to be performed during the school day is at the CM's sole discretion.

E. Contractors can start working on site to investigate for work within 30 days of execution of contract, to the extent permitted by contract. If Contractors are required to coordinate and perform work simultaneously with other Contractors, such work shall be performed during the Normal Working Hours. Contractors are required to work these hours as part of the base bid in order the complete their contract work by the designated Substantial Completion and Final Completion end dates as indicated on the Invitation to Bid. Saturday and Sunday work hours are available from 8am to 9pm upon request for make-up time only (see section D below).

F. Mandatory clean up period - From August 24th, 2023 to August 31st , 2023.

G. Contractors are required per contract to fully staff each project site during the work shifts stated above with the required manpower to complete their work within the allowed scheduled time frame. Contractors are required to provide a 72-hour advanced request to the Owner via the Construction Manager for any Saturday work. Exterior weekend work is subject to city noise ordinance. If a project schedule delay has been caused by the fault of the contractor, the contractor is required to provide Sunday shift to make up the project schedule. All costs for CM, Architect and district personal related to this shift request will be charged to the contractor at a combined rate for all at $3,000 per 8hr shift.

H. Contract summaries will provide start and end date for each contractor.

I. Additional requirements:

1. Multiple Crews: Each Prime Contract shall provide multiple crews, supervision,

cranes, scaffold and other means necessary to perform the Work, and maintain the Project Master Schedules.

2. Interruption of any utility and/or power must be coordinated with the Owner, via the Construction Manager.
3. Any and all -overtime, weekend and/or holiday work required to meet the Project Master Schedules shall be incorporated in the respective Prime Contract's bid.
4. Should a Contractor's progress fall behind, as to schedule, Prime Contractor shall employ additional –or overtime and/or weekend workforce until situation is rectified, to the satisfaction of the Architect and Construction Manager, at no additional cost to the Owner, however subject to charges as stated in section 1.8 C for lack of maintaining schedule
5. Should a Prime Contract feel another Prime Contract is delaying them sufficient time to complete their installations, per the schedule, the Architect and Construction Manager shall be notified in writing immediately of the situation (refer to Conditions of the Contract for protocol). A Prime Contract creating such a delay, that causes a proven burden upon another Prime Contract to maintain schedule, shall bear all costs incurred by the delayed Prime Contract to maintain the schedule.
6. The Architect and Construction Manager shall not be overburdened as to overtime cost, to monitor the work, due to no cause of his or her own. Owner will compensate the Architect and Construction Manager for all additional cost related to the issue of a Prime Contractor's failing to execute the Contract by fully staffing per the work hours and days noted herein. The Owner reserves the right to back charge the responsible Prime Contract for these fees if incurred.
7. All Asbestos and/or Lead Abatement shall take place to meet the requirements of the Preliminary Schedule and Project Master Schedules and shall be coordinated with the other Prime Contractors prior to commencement.

J. The Work shall be conducted to provide the least possible interference to the activities of the Owner's personnel and the surrounding property owners (neighbors).

   1. Prime Contracts are hereby notified that: All Prime Contractors and their subcontractors shall limit excessive noise during 2nd shift known as work extending to 10PM weekdays upon approval by owner and city work hour restrictions. These operations shall not create a disturbance to neighboring properties.

K. Construction access to the site shall be limited to personnel, equipment and deliveries by suppliers relative to the Work of Prime Contractors and their subcontractors. Prime Contracts shall keep the Construction Manager advised of persons accessing the site and shall seek assistance with coordinating parking and storage facility locations for all Prime Contracts.

1. Where applicable, Contractors shall provide Building Site perimeter barricades as described herein the project and all temporary exit doors/lockable gates on the Project, securing these doors, fencing and/or gates at the end of each work shift.
2. When a Prime Contract engages in overtime, weekend or 2nd shift work, during the summer months and or during the normal school year, the respective Prime Contract shall notify Construction Manager of such and be responsible for securing the Project Site at the end of that work shift and perform site walk around the outside of construction area/work zone ensuring all debris is pickup up and there are no construction related hazards of any kind present once the responsible person leaves the site for the evening or weekend. This includes that all materials and equipment are fenced in and keys are removed. All interior projects have the same requirement to ensure that outside the work zone is clean from dust-dirt and that no materials are left outside the work area at any time.
3. ALL DUMPSTERS MUST BE FENCED IN. NO EXCEPTIONS.

1.11 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.

1.12 DRAWINGS AND SPECIFICATIONS

A. Construction Documents indicate the sum total of the Contract that make up the complete work for the Project. Through this Section "Summary of Work", the intent of the Contractor's scope of Work and responsibility is generally described. Related requirements and conditions that are indicated in the Contract Documents include but are not limited to the following:

1. General Conditions and Requirements.
2. Referenced and applicable Codes, Regulations and Standards.
3. Scheduling and phasing requirements.
4. Existing conditions and restrictions on use of the site and facilities.

B. Drawings and Specifications are cooperative and supplementary. Portions of the Work, which can best be illustrated by Drawings, are not included in the Specifications and portions best described by Specifications are not depicted on Drawings.

1. All items necessary to complete the work shall be furnished whether written or illustrated.
2. All primes shall exercise good judgment and perform all work according to related industry standards.

PART 2 - SCOPE OF WORK

2.1 MULTIPLE PRIME CONTRACTS

A. Scope of Work: Work includes but is not limited to, the following:

2.2 All "G, ASB, S, & A" drawings related to Nanuet High School and Barr Middle School building envelope are the responsibility of this contract. This includes exterior clay masonry, lintels, and sunshades. The HS security addition is not part of the BE contract

2.3 Related Sections include, but are not limited to, the following:

A. Division 01 Section "Work Restrictions" for use of the Project site and for requirements for continued Owner occupancy of premises.

B. Division 01 Section "Project Management and Coordination" for general coordination requirements.

C. Division 01 Section "Project Forms" for documents required for Testing and Coordination.

D. Division 01 Section "Temporary Facilities and Controls" for specific requirements for temporary facilities and controls

E. Applicable Specification Sections: All specification Sections itemized below are to be provided complete by this Prime Contract, unless noted otherwise. In addition to these specifications, the contractor is required to review all specifications included in the overall contract that may contain related scope or detail for this specific contract.
   1. **Divisions 00 and 01 – Procurement and Contracting Requirements & General Requirements.**
   2. **Division 02- Existing Conditions**
   3. **Division 04 Masonry**
   4. **Division 05 Metals**
   5. **Division 07 – Thermal and Moisture Protection**

F. Applicable Drawings : All drawings itemized below are to be provided complete by this Prime Contract, unless noted otherwise. In addition to these drawings, the contractor is required to review all drawings included in the overall contract that may contain related scope or detail for this specific contract.
   1. **All "G", "HS-ASB", & "BM-ASB" drawings**
   2. **HS-S001, HS-S102, HS-S104, HS-S501**
   3. **BM-S001, BM-S101, BM-S102, BM-S501**

PART 3 - EXECUTION

3.1 WORK SEQUENCE

A. The Work shall be conducted to provide the least possible interference to the activities of the Owner's personnel, per the Project Preliminary Schedule.

B. Work required during overtime, extended shifts or holidays due to failure of contractor to maintain schedule, will be monitored by Architect/Construction Site representative, and may be monitored by Owners' personnel. Additional costs for Architect/Construction Site Representative and/or Owner personnel will be borne by the Contractor.

C. Coordination of any utility and power interruption must be done with approval of the Architect/Construction Site Representative. Shutdowns must occur during non-occupied timeframes only.

D. Construction access to the site shall be limited to those designated for personnel, equipment and deliveries by the Owner. All contractor staging, parking and storage shall be coordinated with the Construction Site Representative and subject to change.

E. Payments: Each bid that covers more than one school (i.e. one SED project) shall provide completed AIA G732 & G703 by building (for each SED project).

F. No work shall be installed without approved shop drawings. Any work in place without approved shop drawings will be rejected and removed by that contractor at their expense and backed charge all other costs related to.

G. Any work deemed by CM, Architect and District not properly installed by a contractor per the contract drawings and specifications shall be removed immediately and corrected, with all associated costs to be borne solely by that contractor.

H. All prime contractors are to review other prime contractors' scope shown in the contract drawings and specifications and completely understand their responsibility to

coordinate their contract work with other primes in efforts to meet the project schedule and for a complete operational system or area or work.

I. All contractors are to provide within 3 weeks of award a "base line" construction schedule for their work from commencement to completion including all phasing. This schedule is to be updated monthly to show percentage progress of each item listed. This schedule shall be revised to provide a recovery schedule in the event of a delay for any reason. The recovery schedule shall include the "base line" item and the recovery to show how the delay is affecting the overall project schedule. This schedule is to be provided in MS Project or Primavera. Excel schedules are not accepted.

J. Prime contractor "base line" schedules are to be reviewed by each prime contractor and coordinated where work is related and that each prime's work shall be included in each "base line" contractor's schedule as necessary for coordination.

K. All contractors are to provide 2-week look ahead schedules showing work related to the base line and shall be coordinated with other prime 2-week look ahead schedules. These schedules will be Excel format. Format will be provided by the CM.

L. Contractors to provide a full-time supervisor on site 100% of the time. This is not a working foreman. Supervisors are not working with tools they are supervising their workers and coordinating with other contractors and district/ CM. Failure to provide will be default of your contract and subject costs related to and termination.

M. All prime contractors are the provide a project manpower structure showing names and telephone numbers of each responsible person on the project. This shall be updated as needed if personal changes are made.

N. All site equipment and dumpsters are to be behind temporary chain link fence when stored on site and or within the construction work zone where temporary chain link fence has been providing and installed by the prime. Each prime contractor is responsible to provide and install temporary chain link fence around their own stored equipment and dumpsters on site.

O. No equipment, panels or any services shall be turned off for any reason without written request and approval by the district. Project form shall be used for all shutdowns and required a 3-day notice. Other shutdowns may require more time.

A. **CONTRACT No. 01 BUILDING ENVELOPE (BE)** – GENERAL CONSTRUCTION PRIME CONTRACT FOR FAÇADE REPAIR AT NANUET HIGH SCHOOL AND BARR MIDDLE SCHOOL, REPAIR WORK, WATERPROOFING, MASONRY REPOINTING AND BRICK, REPAIRS AND FAÇADE RESTORATION, ABATEMENT. Project Site Superintendent: BE Contractor shall provide one (1) full time, non-working Project Site Superintendent while any work related to this Contract is being performed. Superintendent shall be responsible for the daily activities of this Contract, and work closely with the

Construction Manager and the other Prime Contract Superintendents/Foremen, in a manner that best promotes the objectives of the Project.

1. Superintendent shall be on-site while Contractor's own forces, and/or subcontractors are performing work on the Project Site; also, while other Prime Contracts are installing work, or require the coordination of work related to this Prime Contract, and/or as requested by the Construction Manager.
2. Superintendent shall be the same individual throughout the duration of the Project.
3. Project Site Superintendent shall be an individual with minimum of five (5) years' experience in this field of work.
4. Refer to Section 013100 "Project Management and Coordination" for further requirements.

B. Project Foreman: BE Contractor shall provide at least one **(1) full time Project Foreman during each shift of work per school**; Foreman shall be able to make binding decisions, as they relate to the daily activities of their crew, as related to achieving the goals of the Project.

C. Site Communications: BE Contractor shall provide Project Superintendent with a mobile phone, all costs and service charges shall be paid for by BE Contractor; provide Construction Manager with contact number(s).

D. Project Site Field Office: Provide site office facilities for this Contract's Project Superintendent. Site Office shall be equipped with telephone with answering machine, fax and e-mail. Contact information shall be provided to the Construction Manager.
   1. The Owner reserves the right to seek reimbursement for temporary facilities not provided by this Prime Contract.

E. Scope of Work: Work of the BE Contractor includes, but is not limited to, the following:
   1. Coordination with other Prime Contracts, Owner and Construction Manager as required to adhere to and maintain approved Project Master Schedules. Prior to first payment, this includes developing and submitting the Project Master Schedule for this contract scope of work.
   2. All demolition, including window removal, and new roofing scope indicated in Contract Documents, including removal and legal disposal off site of all existing ballast. Includes all new roofing insulation, tapered and otherwise, ladders, roof hatches, wood blocking, roof metal and accessories, miscellaneous masonry work and miscellaneous steel as indicated in Contract Documents. Includes new roof drain strainers, clamps and hardware at existing roof drains to remain. Includes new pipe supports for roof-mounted conduit and piping scheduled for removal and replacement by others.
   3. All necessary roofing scope to accommodate the work of others, including cutting roof deck following mark out by others, installation of blocking as needed, and

installation of roof drains, curbs, rails and pipe portals supplied by others and flashing of all new roof drains and roof drain retrofits, curbs, rails and pipe portals supplied by others.

4. All interior scope related to window installation shall include patching and painting of existing walls, wood blocking for window shades, all replacement and repair of window sills.
5. All structural deck repair and roof steel supports included in the base contract as indicated in Contract Documents.
6. If required and approved by Allowance Authorization, repair of additional existing roof deck to Architect's specifications.
7. The BE Contractor shall provide and install adequate protection to adjacent areas of construction work and over any removed portions of work where the building is required to be protected from weather.
8. BE Contractor shall conform to phasing and sequencing of Windows, Façade, and Roof Replacement Repairs.. Any deviation shall be clearly indicated and defined in the bid proposal. See the Preliminary Schedule. coordinated with the Owner. See Preliminary Schedule.
9. Work delineation between building and site is indicated on the Contract Drawings.
10. Provide all Asbestos and Lead Abatement as indicated in the Construction Documents; provide all weather tight temporary enclosures as required to maintain security, and to protect existing conditions, at all times.
    a. Post Building(s) as required by regulatory agencies.
    b. Coordinate with Life Safety Plans, Elevation Plans, and Hazardous Materials documents for areas of the existing building(s) that contain Asbestos, Lead, and other components, and coordinate removals accordingly.
    c. Building piping shall have asbestos insulation abated as shown on the contract documents prior to demolition operations. Coordinate with plumbing contractor (PC).
    d. Provide all roofing abatement (Lead and Asbestos); coordinate with roofing subcontractor and other Prime Contracts.
11. For work performed between March, 2023 and August, 2023, BE Contractor shall do the following:
    a. At the start of each work day, BE Contractor shall completely cover all furniture in classrooms and spaces immediately below or adjacent to areas for work for that day with plastic sheeting. Approximately two (2) hours before the end of the work day, BE Contractor shall check all spaces and clean up any loose material that may have fallen in classrooms below, including the repair of ceilings, if necessary. Following cleanup, plastic sheeting shall be folded up so as not to deposit debris on furniture and disposed of. Cleanup (if necessary) and removal of plastic sheeting shall be completed not less than one (1) hour prior to end of work day, allowing custodial staff time to perform regularly

scheduled cleaning and maintenance in these spaces before the end of their shift.

12. BE Contractor shall do the following:
    a. At the start of a new work area, BE Contractor shall completely cover all furniture in classrooms and spaces immediately below or adjacent to the work area with plastic sheeting. Upon completion of that work area, BE Contractor shall check all spaces and clean up any loose material that may have fallen in classrooms and spaces below. Following cleanup, plastic sheeting shall be folded up so as not to deposit debris on furniture and disposed of as per regulations.
13. This Prime Contract shall understand that all related activities for this scope may require work to proceed while existing systems are required to be maintained; all cost associated with this sequence shall be incorporated into the Bid.
14. Environmental Protection: Provide protection, and conduct construction in ways and by methods that comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
    a. Restrict use of noisemaking tools and equipment to hours that will minimize complaints from persons or firms on or near the Project site.
15. Provide dust control within delineated building site while the Work of this Contract is being performed. Limit situations that may create dust contamination while Work of this Contract is idle. **ALL POWER TOOLS MUST HAVE VACCUME ATTACHMENTS.**
16. Provide all demolition as indicated in the Construction Documents, or required for Work of this Prime Contract:
    a. Coordinate all demolition with Hazardous Materials documents. Coordinate with all other Prime Contracts regarding removals required for the Project. Demolition of a system shall mean any and all components removed in their entirety, to the point of origin, source or substrate.
17. Provide cut and patch work related to that of this Prime Contract, and at those areas specifically identified in the Construction Documents, regardless of trade creating the area to be patched.
    a. Each Prime Contract is responsible for all other respective cutting and patching required of their installations (refer to Section 01 73 29 for further information).
18. Provide all miscellaneous wood blocking, shimming and supports for items or equipment installed under this Prime Contract, and as coordinated with other Prime Contracts for metal strapping and/or wood blocking for installation of MEP contract Work.
19. Final connection of utilities to equipment provided by this Prime Contract, are by MEP contracts, unless noted or assigned otherwise.

20. Substantial Completion: Clean all BE Contractor installations and provided equipment at the time of Substantial Completion or as directed by Construction Manager.
21. Refer to Division 00 Section "Project Forms" and make use of these forms for the installation and coordination of the Work. These forms are included to assist this Prime Contract with coordinating the installation of Work by others prior to enclosing and/or finishing work. Owner will not compensate Prime Contract for work not properly coordinated that result in added work, or removal of work. Secure the proper signatures or acknowledgements, as indicated, prior to installing/completing the Work.
22. Coordinate all the preceding requirements, accordingly, with all applicable Alternates indicated in Section 01 23 00 "Alternates".

F. Supplemental Temporary Facilities and Controls by BE Contractor include, but are not limited to:
   1. Waste Disposal Facilities: See Subparagraph 1.7.N of this Section.
   2. Snow and Ice Removal: Provide removal of snow and ice until Substantial Completion of the Project, or as required to avoid delays in the Schedule.
      a. Removal includes temporary roadways, Owner provided contractor parking areas, staging areas, remote staging areas, sidewalks, exterior temporary ramps and stairs within the construction and staging area.
      b. Removal shall include open areas of the Project building that is under construction, including, but not limited to: SOG, SOD and roof deck areas.
   3. Temporary Barricades: Provide, maintain and eventually remove all temporary barricades per OSHA Regulations, Industry Standards, or as indicated in the Construction Documents. These include, but are not limited to, the following areas:
      a. Roof openings/penetrations.
      b. To isolate Abatement areas.
      c. To isolate renovation areas.
      d. Floor openings/penetrations, including stairwells.
      e. Installation shall be insulated if temporary heat or cooling is being employed.
   4. Temporary Doors, Frames & Wall Assemblies: Provide, maintain and eventually remove all temporary installations per OSHA Regulations, Industry Standards, or as indicated in the Construction Documents. Provide fire rated assemblies as required. Provide exit (panic bar/crash bar) devices at locations of egress. Coordinate locations with Construction Exiting Plan, Sequencing/Phasing Plans, and the Construction Manager. Temporary doors shall be constructed using 1/2' plywood and 2x construction, equipped with hasps, locks, handle and latch mechanism, and spring or counter weight installed to allow door to close after opening. Permanent doors will not be used in temporary conditions.
   5. Temporary Heat: The existing heating system and ventilation system in the building area are not to be used for temporary heat or ventilation in construction areas. The

contractor for General Construction must provide temporary heat in construction in construction areas. Provide submittal for temporary heat strategy that states what equipment will be used and where fuel will be stored. Fuel source cannot be located in the building. Heaters with self-contained fuel sources are not allowed to be placed in the building.

6. Temporary Window Openings: Window openings shall be enclosed using 2x construction, 1/2' plywood, and reinforced polyethylene. Where window opening start at or near the floor, plywood shall be installed from finish floor to minimum of 42" AFF; reinforced poly may be installed from this point up. Should contractor choose to install plywood across the entire opening, sufficient area will be installed with reinforced poly to allow emergency escape, if required, and to allow natural light into the work area.
    a. Installation shall be insulated if temporary heat or cooling is being employed.
7. Temporary Exterior Wall Enclosure: Provide and maintain temporary enclosures for weather protection and security of the construction in progress up until completion of permanent installation specified. Enclosures shall protect the building from exposure, foul weather, other construction operations, and similar activities. Provide temporary weather tight enclosure for building exterior.
    a. Where heating and cooling is needed and permanent enclosure is not complete, provide insulated temporary enclosures. Coordinate enclosure with venting and material drying or curing requirements to avoid dangerous conditions and effects.
    b. Install tarpaulins securely; install fire retardant materials only.
    c. Where temporary wood enclosures exceed 100 sq. ft. in area, use fire retardant treated materials for framing and sheathing.
    d. All cost incurred to repair and/or replace materials damaged, due to the failure of BE Contractor to provide and maintain weather tight enclosure shall be borne by this Prime Contract. This includes any contamination of materials that may lead to the introduction of mold and mildew.
    e. Immediately notify the Construction Manager, in writing, as to damage to temporary enclosures by "others"; identify responsible party in the submission. Owner shall not be liable for damages caused by "others" if Prime Contract cannot identify responsible party.
8. Temporary Sanitary Facilities: Provided by each contractor.
9. Project Identification Sign(s) and Construction Access Control Sign(s): Provide sign(s) as indicated in the Construction Documents.
    a. Seek approval of all signs for text and graphics prior to fabrication via shop drawing submittal.
    b. Engage an experienced sign company to provide graphics for Project sign(s).
    c. Construct Project Identification Sign of high density 4' x 8' Sign-Grade plywood.
    d. Construct Construction Access & Control Signs of high density 4' x 4' Sign-Grade plywood.

e. Install sign(s) per Construction Manager's directive, or as indicated on Site Logistics Plan.
f. Erect sign(s) on support of posts or framing of preservative treated wood.
g. Contractor identification signs will not be allowed outside the limits of the site perimeter fence. **NUFSD – SITE SAFETY AND PROJECT INFORMATION REQUIREMENTS SIGNAGE**
    1) Nanuet School District- Emergency contact name and telephone number xxxxxxx—xxxxx-xxxxxxx
    2) Nanuet work hours- Weekday 7AM-9PM Weekends per town requirements.
    3) Nanuet emergency contact number. Xxx-xxx-xxxx

10. Existing Stair Usage: Use of Owner's existing stairs in unoccupied areas will be permitted, provided that at Substantial Completion, stairs are restored to conditions existing before initial use.
    a. Provide photo documentation of existing stair conditions prior to use by all Prime Contracts. Document during use, and at completion of the Renovation Project in order to document any and all damage to the Owner's property.
    b. 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.
11. Provide all shoring required for Work of this Prime Contract, including but not limited to;
    a. Cutting or altering of existing construction.
    b. Provide protection of all new and existing surfaces during the Work. Do not stand, walk, or work off of any unprotected finished surface above the floor.
12. Maintain temporary fencing and barricading to keep unauthorized persons away from excavations and hazardous areas for which this Prime Contract is responsible.
13. Traffic Controls: Provide flagman while any operations of this Prime Contract interfere with traffic flow on adjacent roadways.

END OF SECTION 011200

SECTION 01 12 03 – CONTRACT SUMMARY – GC-01

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

This Section includes a summary of each Prime Contract, including responsibilities for coordination and temporary facilities and controls. One set of Construction Documents is issued covering the Work of multiple Prime Contracts. Each Prime Contract is responsible to review all drawings and specifications for specific requirements indicated, and for a general understanding and knowledge of the work of other Prime Contracts. All Prime Contracts are responsible for all Work of their Contract no matter what drawing on which the Work appears. All Prime Contracts are responsible to coordinate their work related to the complete set of drawings and specifications, not limited to each prime contractor scope. **All Bidders should acknowledge that for each contract listed below, each contractor is their own General Contractor and subject to all General Contractor requirements.**

General Contract: The Interior Contractor shall be selected based on the bid procedure as described in the Bid Documents. Contract Bidders are responsible for (a) trade work coordination, (b) the scope contained in drawings listed below and (c) any and all additional scope specifically identified to be performed by the Interior Contractor in other Bid Packages in the Contract.

a. Interior & Exterior Contract: All work related to Interior and exterior construction includes but is not limited to the following items: (Refer to the Contract Documents for full scope of work.

1) Demolition, ACT, GWB, Plaster Ceiling, Painting, Patching, Flooring, exterior façade and window demolition, excavation, & abatement. New structure, concrete foundations, interior and exterior steel framing, and storefront systems, masonry and metal panel, and finishes.
2) Work related to drawings: (*In addition to these drawings, the contractor is required to review all specifications included in the overall*

contract that may contain related scope or detail for this specific contract.)

a) Nanuet Senior High School
- Security Vestibule Project
- Science Lab Renovation Project

1.3 All "G, AS, S, & A" drawings related to Nanuet High School are the responsibility of this contract. It is the GC's responsibility to review the MEP drawings to coordinate the GC's portion of the work with MEP.

1.4 Related Sections include, but are not limited to, the following:

A. Division 01 Section "Work Restrictions" for use of the Project site and for requirements for continued Owner occupancy of premises.

B. Division 01 Section "Project Management and Coordination" for general coordination requirements.

C. Division 01 Section "Project Forms" for documents required for Testing and Coordination.

D. Division 01 Section "Temporary Facilities and Controls" for specific requirements for temporary facilities and controls

E. Applicable Specification Sections: All specification Sections itemized below are to be provided complete by this Prime Contract, unless noted otherwise. In addition to these specifications, the contractor is required to review all specifications included in the overall contract that may contain related scope or detail for this specific contract.
1. Divisions 00 and 01 – Procurement and Contracting Requirements & General Requirements.
2. Division 02- Existing Conditions
3. Division 03 – Concrete
4. Division 04 Masonry
5. Division 05 – Metals
6. Division 06 – Wood and Plastics
7. Division 07 – Thermal and Moisture Protection
8. Division 08 – Openings
9. Division 09 – Finishes

10. Division 10 – Specialties
11. Division 11 – Equipment
12. Division 12 – Furnishings
13. Division 13 – Special Construction

F. Applicable Drawings : All drawings itemized below are to be provided complete by this Prime Contract, unless noted otherwise. In addition to these drawings, the contractor is required to review all drawings included in the overall contract that may contain related scope or detail for this specific contract.
    1. **All "G", "HS-ASB", & "HS-A" drawings**
    2. **HS-S001, HS-S101, HS-S301, HS-S501**

1.5 DEFINITIONS

1.6 MANAGEMENT AND COORDINATION

A. The Owner shall provide a Construction Manager.

    1. The Construction Manager shall provide a full time construction site representative recognized as the Construction Manager.

1.7 CONSTRUCTION MANAGER

A. The construction manager shall provide on-site administration of the Contracts for Construction in cooperation with the Architect as set in AIA Document A232 ™ – 2009, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition, as modified.

B. The Construction Manager shall provide administrative, management and related services to coordinate scheduled activities and responsibilities of the Multiple Prime Contractors with each other and with those of the Construction Manager, the Owner and the Architect. The Construction Manager shall coordinate the activities of the Multiple Prime Contractors in accordance with the latest approved Project Schedule and the Contract Documents.

C. Utilizing the construction schedules provided by the Prime Contractors, the Construction Manager shall update the Project schedule, incorporating the activities of the Owner, Architect, and Multiple Prime Contractors on the Projects, including activity sequences and durations, allocation of labor and materials, processing of Shop Drawings, Product Data and Samples, and delivery and procurement of products, including those that must be ordered will in advance of construction. The Project schedule shall include the

Owner's occupancy requirements showing portions of the Project having occupancy priority.

D. Utilizing information from the Multiple Prime Contractors, the Construction Manager shall schedule and coordinate the sequence of construction and assignment of space in areas where the Multiple Prime Contractors are performing Work, in accordance with the Contract Documents and the latest approved Project Schedule.

1.8 GENERAL REQUIREMENTS OF PRIME CONTRACTS

A. Prime Contracts: The context used in this Section are separate Prime Contracts that represent significant elements of work that is to be performed concurrently and in close coordination with the work of other Prime Contracts for the benefits of the Owner. Each Prime Contract is recognized to be a major part of the Work.

B. Assignment of Work: Should a conflict be indicated, Section 011200 shall take precedence over all scope of work assignments that may be indicated elsewhere within the Construction Documents.

C. Layout and Installation: Each Prime Contractor shall schedule, layout and install their Work in such manner as not to delay or interfere with, but to compliment the execution of the work of other Prime Contracts, utility companies and Owner's operations.

D. Extent of Contract: The Contract Documents, drawings and specifications each contain more specific descriptions of the Work facilitating which Prime Contract includes specific elements of the Project.

1. Work provided by each Prime Contract shall mean complete and operable systems and assemblies, including products, components, accessories and installations required by the Construction Documents or indicated otherwise.
2. Prime Contractors shall exercise good judgment and perform all work according to related industry standards.
3. The Owner is exempt from payment of Federal, State and local taxes, including sales and compensating use taxes on all materials and supplies incorporated in completing the Work; these taxes are not to be included in the Bid. This exemption does not apply to tools, machinery, equipment or other property leased by, or to, the Contractor or sub-contractor, or to supplies and materials, which even though consumed are not incorporated into the completed work. Prime Contractors, and their sub-contractors, shall be responsible for paying any and all applicable taxes on said tools, machinery, equipment or property, and upon all said unincorporated supplies and materials, whether purchased or leased.
4. Prime Contracts shall understand that time is of the essence, and will adequately staff the Project by employing the appropriate trade's people to perform the Work; these people shall be experienced in their respective trades. A shortage of labor in

the industry shall not be accepted as an excuse for not properly staffing the Project; all efforts shall be made to meet or exceed the schedule, including additional staff and/or labor hours necessary. All cost associated with this item shall be included within the Bid.

5. Local custom and trade union jurisdictional settlements will not control the scope of the Work of each Prime Contract.
   a. When a potential jurisdictional dispute or similar interruption of Work is first identified, or threatened, the affected Prime Contracts shall promptly negotiate a reasonable settlement to avoid or minimize the pending interruption and delays.
   b. Contractor's trade-related issues shall not be grounds for modification or extension of scheduled completion date(s).
6. The Work of all Prime Contracts requires close coordination with other Prime Contracts and construction personnel. Maintain flexibility and cooperation through the Project. "Out of Sequence" and "Delay" claims will only be considered when requirements of Division 01 "Administrative Requirements" have been adhered to. Delay claims must be in writing and forwarded to the Architect, per the requirements of the General Conditions of the Contract. Claims not submitted per these requirements will be rejected and/or denied.
7. The intention of the Work is to follow a logical sequence, however, a Prime Contractor may be required by the Architect or Construction Manager, to temporarily install, omit or leave out a section(s) of Work, out of sequence. All such out of sequence work, and come back time, at these areas shall be performed at no additional cost to the Owner.

E. Substitutions: Per Division 01 Section "Substitution Procedures", each Prime Contractor shall cooperate with the other Prime Contractors involved, to coordinate approved substitutions with remainder of the Work. Contractors shall submit all "Substitutions" at least ten (10) days prior to the date for receipt of Bids as specified in the Instructions to Bidders 002113 Section 3.3 Equivalents or bid will be considered per "basis of design".

F. Construction Schedules: Refer to Divisions 01 Section "Construction Progress Documentation", "Preliminary Schedule" and "Project Management and Coordination" for requirements related to meetings and schedules.

G. Construction Sequencing and Phasing: Prime Contractor shall understand that Sequencing and/or Phasing Plans are contingent upon the work areas being complete/occupied, prior to the next area of Work beginning. Should an area of construction not be complete per the Project Preliminary Schedule, the Project Master Construction Schedule/Sequencing Plans will be adjusted accordingly. The Owner will not be responsible for delay claims due to adjustments being no fault of their own.

1. Prime Contracts may be required to re-sequence the phasing of the project as a result of changes to the schedule. Prime Contracts shall provide these adjustments at no additional cost to the Owner.

H. Existing Conditions: Each Prime Contract shall verify existing conditions in the field prior to work commencing in that area and immediately report conditions to the Architect that are not represented correctly by the Construction Documents.

1. Each Prime Contract is responsible for familiarizing himself with Project Site Logistics and provide a "site logistics plan locating storage area, scaffolds, rubbish areas, stock piles and egress related to all work, included phased construction within 30 days of award.
2. Each Prime Contract has been given ample opportunity to review Existing Conditions related to the Project. Existing Conditions not noted in the Construction Documents that could be easily recognized during pre-bid review that interfere with the respective Prime Contract's work, shall be the responsibility of the respective Prime Contract. This includes all costs associated with removal, patching, relocation or re-fabrication of installations.

I. Hazardous Materials: Each Prime Contract shall familiarize themselves with the Hazardous Materials Sections/Drawings of the Construction Documents and follow DOL/OSHA/EPA/SED regulations while performing their respective Work in these areas. Discovery of non-identified or concealed hazardous materials shall be reported to the Construction Manager immediately and followed up with written documentation of the event.

J. Protection of Installations: Each Prime Contract is responsible for protecting their installations at all times. All costs incurred to repair, replace or clean insufficiently protected materials/installations shall be the responsibility of the installing Prime Contract.

1. Architect shall be notified, in writing, immediately upon material/installation being damaged; notification shall indicate responsible party.
2. Owner will not be liable for damaged materials and/or installations by "others", when "others" cannot be identified.
3. Repair damaged work, clean exposed surfaces or replace construction installations that cannot be repaired.
4. Each Prime Contract shall be responsible for removing all labels not required to remain from their installations.
5. Installations shall be wiped clean and proper protection then installed.
6. Each Prime Contract is responsible to protect another primes work in the event that prime has to work over or on top of that other primes work being complete. The prime working over the completed work takes full responsibility of that other primes completed work both in condition and operation.

7. Gc shall install heavy duty "Ram Board" or equivalent to protect new floor surfaces from damage until final cleaning and acceptance by owner.

K. Daily Cleaning: All Prime Contracts are responsible for any and all debris caused by their Work, including the Work of their subcontractors. A daily clean up and disposal is required by each Prime Contract for the periods which that Prime Contract, or its sub-contractors, are performing Work on site.

1. Assign at least one person for a daily clean and sweep of the work area(s). Prime Contractor shall allot sufficient manpower and time for this to be completed by the end of each shift. Submit name of this person(s) to Construction Manager.
    a. Construction Manager shall have the authority to give direction to person(s) on the Project Site identified by the Prime Contract as designated for cleanup tasks. This shall include the safety review/securing of the site-work zone after each shift.
    b. This person has check that no construction debris was dumped in any district dumpers during this end of shift site review, if found the contractor must remove immediately the next morning to avoid back charges costs of $1500 per day not removed.
2. Any Prime Contract not providing personnel for Daily Cleaning will be Back Charged for labor provided by the Owner to complete this task.
3. Contractor working solely in an area shall be responsible for clean/sweep of that area.
4. Daily cleaning will not mean any one Prime Contract is responsible for assisting another Prime Contract with removing major quantities of debris created by a particular Prime Contract's Work.
5. Daily cleaning will be mandated to remove from the building any debris created by day-to-day activities. All Prime shall assist in sweeping shared work areas and shared corridors while working on site. Each Prime shall assist in mopping of shared corridors while working on site or as required by the Owner.
6. All prime contractors and subcontractors are required to provide sweeping compound for daily cleaning in their respective exterior and interior work areas. Each Prime Contract shall provide a sufficient number of brooms or other necessary tools, for use by their personnel to adequately fulfill their obligations.
7. All prime contractors shall provide and maintain garbage cans/refuse containers with liners for each construction area of their respective contracts as directed by the Construction Manager and shall be responsible for disposing of these materials to a dumpster.
8. All prime contractors provide the necessary equipment/containers (lull/skip-box) to move daily clean/sweep debris from the building to a dumpster on a daily basis, for each construction area of their respective contracts. Skip-box shall be emptied to a dumpster by 9:00 a.m. the following day.

9. Cleaning shall be deemed a Safety & Health issue, with Prime Contracts being held accountable for fulfilling their contractual obligations.

L. Final Cleaning: At Substantial Completion of each area of construction, each Prime Contract shall wipe/vacuum clean all of their respective installations; All interior contracts performing work inside the buildings shall mop clean all building surrounding areas and finish flooring and remove all marks/blemishes to the finish, for each construction area of their respective contracts. Each area of construction shall be wiped clean of all construction dust and debris prior to turnover to the Owner.

M. Cutting and Patching: All Primes are responsible for cutting and patching required to complete their Work. All repair of existing finish Work (including finish floors) shall be performed by contract requiring work, meeting or exceeding minimum contract requirements for that particular section, specification, or type of work. All concealed openings (piping, ductwork, conduit, etc.) must be repaired to comply with specified wall or deck conditions as well as required fire and sound ratings. All corridor penetrations require fire safing. If contractor elects to install their new work in an existing unrated wall or floor opening, whereas the wall/floor is a fire rated condition, that contractor is responsible to fire rate that opening to match the wall/floor fire rating with new and all other existing wire, piping, ducts etc. Other areas are noted in drawings and specifications.

1.9 Project Schedule. The nature of this project is to complete all the work listed as Phase 2 in the schedule by **the Project Closeout Dates specific to each Prime Contract as listed below**. Each Prime Contractor shall include in their bid proper allowances for foul weather.

A. Bids Received: 1/19/2023

B. Anticipated Notice to Proceed: 2/8/2023

C. Submittals: The following items are to be submitted within 60 business days after Notice to Proceed:
   1. Submittal List and Submission Schedule – **15 days after NTP**
   2. Field Investigations
   3. Shop Drawings
   4. Long Lead Items – **30 days after NTP**
   5. Schedule of Values and Key Submittal List – **15 days after NTP**

D. Mobilization: 4/3/2023

E. Substantial Completion and Project Closeout: Per 01 11 00 Milestone Schedule

1.10 TEMPORARY FACILITIES AND CONTROLS OF PRIME CONTRACTS

A. Conditions of Use: Keep temporary services or conditions clean and neat in appearance. Operate in a safe and efficient manner. Relocate temporary facilities as required as work progresses; do not overload facilities or permit them to interfere with progress. Take necessary fire prevention measures; do not allow hazardous, dangerous, or unsanitary conditions to develop or persist on the Project site.

1. Installation, operation, maintenance, and removal of each temporary service or condition are considered part of the respective Prime Contract's own construction activity, as are costs and use charges associated with each facility.
2. Locate service or condition where they will serve the Project adequately and with minimum interference of the Work, coordinate with the Construction Manager and the other Prime Contracts prior to installation.

B. Temporary Use of Permanent Facilities: Prime Contract, as installer of each permanent service or condition, shall assume responsibility for its operation, maintenance and protection during use as a construction facility prior to the Owner's acceptance, regardless of previously assigned temporary facilities and controls responsibility.

C. Owner's Facilities: Contractors are not allowed to use the Owner's facilities (toilets, telephones, food service, etc.) for their own benefit or convenience. Prime Contract Superintendents shall enforce this policy with their respective work forces.

1. Construction personnel parking will be restricted to area as directed and agreed to by the Owner, and to facilitate the completion of the work. Owner reserves the right to remove from their property, unauthorized vehicles occupying unauthorized areas, at respective vehicle owner's expense.

D. Storage on the Project Site: Each Prime Contract shall provide sufficient secure weather-tight storage facilities for their materials and equipment. These storage containers are required to be located on the "site logistics plan." The Owner's facilities and the Project's building areas shall not be used for storage unless agreed upon, in writing, with the Owner via the Construction Manager.

1. Until permanently incorporated into the Work, all materials on the Project site are considered to be the Prime Contract's responsibility for security and protection.
2. Prime contractor is required to check on their onsite stored material periodically to ensure that all material continues to be located in the stored location and that it remains protected from all damage, theft, and endangerment to others and ready to be used on notice for coordination with other contractors. Failure to arrange for materials to be on site to complete coordinated work with other Prime Contractors will result in back charges for delays resulting therefrom.

3. Temporary long-term storage facilities are not available to Prime Contracts by the Owner.
4. Prime Contractors and their subcontractors, shall coordinate deliveries with the Construction Manager to ensure that disruptions and Owner inconvenience are avoided.

E. Tools and Equipment: Each Prime Contractor shall provide all tools and equipment necessary for its own activities; this includes secure lock-up and storage for all items on the Project Site.

1. Provide all construction aids and miscellaneous services and facilities necessary exclusively for its own construction activities; this shall include any additional supplementary power, ventilation, lighting requirements and weather protection.

F. Project Site Communication: Each Prime Contractor shall provide their Project a full time on site at all times Superintendent with a mobile phone for the duration of the Project, as indicated in their Scope of Work. Construction Manager shall be furnished with contact numbers associated with each phone.

G. Safety: Prime Contracts, not the Architect or Construction Manager, are responsible for Project Site Safety, as related to their operations (refer to Section 013150 "Special Procedures" for further requirements).

1. Each Prime Contract shall correct safety hazards and violations immediately. If safety issues are not immediately rectified, the Owner shall secure outside sources to correct the deficiency and back charge the responsible Prime Contract.
2. Maintain unobstructed access/egress to fire extinguishers, fire hydrants, stairways, corridors, ladders and other safety routes/devices.

H. Fire Extinguishers: All Prime Contracts provide and maintain "general use" fire extinguishers for each construction area of their respective contracts; comply with applicable codes for quantities required. Use of the Owner's fire extinguishers to meet this requirement is not permitted. Comply with NFPA for recommended classes for exposure; extinguishers shall be inspected and appropriately tagged prior to being brought on site. Provide stands, painted bright orange, sturdy enough to carry the extinguisher, and built as not to create a tipping hazard.

1. Each Prime Contract shall supplement this requirement by providing additional fire extinguishers specifically related to their work activity (e.g., welding, soldering, abrasive cutting, etc.).
2. Each Prime Contract shall provide and maintain proper fire extinguishers at/in their respective on site office and storage facilities.
3. Store combustible materials in approved containers in fire-safe locations.

I. Welding: Any Prime Contract performing welding, cutting or other activities with open flames or producing sparks shall at a minimum:

1. Coordinate interruption/shutdown of detection system(s) to avoid creating false alarms.
2. Protect the area and surrounding areas from fire and damage.
3. Maintain fire extinguishers, compatible with activity, at the location of the activity.
4. Provide a continuous Fire Watch during the activity and one-half hour beyond the completion of the activity.
5. Provide all necessary fans and ventilation required for the activity.
6. Any welding, burning and or use of flame the contractor is required to provide all required "hot work permit" to use such equipment prior to start of work. Its mandatory that no "hot work" shall start without these permits issued to the CM and Owner. Failure to this requirement will result to the removal of the project super of that company from all district projects.

J. Remove each temporary facility when it can be replaced by the authorized permanent facility no later than Substantial Completion, or as directed by the Architect and/or Construction Manager. Complete or restore permanent facilities that may have been delayed due to interim use of a temporary barrier or condition.

K. Temporary Power: Each Prime Contractor shall provide for their own temporary power needs for any scheduled electrical utility shut downs. Each Prime Contractor shall provide for their own temporary generators, power cords and temporary lighting as needed during these periods to continue to perform their work and maintain adherence to the Preliminary Schedule and approved Project Master Schedules. All temporary power equipment shall comply with all applicable codes and regulations.

L. Waste Disposal Facilities:

1. General debris/refuse/construction waste containers (dumpsters) shall be provided by each prime contractor and secured as specified herein this contract.
2. It shall be the responsibility/requirement of each Prime Contract to bring their waste to the dumpsters, including but not limited to all equipment, demolition debris, discarded materials with further identification including the following; construction and demolition debris refers to discarded materials generally considered non-hazardous in nature, including but not limited to steel, glass, brick, concrete, asphalt material, pipe, gypsum wallboard, and lumber, from the construction or destruction of a structure as part of a construction or demolition project or from the renovation of a structure, including such debris from construction of structures at a site remote from the construction or demolition project site.
3. It shall be the responsibility and requirement of each Prime Contract to recycle metals generated by its Work, and the Work of its subcontracts.

4. Joint-effort recycling by all Prime Contracts is encouraged.

M. Temporary Sanitary Facilities: Provide temporary self-contained toilets units for duration of the project.
   1. Temporary Sanitary Facilities:
      a. Each prime contractor is required to provide their own Temporary Sanitary Facilities and secured behind fencing and/or locked after work hours and weekends.
   2. Comply with regulations and health codes for type, number, location, operation, and maintenance of fixtures and facilities.
   3. Provide separate facilities (minimum of one ea.) for male and female personnel in proportion required by OSHA.
   4. Shield toilets to ensure privacy.
   5. Coordinate mobilization and demobilization of units with Construction Manager.
   6. Toilets shall be cleaned at least once per week, with additional facilities or cleanings provided if requested by Construction Manager.
   7. Provide and maintain adequate supply of toilet tissue and hand sanitizer for each facility.

1.11 WORK HOURS & SEQUENCE

A. Unless otherwise approved by the Construction Manager, During the school days, Work is to be performed in this contract during the hours of 3:30pm to 10:00pm on weekdays, and Saturdays and Sundays from 7:00am to 3:30pm. During School breaks, work is to be performed from 7:00am to 10:00pm. There is no additional cost to the owner for working the hours of 3:30pm through 10:00pm, or weekend work during the school year. Any work done during these times MUST BE COMPLETED, CLEANED, AND TESTED AS NECESSARY FOR STUDENT OCCUPANCY BEFORE THE START OF THE NEXT SCHOOL DAY. Contractors are required to schedule work during school breaks, school days off, and school holidays. **NOTE: Security vestibule workings hours are to be 7:00AM – 4:00PM. There will be black-out periods for testing where work cannot commence. The contractor is expected to request these dates from the CM and integrate into their milestone schedule.**

B. Summer work starts June 28th through August 23rd for 2023. The Summer working hours are from 7:00am to 9:30pm. There is no additional cost to the owner for working the hours of 3:30pm through 9:30pm or on weekends and holidays during the Summer.

C. Contractors are required to start working on site within 30 days of execution of contract, to the extent permitted by contract. Contractors are required to coordinate and perform work simultaneously with other Contractors. Contractors are required to complete their contract work by the designated Substantial Completion and Final

Completion end dates as indicated on the Invitation to Bid.

D. Mandatory clean up periods - From August 24th, 2023 to August 31st , 2023 and August 30th , 2023 to September 6th, 2023, contractors shall clean up all interior and exterior areas.

E. Contractors are required per contract to fully staff the project during the work shifts stated above with the required manpower to complete their work within the allowed scheduled time frame. Contractors are required to provide a 72-hour advanced request to the Owner via the Construction Manager for any Saturday and Sunday work. If a project schedule delay has been caused by the fault of the contractor, the contractor is required to provide 3rd shift work from 9pm to 6am to make up the project schedule. All costs for CM, Architect and district personal related to this 3rd shift request will be charged to the contractor at a combined rate for all at $3,000 per 8hr shift.

F. The shifts noted above are not considered overtime or premium time hours.

G. Contract summaries will provide start and end dates for each contractor.

H. Additional requirements:

1. Multiple Crews: Each Prime Contract shall provide multiple crews, supervision, cranes, scaffold and other means necessary to perform the Work, and maintain the Project Master Schedules.
2. Interruption of any utility and/or power must be coordinated with the Owner, via the Construction Manager.
3. Any and all overtime, weekend and/or holiday work required to meet the Project Master Schedules shall be incorporated in the respective Prime Contract's bid.
4. Should a Contractor's progress fall behind, as to schedule, Prime Contractor shall employ additional – 3rd shift and/or overtime and/or weekend workforce until situation is rectified, to the satisfaction of the Architect and Construction Manager, at no additional cost to the Owner, however subject to charges as stated in section 1.10 E for lack of maintaining schedule
5. Should a Prime Contract feel another Prime Contract is delaying them sufficient time to complete their installations, per the schedule, the Architect and Construction Manager shall be notified in writing immediately of the situation (refer to Conditions of the Contract for protocol). A Prime Contract creating such a delay, that causes a proven burden upon another Prime Contract to maintain schedule, shall bear all costs incurred by the delayed Prime Contract to maintain the schedule.
6. The Architect and Construction Manager shall not be overburdened as to overtime cost, to monitor the work, due to no cause of his or her own. Owner will compensate the Architect and Construction Manager for all additional cost related to the issue of a Prime Contractor's failing to execute the Contract by fully

staffing per the work hours and days noted herein. The Owner reserves the right to back charge the responsible Prime Contract for these fees if incurred.

7. All Asbestos and/or Lead Abatement shall take place to meet the requirements of the Preliminary Schedule and Project Master Schedules and shall be coordinated with the other Prime Contractors prior to commencement.

I. The Work shall be conducted to provide the least possible interference to the activities of the Owner's personnel and the surrounding property owners (neighbors).

1. Prime Contracts are hereby notified that: All Prime Contractors and their subcontractors shall limit excessive noise during 2nd shift known as work extending to 10PM weekdays upon approval by owner and city work hour restrictions. These operations shall not create a disturbance to neighboring properties.

J. Construction access to the site shall be limited to personnel, equipment and deliveries by suppliers relative to the Work of Prime Contractors and their subcontractors. Prime Contracts shall keep the Construction Manager advised of persons accessing the site and shall seek assistance with coordinating parking and storage facility locations for all Prime Contracts.

1. Where applicable, Contractors shall provide Building Site perimeter barricades as described herein the project and all temporary exit doors/lockable gates on the Project, securing these doors, fencing and/or gates at the end of each work shift.
2. When a Prime Contract engages in overtime, weekend or 2nd shift work, during the summer months and or during the normal school year, the respective Prime Contract shall notify Construction Manager of such and be responsible for securing the Project Site at the end of that work shift and perform site walk around the outside of construction area/work zone ensuring all debris is pickup up and there are no construction related hazards of any kind present once the responsible person leaves the site for the evening or weekend. This includes that all materials and equipment are fenced in and keys are removed. All interior projects have the same requirement to ensure that outside the work zone is clean from dust-dirt and that no materials are left outside the work area at any time.

1.11 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.

1.12 DRAWINGS AND SPECIFICATIONS

A. Construction Documents indicate the sum total of the Contract that make up the

complete work for the Project. Through this Section "Summary of Work", the intent of the Contractor's scope of Work and responsibility is generally described. Related requirements and conditions that are indicated in the Contract Documents include but are not limited to the following:

1. General Conditions and Requirements.
2. Referenced and applicable Codes, Regulations and Standards.
3. Scheduling and phasing requirements.
4. Existing conditions and restrictions on use of the site and facilities.

B. Drawings and Specifications are cooperative and supplementary. Portions of the Work, which can best be illustrated by Drawings, are not included in the Specifications and portions best described by Specifications are not depicted on Drawings.

1. All items necessary to complete the work shall be furnished whether written or illustrated.
2. All primes shall exercise good judgment and perform all work according to related industry standards.

PART 2 - SCOPE OF WORK

2.1 PRIME CONTRACTS

A. Scope of Work: Work includes but is not limited to, the following:
1. Provide all work identified in the Contract Documents.
2. All Specification Sections provided.
3. All abatement drawings provided for reference.
4. GC is responsible to install all required access hatches. GC to coordinate with MEP trades for locations and hatches.
5. GC is responsible to install sleeves in foundation walls for penetrations by other prime contractors, MEP contractors to provide GC a written sketch showing exact height/locations with distance from column line and depth below finished slab within sufficient time for GC to install. If information is not provided in a timely manner by MEP, then core drilling is the responsibility of the affected contractor.
6. GC will coordinate MEP opening sizes and locations (HVAC units, louvers, vents, etc) with MEP trades. Lintels for these openings are provided and installed by the GC. **GC WILL BE REQUIRED TO PROVIDE CEILING SHOP DRAWINGS COORDINATED WITH MC & EC CONTRACTS**

7. Fire alarm mag holds furnished and wired by EC, and will be installed on doors by GC.
8. All new roof pipe pitch pockets are supplied and installed by GC. See MC drawings for coordination. All new roof curbs are supplied by MC and installed by GC. GC is to provide the required blocking for any roof curbs and flash with new roofing.
9. The following components of the project are provided by the owner on a state contract. GC will be required to coordinate with these components and furnish work related to their installation:
    a. Roof top Units – GC to provide roofing and curb flashings.
    b. Science lab casework/ FF&E – GC to prep flooring and wall substrates, provide wall base as required around built-in furniture.

PART 3 - EXECUTION

3.1 WORK SEQUENCE

A. The Work shall be conducted to provide the least possible interference to the activities of the Owner's personnel, per the Project Preliminary Schedule.

B. Work required during overtime, extended shifts or holidays due to failure of contractor to maintain schedule, will be monitored by Architect/Construction Site representative, and may be monitored by Owners' personnel. Additional costs for Architect/Construction Site Representative and/or Owner personnel will be borne by the Contractor.

C. Coordination of any utility and power interruption must be done with approval of the Architect/Construction Site Representative. Shutdowns must occur during non-occupied timeframes only.

D. Construction access to the site shall be limited to those designated for personnel, equipment and deliveries by the Owner. All contractor staging, parking and storage shall be coordinated with the Construction Site Representative and subject to change.

E. Payments: Each bid that covers more than one school (i.e. one SED project) shall provide completed AIA G732 & G703 by building (for each SED project).

F. No work shall be installed without approved shop drawings. Any work in place without approved shop drawings will be rejected and removed by that contractor at their expense and backed charge all other costs related to.

G. Any work deemed by CM, Architect and District not properly installed by a contractor per the contract drawings and specifications shall be removed immediately and corrected, with all associated costs to be borne solely by that contractor.
H. All prime contractors shall coordinate their contract work with other primes to meet the project schedule and for a complete operational system or area or work.
I. All contractors are to provide within 3 weeks of award a "base line" construction schedule for their work from commencement to completion including all phasing. This schedule is to be updated monthly to show percentage progress of each item listed. This schedule shall be revised to provide a recovery schedule in the event of a delay for any reason. The recovery schedule shall include the "base line" item and the recovery to show how the delay is affecting the overall project schedule. This schedule is to be provided in MS Project or Primavera. Excel schedules are not accepted.
J. Prime contractor "base line" schedules are to be reviewed by each prime contractor and coordinated where work is related and that each prime's work shall be included in each "base line" contractor's schedule as necessary for coordination.
K. All contractors are to provide 2-week look ahead schedules showing work related to the base line and shall be coordinated with other prime 2-week look ahead schedules. These schedules will be Excel format. Format will be provided by the CM.
L. Contractors to provide a full-time supervisor on site 100% of the time. This is not a working foreman. Supervisors are not working with tools they are supervising their workers and coordinating with other contractors and district/ CM. Failure to provide will be default of your contract and subject costs related to and termination.
M. All prime contractors are the provide a project manpower structure showing names and telephone numbers of each responsible person on the project. This shall be updated as needed if personal changes are made.
N. All site equipment and dumpsters are to be behind temporary chain link fence when stored on site and or within the construction work zone where temporary chain link fence has been providing and installed by the prime. Each prime contractor is responsible to provide and install temporary chain link fence around their own stored equipment and dumpsters on site.
O. No equipment, panels or any services shall be turned off for any reason without written request and approval by the district. Project form shall be used for all shutdowns and required a 3-day notice. Other shutdowns may require more time.

3.5 CONTRACT No. 3 GENERAL CONTRACT (GC-01)– GENERAL CONSTRUCTION PRIME CONTRACT FOR INTERIOR WORKS AT CONTRACT AT NANUET SENIOR HIGH SCHOOL.

A. Project Site Superintendent: GC shall provide one (1) full time, non-working Project Site Superintendent while any work related to this Contract is being performed. Superintendent shall be responsible for the daily activities of this Contract and work closely with the Construction Manager and the other Prime Contract Superintendents/Foremen, in a manner that best promotes the objectives of the Project.

B. Superintendent shall be on-site while Contractor's own forces, and/or subcontractors are performing work on the Project Site; also while other Prime Contracts are installing work, or require the coordination of work related to this Prime Contract, and/or as requested by the Construction Manager.

1. Superintendent shall be the same individual throughout the duration of the Project.
2. Project Site Superintendent shall be an individual with minimum of five (5) years' experience in this field of work.
3. Refer to Section 013100 "Project Management and Coordination" for further requirements.

B. Project Foreman: GC shall provide at least one (1) full time Project Foreman during each shift of work at each school; Foreman shall be able to make binding decisions, as they relate to the daily activities of their crew, as related to achieving the goals of the Project.

C. Site Communications: GC shall provide Project Superintendent with a mobile phone; all costs and service charges shall be paid for by GC; provide Construction Manager with contact number(s).

D. Project Site Field Office: Provide site office facilities for this Contract's Project Superintendent. Site Office shall be equipped with telephone with answering machine, fax and e-mail. Contact information shall be provided to the Construction Manager.

1. The Owner reserves the right to seek reimbursement for temporary facilities not provided by this Prime Contract.

E. Scope of Work: Work of the GC includes, but is not limited to, the following:

1. Coordination with other Prime Contracts, Owner and Construction Manager as required to adhere to and maintain approved Project Master Schedules. Prior to first payment, this includes developing and submitting the Project Master Schedule for Interior works
2. Provide all interior demolition as indicated in the Construction Documents, or required for Work of this Prime Contract:
   a. Coordinate all demolition with Hazardous Materials documents. Coordinate with all other Prime Contracts regarding removals required for the Project.

Demolition of a system shall mean any and all components removed in their entirety, to the point of origin, source or substrate.

3. Provide all new ceiling systems and patching of existing ceilings, complete where indicated in Contract Documents.
4. Contractor access doors furnished by the prime trade requiring access; installation of all access doors will be by contract GC. General contractor is to coordinate with other primes as to location and quantity of access doors to be installed at the appropriate time.
5. The GC shall provide and install flooring protection at all schools prior to demolition to protect the owner's property, and to accommodate storage of Owner property Flooring protection shall be 6 Mil plastic sheeting covered by Masonite hardboard of 1/8" thickness installed so as to cover entire floor area of designated spaces, with joints abutting one another and each joint fully taped with duct tape. At the conclusion of interior work, all interior work areas shall be cleaned and Masonite hardboard and plastic sheeting removed in order for the district to restore the classroom(s) and/or corridors. After the removal of Masonite and plastic sheeting, the exposed existing flooring shall be swept clean by the GC.
6. The GC shall provide one (1) 45' storage containers for the Owner's use, to be placed as directed by the Owner. GC shall provide a Schedule of Values line item in the base bid for storage trailers. If Owner chooses not to utilize this provision, the value of the storage trailers shall be credited back to the Owner at the end of the project.
7. This prime contractor shall provide ALL demolition and new construction of housekeeping pads for MEP contractors for all schools as shown on the contract documents.
8. GC shall conform to phasing and sequencing of interior work as coordinated with the Owner. See Milestone Schedule
9. Environmental Protection: Provide protection, and conduct construction in ways and by methods that comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
    a. Restrict use of noisemaking tools and equipment to hours that will minimize complaints from persons or firms on or near the Project site.
10. Provide dust control within delineated building site while the Work of this Contract is being performed. Limit situations that may create dust contamination while Work of this Contract is idle.
11. Provide all Control Lines and Elevations as required. GC shall transfer lines and elevations to other locations as necessary.
12. Provide cut and patch work related to that of this Prime Contract, and at those areas specifically identified in the Construction Documents, regardless of trade creating the area to be patched.

a. Each Prime Contract is responsible for all other respective cutting and patching required of their installations (refer to Section 01 73 29 for further information).

13. Provide all access panels indicated, and those not indicated whereas inaccessible installations have been provided by this Prime Contract, located above hard ceilings or in walls. Access panels required for MEP equipment accessibility are to be provided by the MEP contractors and installed by the interior contractor. Coordinate locations for panels with MEP contracts.
14. Provide all prep/paint finishes as indicated in the Construction Documents.
15. Provide finishes including, but not limited to; CMU, gypsum board assemblies, plaster, suspended ceiling systems, and all paint and finish systems including those on all surfaces adjacent to and damaged by renovation work during the Project.
    a. Provide all associated surface preparation for each finish included in this Prime Contract.
    b. Provide all plaster wall patch at all removal locations and any locations shown on the contract documents
16. Provide all miscellaneous wood blocking, shimming and supports for items or equipment installed under this Prime Contract, and as coordinated with other Prime Contracts for metal strapping and/or wood blocking for installation of MEP for interior Work.
17. Provide through-penetration fire stop systems in unit masonry assemblies, gypsum wall construction, floor penetrations, and at all structural member penetrations as per contract documents. Contractor shall coordinate with all MEP contractors to complete the scope of work.
18. GC is specifically reminded that there may be miscellaneous asbestos pipe insulation/fittings above some ceilings and inside wall areas. Contractor will investigate above the ceiling and walls prior to demolition and carefully perform the work as necessary to not disturb any insulation/fittings.
19. GC will provide all necessary patching/self-leveling/grinding of flooring substrate to insure a smooth flat floor finish prior to installation of new VCT or urethane flooring.
20. Substantial Completion: Clean all GC installations and provided equipment at the time of Substantial Completion or as directed by Construction Manager.
21. GC to provide negative air machines to properly exhaust all work areas of any odors, dust, fumes.
22. Refer to Division 00 Section “Project Forms” and make use of these forms for the installation and coordination of the Work. These forms are included to assist this Prime Contract with coordinating the installation of Work by others prior to enclosing and/or finishing work. Owner will not compensate Prime Contract for work not properly coordinated that result in added work, or removal of work. Secure the proper signatures or acknowledgements, as indicated, prior to installing/completing the Work.
23. Coordinate all the preceding requirements, accordingly, with all applicable Alternates indicated in Section 01 23 00 “Alternates”.

24. **Portions of the work depicted on the contract drawings or noted in the contract specifications are to be provided by other vendors on cooperative contracts. The prime contractor is to review and coordinate with this work. There will be work required before and after the cooperative vendors that the prime contractor will need to perform to allow installation of the vendors work.**
    a. **The work provided by others that must be coordinated with the prime contractor includes and is not limited to:**
        - **FF&E as depicted on the contract drawings**

F. Supplemental Temporary Facilities and Controls by GC include, but are not limited to:

1. Waste Disposal Facilities: Provided by each contractor.
2. Temporary Interior Barricades: Provide, maintain and eventually remove all temporary barricades per OSHA Regulations, Industry Standards, or as indicated in the Construction Documents. These include, but are not limited to, the following areas:
    a. To isolate new construction areas.
    b. To isolate renovation areas.
    c. Floor openings/penetrations, including stairwells.
        1) Horizontal Openings: close openings in floors and horizontal surfaces with load bearing, wood and/or steel framed construction per applicable regulations.
3. Temporary Doors, Frames & Wall Assemblies: Provide, maintain and eventually remove all temporary installations per OSHA Regulations, Industry Standards, or as indicated in the Construction Documents. Provide fire rated assemblies as required. Provide exit (panic bar/crash bar) devices at locations of egress. Coordinate locations with Construction Exiting Plan, Sequencing/Phasing Plans, and the Construction Manager. Temporary doors shall be constructed using ½" plywood and 2x construction, equipped with hasps, locks, handle and latch mechanism, and spring or counter weight installed to allow door to close after opening. Permanent doors will not be used in temporary conditions.
4. Temporary Sanitary Facilities: Provided by each contractor.
5. Existing Stair Usage: Use of Owner's existing stairs in unoccupied areas will be permitted, provided that at Substantial Completion, stairs are restored to conditions existing before initial use.
    a. Provide photo documentation of existing stair conditions prior to use by all Prime Contracts. Document during use, and at completion of the Renovation Project in order to document any and all damage to the Owner's property.
    b. 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.

6. Indoor air quality management at all areas of Construction, once building is enclosed.
    a. Provide all necessary dust partitions, fans, temporary ducts, and barricades to properly contain and ventilate all work area fumes and odors, created by demolition and new construction or alterations, directly to the outside. Ventilate to an area outside the building, sufficiently away from the building, as not to contaminate other areas. There will be no additional claims honored if the Construction Manager requests additional ventilation or requirements.
    b. Provide and exhaust air system for the project indoor areas that could produce fumes, VOC's, off gasses, dusts, mists, or other emissions.
    c. System Operation:
        1) A sufficient quantity of exhaust fans in existing window openings or other approved locations shall be operated.
        2) Exhaust air system shall operate for a minimum of 72 hours after work is completed or until all materials have cured sufficiently so as to stop out – gassing of fumes or odors and area has been ventilated to remove all detectable traces of odors and fumes.
        3) Maintain 25 feet clearance from all temporary exhaust outlets to all active building outdoor air intakes.
        4) Refer to Division 01 Section "Work Restrictions" for further information.
7. Provide all shoring required for Work of this Prime Contract, including but not limited to;
    a. Cutting or altering of existing construction.
    b. Provide protection of all new and existing surfaces during the Work. Do not stand, walk, or work off of any unprotected finished surface above the floor.
8. Maintain temporary fencing and barricading to keep unauthorized persons away from dangerous and hazardous areas for which this Prime Contract is responsible.
9. Traffic Controls: Provide flagman while any operation of this Prime Contract interferes with traffic flow on adjacent roadways.

END OF SECTION 01 12 03

SECTION 01 12 04 – CONTRACT SUMMARY – GC-02

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

This Section includes a summary of each Prime Contract, including responsibilities for coordination and temporary facilities and controls. One set of Construction Documents is issued covering the Work of multiple Prime Contracts. Each Prime Contract is responsible to review all drawings and specifications for specific requirements indicated, and for a general understanding and knowledge of the work of other Prime Contracts. All Prime Contracts are responsible for all Work of their Contract no matter what drawing on which the Work appears. All Prime Contracts are responsible to coordinate their work related to the complete set of drawings and specifications, not limited to each prime contractor scope. **All Bidders should acknowledge that for each contract listed below, each contractor is their own General Contractor and subject to all General Contractor requirements.**

General Contract: The Interior Contractor shall be selected based on the bid procedure as described in the Bid Documents. Contract Bidders are responsible for (a) trade work coordination, (b) the scope contained in drawings listed below and (c) any and all additional scope specifically identified to be performed by the Interior Contractor in other Bid Packages in the Contract.

a. Interior & Exterior Contract: All work related to Interior and exterior construction includes but is not limited to the following items: (Refer to the Contract Documents for full scope of work.

1) Demolition, ACT, GWB, Plaster Ceiling, Painting, Patching, Flooring, exterior façade and window demolition, excavation, & abatement. New structure, interior and exterior steel framing, and storefront systems, masonry and metal panel, and finishes.
2) Work related to drawings: (*In addition to these drawings, the contractor is required to review all specifications included in the overall*

contract that may contain related scope or detail for this specific contract.)

a) Barr Middle School
- Security Vestibule Project
- STEM Labs Renovation Project

1.3 All "G, AS, S, & A" drawings related to Barr Middle School are the responsibility of this contract. It is the GC's responsibility to review the MEP drawings to coordinate the GC's portion of the work with MEP.

1.4 Related Sections include, but are not limited to, the following:

A. Division 01 Section "Work Restrictions" for use of the Project site and for requirements for continued Owner occupancy of premises.

B. Division 01 Section "Project Management and Coordination" for general coordination requirements.

C. Division 01 Section "Project Forms" for documents required for Testing and Coordination.

D. Division 01 Section "Temporary Facilities and Controls" for specific requirements for temporary facilities and controls

E. Applicable Specification Sections: All specification Sections itemized below are to be provided complete by this Prime Contract, unless noted otherwise. In addition to these specifications, the contractor is required to review all specifications included in the overall contract that may contain related scope or detail for this specific contract.
1. Divisions 00 and 01 – Procurement and Contracting Requirements & General Requirements.
2. Division 02- Existing Conditions
3. Division 03 – Concrete
4. Division 04 Masonry
5. Division 05 – Metals
6. Division 06 – Wood and Plastics
7. Division 07 – Thermal and Moisture Protection
8. Division 08 – Openings
9. Division 09 – Finishes

10. Division 10 – Specialties
11. Division 11 – Equipment
12. Division 12 – Furnishings
13. Division 13 – Special Construction

F. Applicable Drawings : All drawings itemized below are to be provided complete by this Prime Contract, unless noted otherwise. In addition to these drawings, the contractor is required to review all drawings included in the overall contract that may contain related scope or detail for this specific contract.
    1. **All "G", "BM-ASB", & "BM-A" drawings**
    2. **BM-S001, BM-S103, HS-S301, BM-S501**

1.5 DEFINITIONS

1.6 MANAGEMENT AND COORDINATION

A. The Owner shall provide a Construction Manager.

    1. The Construction Manager shall provide a full time construction site representative recognized as the Construction Manager.

1.7 CONSTRUCTION MANAGER

A. The construction manager shall provide on-site administration of the Contracts for Construction in cooperation with the Architect as set in AIA Document A232 ™ – 2009, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition, as modified.

B. The Construction Manager shall provide administrative, management and related services to coordinate scheduled activities and responsibilities of the Multiple Prime Contractors with each other and with those of the Construction Manager, the Owner and the Architect. The Construction Manager shall coordinate the activities of the Multiple Prime Contractors in accordance with the latest approved Project Schedule and the Contract Documents.

C. Utilizing the construction schedules provided by the Prime Contractors, the Construction Manager shall update the Project schedule, incorporating the activities of the Owner, Architect, and Multiple Prime Contractors on the Projects, including activity sequences and durations, allocation of labor and materials, processing of Shop Drawings, Product Data and Samples, and delivery and procurement of products, including those that must be ordered will in advance of construction. The Project schedule shall include the

Owner's occupancy requirements showing portions of the Project having occupancy priority.

D. Utilizing information from the Multiple Prime Contractors, the Construction Manager shall schedule and coordinate the sequence of construction and assignment of space in areas where the Multiple Prime Contractors are performing Work, in accordance with the Contract Documents and the latest approved Project Schedule.

1.8 GENERAL REQUIREMENTS OF PRIME CONTRACTS

A. Prime Contracts: The context used in this Section are separate Prime Contracts that represent significant elements of work that is to be performed concurrently and in close coordination with the work of other Prime Contracts for the benefits of the Owner. Each Prime Contract is recognized to be a major part of the Work.

B. Assignment of Work: Should a conflict be indicated, Section 011200 shall take precedence over all scope of work assignments that may be indicated elsewhere within the Construction Documents.

C. Layout and Installation: Each Prime Contractor shall schedule, layout and install their Work in such manner as not to delay or interfere with, but to compliment the execution of the work of other Prime Contracts, utility companies and Owner's operations.

D. Extent of Contract: The Contract Documents, drawings and specifications each contain more specific descriptions of the Work facilitating which Prime Contract includes specific elements of the Project.

1. Work provided by each Prime Contract shall mean complete and operable systems and assemblies, including products, components, accessories and installations required by the Construction Documents or indicated otherwise.
2. Prime Contractors shall exercise good judgment and perform all work according to related industry standards.
3. The Owner is exempt from payment of Federal, State and local taxes, including sales and compensating use taxes on all materials and supplies incorporated in completing the Work; these taxes are not to be included in the Bid. This exemption does not apply to tools, machinery, equipment or other property leased by, or to, the Contractor or sub-contractor, or to supplies and materials, which even though consumed are not incorporated into the completed work. Prime Contractors, and their sub-contractors, shall be responsible for paying any and all applicable taxes on said tools, machinery, equipment or property, and upon all said unincorporated supplies and materials, whether purchased or leased.
4. Prime Contracts shall understand that time is of the essence, and will adequately staff the Project by employing the appropriate trade's people to perform the Work; these people shall be experienced in their respective trades. A shortage of labor in

the industry shall not be accepted as an excuse for not properly staffing the Project; all efforts shall be made to meet or exceed the schedule, including additional staff and/or labor hours necessary. All cost associated with this item shall be included within the Bid.

5. Local custom and trade union jurisdictional settlements will not control the scope of the Work of each Prime Contract.
   a. When a potential jurisdictional dispute or similar interruption of Work is first identified, or threatened, the affected Prime Contracts shall promptly negotiate a reasonable settlement to avoid or minimize the pending interruption and delays.
   b. Contractor's trade-related issues shall not be grounds for modification or extension of scheduled completion date(s).
6. The Work of all Prime Contracts requires close coordination with other Prime Contracts and construction personnel. Maintain flexibility and cooperation through the Project. "Out of Sequence" and "Delay" claims will only be considered when requirements of Division 01 "Administrative Requirements" have been adhered to. Delay claims must be in writing and forwarded to the Architect, per the requirements of the General Conditions of the Contract. Claims not submitted per these requirements will be rejected and/or denied.
7. The intention of the Work is to follow a logical sequence, however, a Prime Contractor may be required by the Architect or Construction Manager, to temporarily install, omit or leave out a section(s) of Work, out of sequence. All such out of sequence work, and come back time, at these areas shall be performed at no additional cost to the Owner.

E. Substitutions: Per Division 01 Section "Substitution Procedures", each Prime Contractor shall cooperate with the other Prime Contractors involved, to coordinate approved substitutions with remainder of the Work. Contractors shall submit all "Substitutions" at least ten (10) days prior to the date for receipt of Bids as specified in the Instructions to Bidders 002113 Section 3.3 Equivalents or bid will be considered per "basis of design".

F. Construction Schedules: Refer to Divisions 01 Section "Construction Progress Documentation", "Preliminary Schedule" and "Project Management and Coordination" for requirements related to meetings and schedules.

G. Construction Sequencing and Phasing: Prime Contractor shall understand that Sequencing and/or Phasing Plans are contingent upon the work areas being complete/occupied, prior to the next area of Work beginning. Should an area of construction not be complete per the Project Preliminary Schedule, the Project Master Construction Schedule/Sequencing Plans will be adjusted accordingly. The Owner will not be responsible for delay claims due to adjustments being no fault of their own.

1. Prime Contracts may be required to re-sequence the phasing of the project as a result of changes to the schedule. Prime Contracts shall provide these adjustments at no additional cost to the Owner.

H. Existing Conditions: Each Prime Contract shall verify existing conditions in the field prior to work commencing in that area and immediately report conditions to the Architect that are not represented correctly by the Construction Documents.

1. Each Prime Contract is responsible for familiarizing himself with Project Site Logistics and provide a "site logistics plan locating storage area, scaffolds, rubbish areas, stock piles and egress related to all work, included phased construction within 30 days of award.
2. Each Prime Contract has been given ample opportunity to review Existing Conditions related to the Project. Existing Conditions not noted in the Construction Documents that could be easily recognized during pre-bid review that interfere with the respective Prime Contract's work, shall be the responsibility of the respective Prime Contract. This includes all costs associated with removal, patching, relocation or re-fabrication of installations.

I. Hazardous Materials: Each Prime Contract shall familiarize themselves with the Hazardous Materials Sections/Drawings of the Construction Documents and follow DOL/OSHA/EPA/SED regulations while performing their respective Work in these areas. Discovery of non-identified or concealed hazardous materials shall be reported to the Construction Manager immediately and followed up with written documentation of the event.

J. Protection of Installations: Each Prime Contract is responsible for protecting their installations at all times. All costs incurred to repair, replace or clean insufficiently protected materials/installations shall be the responsibility of the installing Prime Contract.

1. Architect shall be notified, in writing, immediately upon material/installation being damaged; notification shall indicate responsible party.
2. Owner will not be liable for damaged materials and/or installations by "others", when "others" cannot be identified.
3. Repair damaged work, clean exposed surfaces or replace construction installations that cannot be repaired.
4. Each Prime Contract shall be responsible for removing all labels not required to remain from their installations.
5. Installations shall be wiped clean and proper protection then installed.
6. Each Prime Contract is responsible to protect another primes work in the event that prime has to work over or on top of that other primes work being complete. The prime working over the completed work takes full responsibility of that other primes completed work both in condition and operation.

7. Gc shall install heavy duty "Ram Board" or equivalent to protect new floor surfaces from damage until final cleaning and acceptance by owner.

K. Daily Cleaning: All Prime Contracts are responsible for any and all debris caused by their Work, including the Work of their subcontractors. A daily clean up and disposal is required by each Prime Contract for the periods which that Prime Contract, or its sub-contractors, are performing Work on site.

1. Assign at least one person for a daily clean and sweep of the work area(s). Prime Contractor shall allot sufficient manpower and time for this to be completed by the end of each shift. Submit name of this person(s) to Construction Manager.
    a. Construction Manager shall have the authority to give direction to person(s) on the Project Site identified by the Prime Contract as designated for cleanup tasks. This shall include the safety review/securing of the site-work zone after each shift.
    b. This person has check that no construction debris was dumped in any district dumpers during this end of shift site review, if found the contractor must remove immediately the next morning to avoid back charges costs of $1500 per day not removed.
2. Any Prime Contract not providing personnel for Daily Cleaning will be Back Charged for labor provided by the Owner to complete this task.
3. Contractor working solely in an area shall be responsible for clean/sweep of that area.
4. Daily cleaning will not mean any one Prime Contract is responsible for assisting another Prime Contract with removing major quantities of debris created by a particular Prime Contract's Work.
5. Daily cleaning will be mandated to remove from the building any debris created by day-to-day activities. All Prime shall assist in sweeping shared work areas and shared corridors while working on site. Each Prime shall assist in mopping of shared corridors while working on site or as required by the Owner.
6. All prime contractors and subcontractors are required to provide sweeping compound for daily cleaning in their respective exterior and interior work areas. Each Prime Contract shall provide a sufficient number of brooms or other necessary tools, for use by their personnel to adequately fulfill their obligations.
7. All prime contractors shall provide and maintain garbage cans/refuse containers with liners for each construction area of their respective contracts as directed by the Construction Manager and shall be responsible for disposing of these materials to a dumpster.
8. All prime contractors provide the necessary equipment/containers (lull/skip-box) to move daily clean/sweep debris from the building to a dumpster on a daily basis, for each construction area of their respective contracts. Skip-box shall be emptied to a dumpster by 9:00 a.m. the following day.

9. Cleaning shall be deemed a Safety & Health issue, with Prime Contracts being held accountable for fulfilling their contractual obligations.

L. Final Cleaning: At Substantial Completion of each area of construction, each Prime Contract shall wipe/vacuum clean all of their respective installations; All interior contracts performing work inside the buildings shall mop clean all building surrounding areas and finish flooring and remove all marks/blemishes to the finish, for each construction area of their respective contracts. Each area of construction shall be wiped clean of all construction dust and debris prior to turnover to the Owner.

M. Cutting and Patching: All Primes are responsible for cutting and patching required to complete their Work. All repair of existing finish Work (including finish floors) shall be performed by contract requiring work, meeting or exceeding minimum contract requirements for that particular section, specification, or type of work. All concealed openings (piping, ductwork, conduit, etc.) must be repaired to comply with specified wall or deck conditions as well as required fire and sound ratings. All corridor penetrations require fire safing. If contractor elects to install their new work in an existing unrated wall or floor opening, whereas the wall/floor is a fire rated condition, that contractor is responsible to fire rate that opening to match the wall/floor fire rating with new and all other existing wire, piping, ducts etc. Other areas are noted in drawings and specifications.

1.9 Project Schedule. The nature of this project is to complete all the work listed as Phase 2 in the schedule by **the Project Closeout Dates specific to each Prime Contract as listed below**. Each Prime Contractor shall include in their bid proper allowances for foul weather.

A. Bids Received: 1/19/2023

B. Anticipated Notice to Proceed: 2/8/2023

C. Submittals: The following items are to be submitted within 60 business days after Notice to Proceed:
   1. Submittal List and Submission Schedule – **15 days after NTP**
   2. Field Investigations
   3. Shop Drawings
   4. Long Lead Items – **30 days after NTP**
   5. Schedule of Values and Key Submittal List – **15 days after NTP**

D. Mobilization: 6/26/2023

E. Substantial Completion and Project Closeout: Per 01 11 00 Milestone Schedule

1.10 TEMPORARY FACILITIES AND CONTROLS OF PRIME CONTRACTS

A. Conditions of Use: Keep temporary services or conditions clean and neat in appearance. Operate in a safe and efficient manner. Relocate temporary facilities as required as work progresses; do not overload facilities or permit them to interfere with progress. Take necessary fire prevention measures; do not allow hazardous, dangerous, or unsanitary conditions to develop or persist on the Project site.

1. Installation, operation, maintenance, and removal of each temporary service or condition are considered part of the respective Prime Contract's own construction activity, as are costs and use charges associated with each facility.
2. Locate service or condition where they will serve the Project adequately and with minimum interference of the Work, coordinate with the Construction Manager and the other Prime Contracts prior to installation.

B. Temporary Use of Permanent Facilities: Prime Contract, as installer of each permanent service or condition, shall assume responsibility for its operation, maintenance and protection during use as a construction facility prior to the Owner's acceptance, regardless of previously assigned temporary facilities and controls responsibility.

C. Owner's Facilities: Contractors are not allowed to use the Owner's facilities (toilets, telephones, food service, etc.) for their own benefit or convenience. Prime Contract Superintendents shall enforce this policy with their respective work forces.

1. Construction personnel parking will be restricted to area as directed and agreed to by the Owner, and to facilitate the completion of the work. Owner reserves the right to remove from their property, unauthorized vehicles occupying unauthorized areas, at respective vehicle owner's expense.

D. Storage on the Project Site: Each Prime Contract shall provide sufficient secure weather-tight storage facilities for their materials and equipment. These storage containers are required to be located on the "site logistics plan." The Owner's facilities and the Project's building areas shall <u>not</u> be used for storage unless agreed upon, in writing, with the Owner via the Construction Manager.

1. Until permanently incorporated into the Work, all materials on the Project site are considered to be the Prime Contract's responsibility for security and protection.
2. Prime contractor is required to check on their onsite stored material periodically to ensure that all material continues to be located in the stored location and that it remains protected from all damage, theft, and endangerment to others and ready to be used on notice for coordination with other contractors. Failure to arrange for

materials to be on site to complete coordinated work with other Prime Contractors will result in back charges for delays resulting therefrom.

3. Temporary long-term storage facilities are not available to Prime Contracts by the Owner.
4. Prime Contractors and their subcontractors, shall coordinate deliveries with the Construction Manager to ensure that disruptions and Owner inconvenience are avoided.

E. Tools and Equipment: Each Prime Contractor shall provide all tools and equipment necessary for its own activities; this includes secure lock-up and storage for all items on the Project Site.

1. Provide all construction aids and miscellaneous services and facilities necessary exclusively for its own construction activities; this shall include any additional supplementary power, ventilation, lighting requirements and weather protection.

F. Project Site Communication: Each Prime Contractor shall provide their Project a full time on site at all times Superintendent with a mobile phone for the duration of the Project, as indicated in their Scope of Work. Construction Manager shall be furnished with contact numbers associated with each phone.

G. Safety: Prime Contracts, not the Architect or Construction Manager, are responsible for Project Site Safety, as related to their operations (refer to Section 013150 "Special Procedures" for further requirements).

1. Each Prime Contract shall correct safety hazards and violations immediately. If safety issues are not immediately rectified, the Owner shall secure outside sources to correct the deficiency and back charge the responsible Prime Contract.
2. Maintain unobstructed access/egress to fire extinguishers, fire hydrants, stairways, corridors, ladders and other safety routes/devices.

H. Fire Extinguishers: All Prime Contracts provide and maintain "general use" fire extinguishers for each construction area of their respective contracts; comply with applicable codes for quantities required. Use of the Owner's fire extinguishers to meet this requirement is not permitted. Comply with NFPA for recommended classes for exposure; extinguishers shall be inspected and appropriately tagged prior to being brought on site. Provide stands, painted bright orange, sturdy enough to carry the extinguisher, and built as not to create a tipping hazard.

1. Each Prime Contract shall supplement this requirement by providing additional fire extinguishers specifically related to their work activity (e.g., welding, soldering, abrasive cutting, etc.).
2. Each Prime Contract shall provide and maintain proper fire extinguishers at/in their respective on site office and storage facilities.

3. Store combustible materials in approved containers in fire-safe locations.

I. Welding: Any Prime Contract performing welding, cutting or other activities with open flames or producing sparks shall at a minimum:

1. Coordinate interruption/shutdown of detection system(s) to avoid creating false alarms.
2. Protect the area and surrounding areas from fire and damage.
3. Maintain fire extinguishers, compatible with activity, at the location of the activity.
4. Provide a continuous Fire Watch during the activity and one-half hour beyond the completion of the activity.
5. Provide all necessary fans and ventilation required for the activity.
6. Any welding, burning and or use of flame the contractor is required to provide all required "hot work permit" to use such equipment prior to start of work. Its mandatory that no "hot work" shall start without these permits issued to the CM and Owner. Failure to this requirement will result to the removal of the project super of that company from all district projects.

J. Remove each temporary facility when it can be replaced by the authorized permanent facility no later than Substantial Completion, or as directed by the Architect and/or Construction Manager. Complete or restore permanent facilities that may have been delayed due to interim use of a temporary barrier or condition.

K. Temporary Power: Each Prime Contractor shall provide for their own temporary power needs for any scheduled electrical utility shut downs. Each Prime Contractor shall provide for their own temporary generators, power cords and temporary lighting as needed during these periods to continue to perform their work and maintain adherence to the Preliminary Schedule and approved Project Master Schedules. All temporary power equipment shall comply with all applicable codes and regulations.

L. Waste Disposal Facilities:

1. General debris/refuse/construction waste containers (dumpsters) shall be provided by each prime contractor and secured as specified herein this contract.
2. It shall be the responsibility/requirement of each Prime Contract to bring their waste to the dumpsters, including but not limited to all equipment, demolition debris, discarded materials with further identification including the following; construction and demolition debris refers to discarded materials generally considered non-hazardous in nature, including but not limited to steel, glass, brick, concrete, asphalt material, pipe, gypsum wallboard, and lumber, from the construction or destruction of a structure as part of a construction or demolition project or from the renovation of a structure, including such debris from construction of structures at a site remote from the construction or demolition project site.

3. It shall be the responsibility and requirement of each Prime Contract to recycle metals generated by its Work, and the Work of its subcontracts.
4. Joint-effort recycling by all Prime Contracts is encouraged.

M. Temporary Sanitary Facilities: Provide temporary self-contained toilets units for duration of the project.
   1. Temporary Sanitary Facilities:
      a. Each prime contractor is required to provide their own Temporary Sanitary Facilities and secured behind fencing and/or locked after work hours and weekends.
   2. Comply with regulations and health codes for type, number, location, operation, and maintenance of fixtures and facilities.
   3. Provide separate facilities (minimum of one ea.) for male and female personnel in proportion required by OSHA.
   4. Shield toilets to ensure privacy.
   5. Coordinate mobilization and demobilization of units with Construction Manager.
   6. Toilets shall be cleaned at least once per week, with additional facilities or cleanings provided if requested by Construction Manager.
   7. Provide and maintain adequate supply of toilet tissue and hand sanitizer for each facility.

1.11 WORK HOURS & SEQUENCE

A. Unless otherwise approved by the Construction Manager, During the school days, Work is to be performed in this contract during the hours of 3:30pm to 10:00pm on weekdays, and Saturdays and Sundays from 7:00am to 3:30pm. During School breaks, work is to be performed from 7:00am to 10:00pm. There is no additional cost to the owner for working the hours of 3:30pm through 10:00pm, or weekend work during the school year. Any work done during these times MUST BE COMPLETED, CLEANED, AND TESTED AS NECESSARY FOR STUDENT OCCUPANCY BEFORE THE START OF THE NEXT SCHOOL DAY. Contractors are required to schedule work during school breaks, school days off, and school holidays.

B. Summer work starts June 28th through August 23rd for 2023. The Summer working hours are from 7:00am to 9:30pm. There is no additional cost to the owner for working the hours of 3:30pm through 9:30pm or on weekends and holidays during the Summer.

C. Contractors are required to start working on site within 30 days of execution of contract, to the extent permitted by contract. Contractors are required to coordinate and perform work simultaneously with other Contractors. Contractors are required to complete their contract work by the designated Substantial Completion and Final Completion end dates as indicated on the Invitation to Bid.

D. Mandatory clean up periods - From August 24th, 2023 to August 31st , 2023 and August 30th , 2023 to September 6th, 2023, contractors shall clean up all interior and exterior areas.

E. Contractors are required per contract to fully staff the project during the work shifts stated above with the required manpower to complete their work within the allowed scheduled time frame. Contractors are required to provide a 72-hour advanced request to the Owner via the Construction Manager for any Saturday and Sunday work. If a project schedule delay has been caused by the fault of the contractor, the contractor is required to provide 3rd shift work from 9pm to 6am to make up the project schedule. All costs for CM, Architect and district personal related to this 3rd shift request will be charged to the contractor at a combined rate for all at $3,000 per 8hr shift.

F. The shifts noted above are not considered overtime or premium time hours.

G. Contract summaries will provide start and end dates for each contractor.

H. Additional requirements:

1. Multiple Crews: Each Prime Contract shall provide multiple crews, supervision, cranes, scaffold and other means necessary to perform the Work, and maintain the Project Master Schedules.
2. Interruption of any utility and/or power must be coordinated with the Owner, via the Construction Manager.
3. Any and all overtime, weekend and/or holiday work required to meet the Project Master Schedules shall be incorporated in the respective Prime Contract's bid.
4. Should a Contractor's progress fall behind, as to schedule, Prime Contractor shall employ additional – 3rd shift and/or overtime and/or weekend workforce until situation is rectified, to the satisfaction of the Architect and Construction Manager, at no additional cost to the Owner, however subject to charges as stated in section 1.10 E for lack of maintaining schedule
5. Should a Prime Contract feel another Prime Contract is delaying them sufficient time to complete their installations, per the schedule, the Architect and Construction Manager shall be notified in writing immediately of the situation (refer to Conditions of the Contract for protocol). A Prime Contract creating such a delay, that causes a proven burden upon another Prime Contract to maintain schedule, shall bear all costs incurred by the delayed Prime Contract to maintain the schedule.
6. The Architect and Construction Manager shall not be overburdened as to overtime cost, to monitor the work, due to no cause of his or her own. Owner will compensate the Architect and Construction Manager for all additional cost related to the issue of a Prime Contractor's failing to execute the Contract by fully staffing per the work hours and days noted herein. The Owner reserves the right to back charge the responsible Prime Contract for these fees if incurred.

7. All Asbestos and/or Lead Abatement shall take place to meet the requirements of the Preliminary Schedule and Project Master Schedules and shall be coordinated with the other Prime Contractors prior to commencement.

I. The Work shall be conducted to provide the least possible interference to the activities of the Owner's personnel and the surrounding property owners (neighbors).

1. Prime Contracts are hereby notified that: All Prime Contractors and their subcontractors shall limit excessive noise during 2nd shift known as work extending to 10PM weekdays upon approval by owner and city work hour restrictions. These operations shall not create a disturbance to neighboring properties.

J. Construction access to the site shall be limited to personnel, equipment and deliveries by suppliers relative to the Work of Prime Contractors and their subcontractors. Prime Contracts shall keep the Construction Manager advised of persons accessing the site and shall seek assistance with coordinating parking and storage facility locations for all Prime Contracts.

1. Where applicable, Contractors shall provide Building Site perimeter barricades as described herein the project and all temporary exit doors/lockable gates on the Project, securing these doors, fencing and/or gates at the end of each work shift.
2. When a Prime Contract engages in overtime, weekend or 2nd shift work, during the summer months and or during the normal school year, the respective Prime Contract shall notify Construction Manager of such and be responsible for securing the Project Site at the end of that work shift and perform site walk around the outside of construction area/work zone ensuring all debris is pickup up and there are no construction related hazards of any kind present once the responsible person leaves the site for the evening or weekend. This includes that all materials and equipment are fenced in and keys are removed. All interior projects have the same requirement to ensure that outside the work zone is clean from dust-dirt and that no materials are left outside the work area at any time.

1.11 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.

1.12 DRAWINGS AND SPECIFICATIONS

A. Construction Documents indicate the sum total of the Contract that make up the complete work for the Project. Through this Section "Summary of Work", the intent of the Contractor's scope of Work and responsibility is generally described. Related

requirements and conditions that are indicated in the Contract Documents include but are not limited to the following:

1. General Conditions and Requirements.
2. Referenced and applicable Codes, Regulations and Standards.
3. Scheduling and phasing requirements.
4. Existing conditions and restrictions on use of the site and facilities.

B. Drawings and Specifications are cooperative and supplementary. Portions of the Work, which can best be illustrated by Drawings, are not included in the Specifications and portions best described by Specifications are not depicted on Drawings.

1. All items necessary to complete the work shall be furnished whether written or illustrated.
2. All primes shall exercise good judgment and perform all work according to related industry standards.

PART 2 - SCOPE OF WORK

2.1 PRIME CONTRACTS

A. Scope of Work: Work includes but is not limited to, the following:
   1. Provide all work identified in the Contract Documents.
   2. All Specification Sections provided.
   3. All abatement drawings provided for reference.
   4. GC is responsible to install all required access hatches. GC to coordinate with MEP trades for locations and hatches.
   5. GC is responsible to install sleeves in foundation walls for penetrations by other prime contractors, MEP contractors to provide GC a written sketch showing exact height/locations with distance from column line and depth below finished slab within sufficient time for GC to install. If information is not provided in a timely manner by MEP, then core drilling is the responsibility of the affected contractor.
   6. GC will coordinate MEP opening sizes and locations (HVAC units, louvers, vents, etc) with MEP trades. Lintels for these openings are provided and installed by the GC.
   7. Fire alarm mag holds furnished and wired by EC, and will be installed on doors by GC.
   8. All new roof pipe pitch pockets are supplied and installed by GC. See MC drawings for coordination. All new roof curbs are supplied and installed by MC.

GC is to provide required blocking for any roof curbs and flash with new roofing.

9. All Trenching and patching is by each trade as required by their contract drawings. The GC shall coordinate self-level and flooring with other trades required cutting and patching.
10. **GC WILL BE REQUIRED TO PROVIDE CEILING SHOP DRAWINGS COORDINATED WITH MC & EC CONTRACTS**

PART 3 - EXECUTION

3.1 WORK SEQUENCE

A. The Work shall be conducted to provide the least possible interference to the activities of the Owner's personnel, per the Project Preliminary Schedule.

B. Work required during overtime, extended shifts or holidays due to failure of contractor to maintain schedule, will be monitored by Architect/Construction Site representative, and may be monitored by Owners' personnel. Additional costs for Architect/Construction Site Representative and/or Owner personnel will be borne by the Contractor.

C. Coordination of any utility and power interruption must be done with approval of the Architect/Construction Site Representative. Shutdowns must occur during non-occupied timeframes only.

D. Construction access to the site shall be limited to those designated for personnel, equipment and deliveries by the Owner. All contractor staging, parking and storage shall be coordinated with the Construction Site Representative and subject to change.

E. Payments: Each bid that covers more than one school (i.e. one SED project) shall provide completed AIA G732 & G703 by building (for each SED project).
F. No work shall be installed without approved shop drawings. Any work in place without approved shop drawings will be rejected and removed by that contractor at their expense and backed charge all other costs related to.
G. Any work deemed by CM, Architect and District not properly installed by a contractor per the contract drawings and specifications shall be removed immediately and corrected, with all associated costs to be borne solely by that contractor.
H. All prime contractors shall coordinate their contract work with other primes to meet the project schedule and for a complete operational system or area or work.

I. All contractors are to provide within 3 weeks of award a "base line" construction schedule for their work from commencement to completion including all phasing. This schedule is to be updated monthly to show percentage progress of each item listed. This schedule shall be revised to provide a recovery schedule in the event of a delay for any reason. The recovery schedule shall include the "base line" item and the recovery to show how the delay is affecting the overall project schedule. This schedule is to be provided in MS Project or Primavera. Excel schedules are not accepted.

J. Prime contractor "base line" schedules are to be reviewed by each prime contractor and coordinated where work is related and that each prime's work shall be included in each "base line" contractor's schedule as necessary for coordination.

K. All contractors are to provide 2-week look ahead schedules showing work related to the base line and shall be coordinated with other prime 2-week look ahead schedules. These schedules will be Excel format. Format will be provided by the CM.

L. Contractors to provide a full-time supervisor on site 100% of the time. This is not a working foreman. Supervisors are not working with tools they are supervising their workers and coordinating with other contractors and district/ CM. Failure to provide will be default of your contract and subject costs related to and termination.

M. All prime contractors are the provide a project manpower structure showing names and telephone numbers of each responsible person on the project. This shall be updated as needed if personal changes are made.

N. All site equipment and dumpsters are to be behind temporary chain link fence when stored on site and or within the construction work zone where temporary chain link fence has been providing and installed by the prime. Each prime contractor is responsible to provide and install temporary chain link fence around their own stored equipment and dumpsters on site.

O. No equipment, panels or any services shall be turned off for any reason without written request and approval by the district. Project form shall be used for all shutdowns and required a 3-day notice. Other shutdowns may require more time.

3.5 CONTRACT No. 04 GENERAL CONTRACT (GC-02)– GENERAL CONSTRUCTION PRIME CONTRACT FOR INTERIOR WORKS AT CONTRACT AT BARR MIDDLE SCHOOL.

A. Project Site Superintendent: GC shall provide one (1) full time, non-working Project Site Superintendent while any work related to this Contract is being performed. Superintendent shall be responsible for the daily activities of this Contract and work closely with the Construction Manager and the other Prime Contract Superintendents/Foremen, in a manner that best promotes the objectives of the Project.

B. Superintendent shall be on-site while Contractor's own forces, and/or subcontractors are performing work on the Project Site; also while other Prime Contracts are installing work, or require the coordination of work related to this Prime Contract, and/or as requested by the Construction Manager.

1. Superintendent shall be the same individual throughout the duration of the Project.
2. Project Site Superintendent shall be an individual with minimum of five (5) years' experience in this field of work.
3. Refer to Section 013100 "Project Management and Coordination" for further requirements.

B. Project Foreman: GC shall provide at least one (1) full time Project Foreman during each shift of work at each school; Foreman shall be able to make binding decisions, as they relate to the daily activities of their crew, as related to achieving the goals of the Project.

C. Site Communications: GC shall provide Project Superintendent with a mobile phone; all costs and service charges shall be paid for by GC; provide Construction Manager with contact number(s).

D. Project Site Field Office: Provide site office facilities for this Contract's Project Superintendent. Site Office shall be equipped with telephone with answering machine, fax and e-mail. Contact information shall be provided to the Construction Manager.

1. The Owner reserves the right to seek reimbursement for temporary facilities not provided by this Prime Contract.

E. Scope of Work: Work of the GC includes, but is not limited to, the following:

1. Coordination with other Prime Contracts, Owner and Construction Manager as required to adhere to and maintain approved Project Master Schedules. Prior to first payment, this includes developing and submitting the Project Master Schedule for Interior works
2. Provide all interior demolition as indicated in the Construction Documents, or required for Work of this Prime Contract:
    a. Coordinate all demolition with Hazardous Materials documents. Coordinate with all other Prime Contracts regarding removals required for the Project. Demolition of a system shall mean any and all components removed in their entirety, to the point of origin, source or substrate.
3. Provide all new ceiling systems and patching of existing ceilings, complete where indicated in Contract Documents.
4. Contractor access doors furnished by the prime trade requiring access; installation of all access doors will be by contract GC. General contractor is to coordinate with

other primes as to location and quantity of access doors to be installed at the appropriate time.

5. The GC shall provide and install flooring protection at all schools prior to demolition to protect the owner's property, and to accommodate storage of Owner property Flooring protection shall be 6 Mil plastic sheeting covered by Masonite hardboard of 1/8" thickness installed so as to cover entire floor area of designated spaces, with joints abutting one another and each joint fully taped with duct tape. At the conclusion of interior work, all interior work areas shall be cleaned and Masonite hardboard and plastic sheeting removed in order for the district to restore the classroom(s) and/or corridors. After the removal of Masonite and plastic sheeting, the exposed existing flooring shall be swept clean by the GC.
6. The GC shall provide one (1) 45' storage containers for the Owner's use, to be placed as directed by the Owner. GC shall provide a Schedule of Values line item in the base bid for storage trailers. If Owner chooses not to utilize this provision, the value of the storage trailers shall be credited back to the Owner at the end of the project.
7. This prime contractor shall provide ALL demolition and new construction of housekeeping pads for MEP contractors for all schools as shown on the contract documents.
8. GC shall conform to phasing and sequencing of interior work as coordinated with the Owner. See Milestone Schedule
9. Environmental Protection: Provide protection, and conduct construction in ways and by methods that comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
    a. Restrict use of noisemaking tools and equipment to hours that will minimize complaints from persons or firms on or near the Project site.
10. Provide dust control within delineated building site while the Work of this Contract is being performed. Limit situations that may create dust contamination while Work of this Contract is idle.
11. Provide all Control Lines and Elevations as required. GC shall transfer lines and elevations to other locations as necessary.
12. Provide cut and patch work related to that of this Prime Contract, and at those areas specifically identified in the Construction Documents, regardless of trade creating the area to be patched.
    a. Each Prime Contract is responsible for all other respective cutting and patching required of their installations (refer to Section 01 73 29 for further information).
13. Provide all access panels indicated, and those not indicated whereas inaccessible installations have been provided by this Prime Contract, located above hard ceilings or in walls. Access panels required for MEP equipment accessibility are to be provided by the MEP contractors and installed by the interior contractor. Coordinate locations for panels with MEP contracts.

14. Provide all prep/paint finishes as indicated in the Construction Documents.
15. Provide finishes including, but not limited to; CMU, gypsum board assemblies, plaster, suspended ceiling systems, and all paint and finish systems including those on all surfaces adjacent to and damaged by renovation work during the Project.
    a. Provide all associated surface preparation for each finish included in this Prime Contract.
    b. Provide all plaster wall patch at all removal locations and any locations shown on the contract documents
16. Provide all miscellaneous wood blocking, shimming and supports for items or equipment installed under this Prime Contract, and as coordinated with other Prime Contracts for metal strapping and/or wood blocking for installation of MEP for interior Work.
17. Provide through-penetration fire stop systems in unit masonry assemblies, gypsum wall construction, floor penetrations, and at all structural member penetrations as per contract documents. Contractor shall coordinate with all MEP contractors to complete the scope of work.
18. GC is specifically reminded that there may be miscellaneous asbestos pipe insulation/fittings above some ceilings and inside wall areas. Contractor will investigate above the ceiling and walls prior to demolition and carefully perform the work as necessary to not disturb any insulation/fittings.
19. GC will provide all necessary patching/self-leveling/grinding of flooring substrate to insure a smooth flat floor finish prior to installation of new VCT or urethane flooring.
20. Substantial Completion: Clean all GC installations and provided equipment at the time of Substantial Completion or as directed by Construction Manager.
21. GC to provide negative air machines to properly exhaust all work areas of any odors, dust, fumes.
22. Refer to Division 00 Section "Project Forms" and make use of these forms for the installation and coordination of the Work. These forms are included to assist this Prime Contract with coordinating the installation of Work by others prior to enclosing and/or finishing work. Owner will not compensate Prime Contract for work not properly coordinated that result in added work, or removal of work. Secure the proper signatures or acknowledgements, as indicated, prior to installing/completing the Work.
23. Coordinate all the preceding requirements, accordingly, with all applicable Alternates indicated in Section 01 23 00 "Alternates".
24. **Portions of the work depicted on the contract drawings or noted in the contract specifications are to be provided by other vendors on cooperative contracts. The prime contractor is to review and coordinate with this work. There will be work required before and after the cooperative vendors that the prime contractor will need to perform to allow installation of the vendors work.**

a. **The work provided by others that must be coordinated with the prime contractor includes and is not limited to:**
   - **FF&E as depicted on the contract drawings**

F. Supplemental Temporary Facilities and Controls by GC include, but are not limited to:

1. Waste Disposal Facilities: Provided by each contractor.
2. Temporary Interior Barricades: Provide, maintain and eventually remove all temporary barricades per OSHA Regulations, Industry Standards, or as indicated in the Construction Documents. These include, but are not limited to, the following areas:
   a. To isolate new construction areas.
   b. To isolate renovation areas.
   c. Floor openings/penetrations, including stairwells.
      1) Horizontal Openings: close openings in floors and horizontal surfaces with load bearing, wood and/or steel framed construction per applicable regulations.
3. Temporary Doors, Frames & Wall Assemblies: Provide, maintain and eventually remove all temporary installations per OSHA Regulations, Industry Standards, or as indicated in the Construction Documents. Provide fire rated assemblies as required. Provide exit (panic bar/crash bar) devices at locations of egress. Coordinate locations with Construction Exiting Plan, Sequencing/Phasing Plans, and the Construction Manager. Temporary doors shall be constructed using ½" plywood and 2x construction, equipped with hasps, locks, handle and latch mechanism, and spring or counter weight installed to allow door to close after opening. Permanent doors will not be used in temporary conditions.
4. Temporary Sanitary Facilities: Provided by each contractor.
5. Existing Stair Usage: Use of Owner's existing stairs in unoccupied areas will be permitted, provided that at Substantial Completion, stairs are restored to conditions existing before initial use.
   a. Provide photo documentation of existing stair conditions prior to use by all Prime Contracts. Document during use, and at completion of the Renovation Project in order to document any and all damage to the Owner's property.
   b. 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.
6. Indoor air quality management at all areas of Construction, once building is enclosed.
   a. Provide all necessary dust partitions, fans, temporary ducts, and barricades to properly contain and ventilate all work area fumes and odors, created by

demolition and new construction or alterations, directly to the outside. Ventilate to an area outside the building, sufficiently away from the building, as not to contaminate other areas. There will be no additional claims honored if the Construction Manager requests additional ventilation or requirements.

b. Provide and exhaust air system for the project indoor areas that could produce fumes, VOC's, off gasses, dusts, mists, or other emissions.
c. System Operation:
    1) A sufficient quantity of exhaust fans in existing window openings or other approved locations shall be operated.
    2) Exhaust air system shall operate for a minimum of 72 hours after work is completed or until all materials have cured sufficiently so as to stop out – gassing of fumes or odors and area has been ventilated to remove all detectable traces of odors and fumes.
    3) Maintain 25 feet clearance from all temporary exhaust outlets to all active building outdoor air intakes.
    4) Refer to Division 01 Section "Work Restrictions" for further information.

7. Provide all shoring required for Work of this Prime Contract, including but not limited to;
    a. Cutting or altering of existing construction.
    b. Provide protection of all new and existing surfaces during the Work. Do not stand, walk, or work off of any unprotected finished surface above the floor.
8. Maintain temporary fencing and barricading to keep unauthorized persons away from dangerous and hazardous areas for which this Prime Contract is responsible.
9. Traffic Controls: Provide flagman while any operation of this Prime Contract interferes with traffic flow on adjacent roadways.

END OF SECTION 01 12 04

SECTION 01 12 05 – CONTRACT SUMMARY – GC-03

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

This Section includes a summary of each Prime Contract, including responsibilities for coordination and temporary facilities and controls. One set of Construction Documents is issued covering the Work of multiple Prime Contracts. Each Prime Contract is responsible to review all drawings and specifications for specific requirements indicated, and for a general understanding and knowledge of the work of other Prime Contracts. All Prime Contracts are responsible for all Work of their Contract no matter what drawing on which the Work appears. All Prime Contracts are responsible to coordinate their work related to the complete set of drawings and specifications, not limited to each prime contractor scope. **All Bidders should acknowledge that for each contract listed below, each contractor is their own General Contractor and subject to all General Contractor requirements.**

General Contract: The Interior Contractor shall be selected based on the bid procedure as described in the Bid Documents. Contract Bidders are responsible for (a) trade work coordination, (b) the scope contained in drawings listed below and (c) any and all additional scope specifically identified to be performed by the Interior Contractor in other Bid Packages in the Contract.

a. Interior & Exterior Contract: All work related to Interior and exterior construction includes but is not limited to the following items: (Refer to the Contract Documents for full scope of work.

   1) Demolition, ACT, GWB, Plaster Ceiling, Painting, Patching, Flooring, Tile, & abatement. Interior steel framing,
   2) Work related to drawings: (*In addition to these drawings, the contractor is required to review all specifications included in the overall contract that may contain related scope or detail for this specific contract.)*

a) Miller Elementary School
- Toilet Room Renovation Projects

1.3 All "G, ASB,& A" drawings related to Mille Elementary School are the responsibility of this contract. It is the GC's responsibility to review the MEP drawings to coordinate the GC's portion of the work with MEP.

1.4 Related Sections include, but are not limited to, the following:

A. Division 01 Section "Work Restrictions" for use of the Project site and for requirements for continued Owner occupancy of premises.

B. Division 01 Section "Project Management and Coordination" for general coordination requirements.

C. Division 01 Section "Project Forms" for documents required for Testing and Coordination.

D. Division 01 Section "Temporary Facilities and Controls" for specific requirements for temporary facilities and controls

E. Applicable Specification Sections: All specification Sections itemized below are to be provided complete by this Prime Contract, unless noted otherwise. In addition to these specifications, the contractor is required to review all specifications included in the overall contract that may contain related scope or detail for this specific contract.
1. Divisions 00 and 01 – Procurement and Contracting Requirements & General Requirements.
2. Division 02- Existing Conditions
3. Division 03 – Concrete
4. Division 04 Masonry
5. Division 05 – Metals
6. Division 06 – Wood and Plastics
7. Division 07 – Thermal and Moisture Protection
8. Division 08 – Openings
9. Division 09 – Finishes
10. Division 10 – Specialties
11. Division 11 – Equipment

F. Applicable Drawings : All drawings itemized below are to be provided complete by this Prime Contract, unless noted otherwise. In addition to these drawings, the contractor is required to review all drawings included in the overall contract that may contain related scope or detail for this specific contract.
   1. **All "G", "ME-ASB", & "ME-A" drawings**

1.5 DEFINITIONS

1.6 MANAGEMENT AND COORDINATION

A. The Owner shall provide a Construction Manager.

   1. The Construction Manager shall provide a full time construction site representative recognized as the Construction Manager.

1.7 CONSTRUCTION MANAGER

A. The construction manager shall provide on-site administration of the Contracts for Construction in cooperation with the Architect as set in AIA Document A232 ™ – 2009, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition, as modified.

B. The Construction Manager shall provide administrative, management and related services to coordinate scheduled activities and responsibilities of the Multiple Prime Contractors with each other and with those of the Construction Manager, the Owner and the Architect. The Construction Manager shall coordinate the activities of the Multiple Prime Contractors in accordance with the latest approved Project Schedule and the Contract Documents.

C. Utilizing the construction schedules provided by the Prime Contractors, the Construction Manager shall update the Project schedule, incorporating the activities of the Owner, Architect, and Multiple Prime Contractors on the Projects, including activity sequences and durations, allocation of labor and materials, processing of Shop Drawings, Product Data and Samples, and delivery and procurement of products, including those that must be ordered will in advance of construction. The Project schedule shall include the Owner's occupancy requirements showing portions of the Project having occupancy priority.

D. Utilizing information from the Multiple Prime Contractors, the Construction Manager shall schedule and coordinate the sequence of construction and assignment of space in areas where the Multiple Prime Contractors are performing Work, in accordance with the Contract Documents and the latest approved Project Schedule.

1.8 GENERAL REQUIREMENTS OF PRIME CONTRACTS

A. Prime Contracts: The context used in this Section are separate Prime Contracts that represent significant elements of work that is to be performed concurrently and in close coordination with the work of other Prime Contracts for the benefits of the Owner. Each Prime Contract is recognized to be a major part of the Work.

B. Assignment of Work: Should a conflict be indicated, Section 011200 shall take precedence over all scope of work assignments that may be indicated elsewhere within the Construction Documents.

C. Layout and Installation: Each Prime Contractor shall schedule, layout and install their Work in such manner as not to delay or interfere with, but to compliment the execution of the work of other Prime Contracts, utility companies and Owner's operations.

D. Extent of Contract: The Contract Documents, drawings and specifications each contain more specific descriptions of the Work facilitating which Prime Contract includes specific elements of the Project.

1. Work provided by each Prime Contract shall mean complete and operable systems and assemblies, including products, components, accessories and installations required by the Construction Documents or indicated otherwise.
2. Prime Contractors shall exercise good judgment and perform all work according to related industry standards.
3. The Owner is exempt from payment of Federal, State and local taxes, including sales and compensating use taxes on all materials and supplies incorporated in completing the Work; these taxes are not to be included in the Bid. This exemption does not apply to tools, machinery, equipment or other property leased by, or to, the Contractor or sub-contractor, or to supplies and materials, which even though consumed are not incorporated into the completed work. Prime Contractors, and their sub-contractors, shall be responsible for paying any and all applicable taxes on said tools, machinery, equipment or property, and upon all said unincorporated supplies and materials, whether purchased or leased.
4. Prime Contracts shall understand that time is of the essence, and will adequately staff the Project by employing the appropriate trade's people to perform the Work; these people shall be experienced in their respective trades. A shortage of labor in the industry shall not be accepted as an excuse for not properly staffing the Project; all efforts shall be made to meet or exceed the schedule, including additional staff and/or labor hours necessary. All cost associated with this item shall be included within the Bid.
5. Local custom and trade union jurisdictional settlements will not control the scope of the Work of each Prime Contract.
    a. When a potential jurisdictional dispute or similar interruption of Work is first identified, or threatened, the affected Prime Contracts shall promptly negotiate

a reasonable settlement to avoid or minimize the pending interruption and delays.

b. Contractor's trade-related issues shall not be grounds for modification or extension of scheduled completion date(s).

6. The Work of all Prime Contracts requires close coordination with other Prime Contracts and construction personnel. Maintain flexibility and cooperation through the Project. "Out of Sequence" and "Delay" claims will only be considered when requirements of Division 01 "Administrative Requirements" have been adhered to. Delay claims must be in writing and forwarded to the Architect, per the requirements of the General Conditions of the Contract. Claims not submitted per these requirements will be rejected and/or denied.
7. The intention of the Work is to follow a logical sequence, however, a Prime Contractor may be required by the Architect or Construction Manager, to temporarily install, omit or leave out a section(s) of Work, out of sequence. All such out of sequence work, and come back time, at these areas shall be performed at no additional cost to the Owner.

E. Substitutions: Per Division 01 Section "Substitution Procedures", each Prime Contractor shall cooperate with the other Prime Contractors involved, to coordinate approved substitutions with remainder of the Work. Contractors shall submit all "Substitutions" at least ten (10) days prior to the date for receipt of Bids as specified in the Instructions to Bidders 002113 Section 3.3 Equivalents or bid will be considered per "basis of design".

F. Construction Schedules: Refer to Divisions 01 Section "Construction Progress Documentation", "Preliminary Schedule" and "Project Management and Coordination" for requirements related to meetings and schedules.

G. Construction Sequencing and Phasing: Prime Contractor shall understand that Sequencing and/or Phasing Plans are contingent upon the work areas being complete/occupied, prior to the next area of Work beginning. Should an area of construction not be complete per the Project Preliminary Schedule, the Project Master Construction Schedule/Sequencing Plans will be adjusted accordingly. The Owner will not be responsible for delay claims due to adjustments being no fault of their own.

1. Prime Contracts may be required to re-sequence the phasing of the project as a result of changes to the schedule. Prime Contracts shall provide these adjustments at no additional cost to the Owner.

H. Existing Conditions: Each Prime Contract shall verify existing conditions in the field prior to work commencing in that area and immediately report conditions to the Architect that are not represented correctly by the Construction Documents.

1. Each Prime Contract is responsible for familiarizing himself with Project Site Logistics and provide a "site logistics plan locating storage area, scaffolds, rubbish

areas, stock piles and egress related to all work, included phased construction within 30 days of award.

2. Each Prime Contract has been given ample opportunity to review Existing Conditions related to the Project. Existing Conditions not noted in the Construction Documents that could be easily recognized during pre-bid review that interfere with the respective Prime Contract's work, shall be the responsibility of the respective Prime Contract. This includes all costs associated with removal, patching, relocation or re-fabrication of installations.

I. Hazardous Materials: Each Prime Contract shall familiarize themselves with the Hazardous Materials Sections/Drawings of the Construction Documents and follow DOL/OSHA/EPA/SED regulations while performing their respective Work in these areas. Discovery of non-identified or concealed hazardous materials shall be reported to the Construction Manager immediately and followed up with written documentation of the event.

J. Protection of Installations: Each Prime Contract is responsible for protecting their installations at all times. All costs incurred to repair, replace or clean insufficiently protected materials/installations shall be the responsibility of the installing Prime Contract.

1. Architect shall be notified, in writing, immediately upon material/installation being damaged; notification shall indicate responsible party.
2. Owner will not be liable for damaged materials and/or installations by "others", when "others" cannot be identified.
3. Repair damaged work, clean exposed surfaces or replace construction installations that cannot be repaired.
4. Each Prime Contract shall be responsible for removing all labels not required to remain from their installations.
5. Installations shall be wiped clean and proper protection then installed.
6. Each Prime Contract is responsible to protect another primes work in the event that prime has to work over or on top of that other primes work being complete. The prime working over the completed work takes full responsibility of that other primes completed work both in condition and operation.
7. Gc shall install heavy duty "Ram Board" or equivalent to protect new floor surfaces from damage until final cleaning and acceptance by owner.

K. Daily Cleaning: All Prime Contracts are responsible for any and all debris caused by their Work, including the Work of their subcontractors. A daily clean up and disposal is required by each Prime Contract for the periods which that Prime Contract, or its sub-contractors, are performing Work on site.

1. Assign at least one person for a daily clean and sweep of the work area(s). Prime Contractor shall allot sufficient manpower and time for this to be completed by the end of each shift. Submit name of this person(s) to Construction Manager.
    a. Construction Manager shall have the authority to give direction to person(s) on the Project Site identified by the Prime Contract as designated for cleanup tasks. This shall include the safety review/securing of the site-work zone after each shift.
    b. This person has check that no construction debris was dumped in any district dumpers during this end of shift site review, if found the contractor must remove immediately the next morning to avoid back charges costs of $1500 per day not removed.
2. Any Prime Contract not providing personnel for Daily Cleaning will be Back Charged for labor provided by the Owner to complete this task.
3. Contractor working solely in an area shall be responsible for clean/sweep of that area.
4. Daily cleaning will not mean any one Prime Contract is responsible for assisting another Prime Contract with removing major quantities of debris created by a particular Prime Contract's Work.
5. Daily cleaning will be mandated to remove from the building any debris created by day-to-day activities. All Prime shall assist in sweeping shared work areas and shared corridors while working on site. Each Prime shall assist in mopping of shared corridors while working on site or as required by the Owner.
6. All prime contractors and subcontractors are required to provide sweeping compound for daily cleaning in their respective exterior and interior work areas. Each Prime Contract shall provide a sufficient number of brooms or other necessary tools, for use by their personnel to adequately fulfill their obligations.
7. All prime contractors shall provide and maintain garbage cans/refuse containers with liners for each construction area of their respective contracts as directed by the Construction Manager and shall be responsible for disposing of these materials to a dumpster.
8. All prime contractors provide the necessary equipment/containers (lull/skip-box) to move daily clean/sweep debris from the building to a dumpster on a daily basis, for each construction area of their respective contracts. Skip-box shall be emptied to a dumpster by 9:00 a.m. the following day.
9. Cleaning shall be deemed a Safety & Health issue, with Prime Contracts being held accountable for fulfilling their contractual obligations.

L. Final Cleaning: At Substantial Completion of each area of construction, each Prime Contract shall wipe/vacuum clean all of their respective installations; All interior contracts performing work inside the buildings shall mop clean all building surrounding areas and finish flooring and remove all marks/blemishes to the finish, for each construction area

of their respective contracts. Each area of construction shall be wiped clean of all construction dust and debris prior to turnover to the Owner.

M. Cutting and Patching: All Primes are responsible for cutting and patching required to complete their Work. All repair of existing finish Work (including finish floors) shall be performed by contract requiring work, meeting or exceeding minimum contract requirements for that particular section, specification, or type of work. All concealed openings (piping, ductwork, conduit, etc.) must be repaired to comply with specified wall or deck conditions as well as required fire and sound ratings. All corridor penetrations require fire safing. If contractor elects to install their new work in an existing unrated wall or floor opening, whereas the wall/floor is a fire rated condition, that contractor is responsible to fire rate that opening to match the wall/floor fire rating with new and all other existing wire, piping, ducts etc. Other areas are noted in drawings and specifications.

1.9 Project Schedule. The nature of this project is to complete all the work listed as Phase 2 in the schedule by **the Project Closeout Dates specific to each Prime Contract as listed below**. Each Prime Contractor shall include in their bid proper allowances for foul weather.

A. Bids Received: 1/19/2023

B. Anticipated Notice to Proceed: 2/8/2023

C. Submittals: The following items are to be submitted within 60 business days after Notice to Proceed:
   1. Submittal List and Submission Schedule – **15 days after NTP**
   2. Field Investigations
   3. Shop Drawings
   4. Long Lead Items – **30 days after NTP**
   5. Schedule of Values and Key Submittal List – **15 days after NTP**

D. Mobilization: 6/26/2023

E. Substantial Completion and Project Closeout: Per 01 11 00 Milestone Schedule

1.10 TEMPORARY FACILITIES AND CONTROLS OF PRIME CONTRACTS

A. Conditions of Use: Keep temporary services or conditions clean and neat in appearance. Operate in a safe and efficient manner. Relocate temporary facilities as required as work progresses; do not overload facilities or permit them to interfere with progress. Take

necessary fire prevention measures; do not allow hazardous, dangerous, or unsanitary conditions to develop or persist on the Project site.

1. Installation, operation, maintenance, and removal of each temporary service or condition are considered part of the respective Prime Contract's own construction activity, as are costs and use charges associated with each facility.
2. Locate service or condition where they will serve the Project adequately and with minimum interference of the Work, coordinate with the Construction Manager and the other Prime Contracts prior to installation.

B. Temporary Use of Permanent Facilities: Prime Contract, as installer of each permanent service or condition, shall assume responsibility for its operation, maintenance and protection during use as a construction facility prior to the Owner's acceptance, regardless of previously assigned temporary facilities and controls responsibility.

C. Owner's Facilities: Contractors are not allowed to use the Owner's facilities (toilets, telephones, food service, etc.) for their own benefit or convenience. Prime Contract Superintendents shall enforce this policy with their respective work forces.

1. Construction personnel parking will be restricted to area as directed and agreed to by the Owner, and to facilitate the completion of the work. Owner reserves the right to remove from their property, unauthorized vehicles occupying unauthorized areas, at respective vehicle owner's expense.

D. Storage on the Project Site: Each Prime Contract shall provide sufficient secure weather-tight storage facilities for their materials and equipment. These storage containers are required to be located on the "site logistics plan." The Owner's facilities and the Project's building areas shall <u>not</u> be used for storage unless agreed upon, in writing, with the Owner via the Construction Manager.

1. Until permanently incorporated into the Work, all materials on the Project site are considered to be the Prime Contract's responsibility for security and protection.
2. Prime contractor is required to check on their onsite stored material periodically to ensure that all material continues to be located in the stored location and that it remains protected from all damage, theft, and endangerment to others and ready to be used on notice for coordination with other contractors. Failure to arrange for materials to be on site to complete coordinated work with other Prime Contractors will result in back charges for delays resulting therefrom.
3. Temporary long-term storage facilities are not available to Prime Contracts by the Owner.
4. Prime Contractors and their subcontractors, shall coordinate deliveries with the Construction Manager to ensure that disruptions and Owner inconvenience are avoided.

E. Tools and Equipment: Each Prime Contractor shall provide all tools and equipment necessary for its own activities; this includes secure lock-up and storage for all items on the Project Site.

1. Provide all construction aids and miscellaneous services and facilities necessary exclusively for its own construction activities; this shall include any additional supplementary power, ventilation, lighting requirements and weather protection.

F. Project Site Communication: Each Prime Contractor shall provide their Project a full time on site at all times Superintendent with a mobile phone for the duration of the Project, as indicated in their Scope of Work. Construction Manager shall be furnished with contact numbers associated with each phone.

G. Safety: Prime Contracts, not the Architect or Construction Manager, are responsible for Project Site Safety, as related to their operations (refer to Section 013150 "Special Procedures" for further requirements).

1. Each Prime Contract shall correct safety hazards and violations immediately. If safety issues are not immediately rectified, the Owner shall secure outside sources to correct the deficiency and back charge the responsible Prime Contract.
2. Maintain unobstructed access/egress to fire extinguishers, fire hydrants, stairways, corridors, ladders and other safety routes/devices.

H. Fire Extinguishers: All Prime Contracts provide and maintain "general use" fire extinguishers for each construction area of their respective contracts; comply with applicable codes for quantities required. Use of the Owner's fire extinguishers to meet this requirement is not permitted. Comply with NFPA for recommended classes for exposure; extinguishers shall be inspected and appropriately tagged prior to being brought on site. Provide stands, painted bright orange, sturdy enough to carry the extinguisher, and built as not to create a tipping hazard.

1. Each Prime Contract shall supplement this requirement by providing additional fire extinguishers specifically related to their work activity (e.g., welding, soldering, abrasive cutting, etc.).
2. Each Prime Contract shall provide and maintain proper fire extinguishers at/in their respective on site office and storage facilities.
3. Store combustible materials in approved containers in fire-safe locations.

I. Welding: Any Prime Contract performing welding, cutting or other activities with open flames or producing sparks shall at a minimum:

1. Coordinate interruption/shutdown of detection system(s) to avoid creating false alarms.
2. Protect the area and surrounding areas from fire and damage.
3. Maintain fire extinguishers, compatible with activity, at the location of the activity.

4. Provide a continuous Fire Watch during the activity and one-half hour beyond the completion of the activity.
5. Provide all necessary fans and ventilation required for the activity.
6. Any welding, burning and or use of flame the contractor is required to provide all required "hot work permit" to use such equipment prior to start of work. Its mandatory that no "hot work" shall start without these permits issued to the CM and Owner. Failure to this requirement will result to the removal of the project super of that company from all district projects.

J. Remove each temporary facility when it can be replaced by the authorized permanent facility no later than Substantial Completion, or as directed by the Architect and/or Construction Manager. Complete or restore permanent facilities that may have been delayed due to interim use of a temporary barrier or condition.

K. Temporary Power: Each Prime Contractor shall provide for their own temporary power needs for any scheduled electrical utility shut downs. Each Prime Contractor shall provide for their own temporary generators, power cords and temporary lighting as needed during these periods to continue to perform their work and maintain adherence to the Preliminary Schedule and approved Project Master Schedules. All temporary power equipment shall comply with all applicable codes and regulations.

L. Waste Disposal Facilities:

1. General debris/refuse/construction waste containers (dumpsters) shall be provided by each prime contractor and secured as specified herein this contract.
2. It shall be the responsibility/requirement of each Prime Contract to bring their waste to the dumpsters, including but not limited to all equipment, demolition debris, discarded materials with further identification including the following; construction and demolition debris refers to discarded materials generally considered non-hazardous in nature, including but not limited to steel, glass, brick, concrete, asphalt material, pipe, gypsum wallboard, and lumber, from the construction or destruction of a structure as part of a construction or demolition project or from the renovation of a structure, including such debris from construction of structures at a site remote from the construction or demolition project site.
3. It shall be the responsibility and requirement of each Prime Contract to recycle metals generated by its Work, and the Work of its subcontracts.
4. Joint-effort recycling by all Prime Contracts is encouraged.

M. Temporary Sanitary Facilities: Provide temporary self-contained toilets units for duration of the project.
    1. Temporary Sanitary Facilities:

a. Each prime contractor is required to provide their own Temporary Sanitary Facilities and secured behind fencing and/or locked after work hours and weekends.

2. Comply with regulations and health codes for type, number, location, operation, and maintenance of fixtures and facilities.
3. Provide separate facilities (minimum of one ea.) for male and female personnel in proportion required by OSHA.
4. Shield toilets to ensure privacy.
5. Coordinate mobilization and demobilization of units with Construction Manager.
6. Toilets shall be cleaned at least once per week, with additional facilities or cleanings provided if requested by Construction Manager.
7. Provide and maintain adequate supply of toilet tissue and hand sanitizer for each facility.

1.11 WORK HOURS & SEQUENCE

A. Unless otherwise approved by the Construction Manager, During the school days, Work is to be performed in this contract during the hours of 3:30pm to 10:00pm on weekdays, and Saturdays and Sundays from 7:00am to 3:30pm. During School breaks, work is to be performed from 7:00am to 10:00pm. There is no additional cost to the owner for working the hours of 3:30pm through 10:00pm, or weekend work during the school year. Any work done during these times MUST BE COMPLETED, CLEANED, AND TESTED AS NECESSARY FOR STUDENT OCCUPANCY BEFORE THE START OF THE NEXT SCHOOL DAY. Contractors are required to schedule work during school breaks, school days off, and school holidays.

B. Summer work starts June 28th through August 23rd for 2023. The Summer working hours are from 7:00am to 9:30pm. There is no additional cost to the owner for working the hours of 3:30pm through 9:30pm or on weekends and holidays during the Summer.

C. Contractors are required to start working on site within 30 days of execution of contract, to the extent permitted by contract. Contractors are required to coordinate and perform work simultaneously with other Contractors. Contractors are required to complete their contract work by the designated Substantial Completion and Final Completion end dates as indicated on the Invitation to Bid.

D. Mandatory clean up periods - From August 24th, 2023 to August 31st , 2023 and August 30th , 2023 to September 6th, 2023, contractors shall clean up all interior and exterior areas.

E. Contractors are required per contract to fully staff the project during the work shifts stated above with the required manpower to complete their work within the allowed

scheduled time frame. Contractors are required to provide a 72-hour advanced request to the Owner via the Construction Manager for any Saturday and Sunday work. If a project schedule delay has been caused by the fault of the contractor, the contractor is required to provide 3rd shift work from 9pm to 6am to make up the project schedule. All costs for CM, Architect and district personal related to this 3rd shift request will be charged to the contractor at a combined rate for all at $3,000 per 8hr shift.

F. The shifts noted above are not considered overtime or premium time hours.

G. Contract summaries will provide start and end dates for each contractor.

H. Additional requirements:

1. Multiple Crews: Each Prime Contract shall provide multiple crews, supervision, cranes, scaffold and other means necessary to perform the Work, and maintain the Project Master Schedules.
2. Interruption of any utility and/or power must be coordinated with the Owner, via the Construction Manager.
3. Any and all overtime, weekend and/or holiday work required to meet the Project Master Schedules shall be incorporated in the respective Prime Contract's bid.
4. Should a Contractor's progress fall behind, as to schedule, Prime Contractor shall employ additional – 3rd shift and/or overtime and/or weekend workforce until situation is rectified, to the satisfaction of the Architect and Construction Manager, at no additional cost to the Owner, however subject to charges as stated in section 1.10 E for lack of maintaining schedule
5. Should a Prime Contract feel another Prime Contract is delaying them sufficient time to complete their installations, per the schedule, the Architect and Construction Manager shall be notified in writing immediately of the situation (refer to Conditions of the Contract for protocol). A Prime Contract creating such a delay, that causes a proven burden upon another Prime Contract to maintain schedule, shall bear all costs incurred by the delayed Prime Contract to maintain the schedule.
6. The Architect and Construction Manager shall not be overburdened as to overtime cost, to monitor the work, due to no cause of his or her own. Owner will compensate the Architect and Construction Manager for all additional cost related to the issue of a Prime Contractor's failing to execute the Contract by fully staffing per the work hours and days noted herein. The Owner reserves the right to back charge the responsible Prime Contract for these fees if incurred.
7. All Asbestos and/or Lead Abatement shall take place to meet the requirements of the Preliminary Schedule and Project Master Schedules and shall be coordinated with the other Prime Contractors prior to commencement.

I. The Work shall be conducted to provide the least possible interference to the activities of the Owner's personnel and the surrounding property owners (neighbors).

1. Prime Contracts are hereby notified that: All Prime Contractors and their subcontractors shall limit excessive noise during 2nd shift known as work extending to 10PM weekdays upon approval by owner and city work hour restrictions. These operations shall not create a disturbance to neighboring properties.

J. Construction access to the site shall be limited to personnel, equipment and deliveries by suppliers relative to the Work of Prime Contractors and their subcontractors. Prime Contracts shall keep the Construction Manager advised of persons accessing the site and shall seek assistance with coordinating parking and storage facility locations for all Prime Contracts.

1. Where applicable, Contractors shall provide Building Site perimeter barricades as described herein the project and all temporary exit doors/lockable gates on the Project, securing these doors, fencing and/or gates at the end of each work shift.
2. When a Prime Contract engages in overtime, weekend or 2nd shift work, during the summer months and or during the normal school year, the respective Prime Contract shall notify Construction Manager of such and be responsible for securing the Project Site at the end of that work shift and perform site walk around the outside of construction area/work zone ensuring all debris is pickup up and there are no construction related hazards of any kind present once the responsible person leaves the site for the evening or weekend. This includes that all materials and equipment are fenced in and keys are removed. All interior projects have the same requirement to ensure that outside the work zone is clean from dust-dirt and that no materials are left outside the work area at any time.

1.11 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.

1.12 DRAWINGS AND SPECIFICATIONS

A. Construction Documents indicate the sum total of the Contract that make up the complete work for the Project. Through this Section "Summary of Work", the intent of the Contractor's scope of Work and responsibility is generally described. Related requirements and conditions that are indicated in the Contract Documents include but are not limited to the following:

1. General Conditions and Requirements.
2. Referenced and applicable Codes, Regulations and Standards.
3. Scheduling and phasing requirements.
4. Existing conditions and restrictions on use of the site and facilities.

B. Drawings and Specifications are cooperative and supplementary. Portions of the Work, which can best be illustrated by Drawings, are not included in the Specifications and portions best described by Specifications are not depicted on Drawings.

1. All items necessary to complete the work shall be furnished whether written or illustrated.
2. All primes shall exercise good judgment and perform all work according to related industry standards.

PART 2 - SCOPE OF WORK

2.1 PRIME CONTRACTS

A. Scope of Work: Work includes but is not limited to, the following:
1. Provide all work identified in the Contract Documents.
2. All Specification Sections provided.
3. All abatement drawings provided for reference.
4. All concrete slabs are to receive vapor lock 20/20 additive to enable epoxy floor finishes to be installed without the presence of excessive moisture.
5. GC is responsible to install all required access hatches. GC to coordinate with MEP trades for locations and hatches.
6. GC is responsible to install sleeves in foundation walls for penetrations by other prime contractors, MEP contractors to provide GC a written sketch showing exact height/locations with distance from column line and depth below finished slab within sufficient time for GC to install. If information is not provided in a timely manner by MEP, then core drilling is the responsibility of the affected contractor.
7. GC will coordinate MEP opening sizes and locations (HVAC units, louvers, vents, etc) with MEP trades. Lintels for these openings are provided and installed by the GC.
8. Fire alarm mag holds furnished and wired by EC, and will be installed on doors by GC.
9. All new roof pipe pitch pockets are supplied and installed by GC. See MC drawings for coordination. All new roof curbs are supplied and installed by MC. GC is to provide required blocking for any roof curbs and flash with new roofing.
10. GC contract is responsible to bring bathroom footprint to the correct elevation utilizing structural fill or grout as required.

11. All Trenching and patching is by each trade as required by their contract drawings. The GC shall coordinate self-level and flooring with other trades required cutting and patching.

PART 3 - EXECUTION

3.1 WORK SEQUENCE

A. The Work shall be conducted to provide the least possible interference to the activities of the Owner's personnel, per the Project Preliminary Schedule.

B. Work required during overtime, extended shifts or holidays due to failure of contractor to maintain schedule, will be monitored by Architect/Construction Site representative, and may be monitored by Owners' personnel. Additional costs for Architect/Construction Site Representative and/or Owner personnel will be borne by the Contractor.

C. Coordination of any utility and power interruption must be done with approval of the Architect/Construction Site Representative. Shutdowns must occur during non-occupied timeframes only.

D. Construction access to the site shall be limited to those designated for personnel, equipment and deliveries by the Owner. All contractor staging, parking and storage shall be coordinated with the Construction Site Representative and subject to change.

E. Payments: Each bid that covers more than one school (i.e. one SED project) shall provide completed AIA G732 & G703 by building (for each SED project).

F. No work shall be installed without approved shop drawings. Any work in place without approved shop drawings will be rejected and removed by that contractor at their expense and backed charge all other costs related to.

G. Any work deemed by CM, Architect and District not properly installed by a contractor per the contract drawings and specifications shall be removed immediately and corrected, with all associated costs to be borne solely by that contractor.

H. All prime contractors shall coordinate their contract work with other primes to meet the project schedule and for a complete operational system or area or work.

I. All contractors are to provide within 3 weeks of award a "base line" construction schedule for their work from commencement to completion including all phasing. This schedule is to be updated monthly to show percentage progress of each item listed. This schedule shall be revised to provide a recovery schedule in the event of a delay for any reason. The recovery schedule shall include the "base line" item and the recovery

to show how the delay is affecting the overall project schedule. This schedule is to be provided in MS Project or Primavera. Excel schedules are not accepted.

J. Prime contractor "base line" schedules are to be reviewed by each prime contractor and coordinated where work is related and that each prime's work shall be included in each "base line" contractor's schedule as necessary for coordination.

K. All contractors are to provide 2-week look ahead schedules showing work related to the base line and shall be coordinated with other prime 2-week look ahead schedules. These schedules will be Excel format. Format will be provided by the CM.

L. Contractors to provide a full-time supervisor on site 100% of the time. This is not a working foreman. Supervisors are not working with tools they are supervising their workers and coordinating with other contractors and district/ CM. Failure to provide will be default of your contract and subject costs related to and termination.

M. All prime contractors are the provide a project manpower structure showing names and telephone numbers of each responsible person on the project. This shall be updated as needed if personal changes are made.

N. All site equipment and dumpsters are to be behind temporary chain link fence when stored on site and or within the construction work zone where temporary chain link fence has been providing and installed by the prime. Each prime contractor is responsible to provide and install temporary chain link fence around their own stored equipment and dumpsters on site.

O. No equipment, panels or any services shall be turned off for any reason without written request and approval by the district. Project form shall be used for all shutdowns and required a 3-day notice. Other shutdowns may require more time.

3.5 CONTRACT No. 05 GENERAL CONTRACT (GC-03)– GENERAL CONSTRUCTION PRIME CONTRACT FOR INTERIOR WORKS AT CONTRACT AT MILLER ELEMENTARY SCHOOL.

A. Project Site Superintendent: GC shall provide one (1) full time, non-working Project Site Superintendent while any work related to this Contract is being performed. Superintendent shall be responsible for the daily activities of this Contract and work closely with the Construction Manager and the other Prime Contract Superintendents/Foremen, in a manner that best promotes the objectives of the Project.

B. Superintendent shall be on-site while Contractor's own forces, and/or subcontractors are performing work on the Project Site; also while other Prime Contracts are installing work, or require the coordination of work related to this Prime Contract, and/or as requested by the Construction Manager.

1. Superintendent shall be the same individual throughout the duration of the Project.
2. Project Site Superintendent shall be an individual with minimum of five (5) years' experience in this field of work.
3. Refer to Section 013100 "Project Management and Coordination" for further requirements.

B. Project Foreman: GC shall provide at least one (1) full time Project Foreman during each shift of work at each school; Foreman shall be able to make binding decisions, as they relate to the daily activities of their crew, as related to achieving the goals of the Project.

C. Site Communications: GC shall provide Project Superintendent with a mobile phone; all costs and service charges shall be paid for by GC; provide Construction Manager with contact number(s).

D. Project Site Field Office: Provide site office facilities for this Contract's Project Superintendent. Site Office shall be equipped with telephone with answering machine, fax and e-mail. Contact information shall be provided to the Construction Manager.

1. The Owner reserves the right to seek reimbursement for temporary facilities not provided by this Prime Contract.

E. Scope of Work: Work of the GC includes, but is not limited to, the following:

1. Coordination with other Prime Contracts, Owner and Construction Manager as required to adhere to and maintain approved Project Master Schedules. Prior to first payment, this includes developing and submitting the Project Master Schedule for Interior works
2. Provide all interior demolition as indicated in the Construction Documents, or required for Work of this Prime Contract:
    a. Coordinate all demolition with Hazardous Materials documents. Coordinate with all other Prime Contracts regarding removals required for the Project. Demolition of a system shall mean any and all components removed in their entirety, to the point of origin, source or substrate.
3. Provide all new ceiling systems and patching of existing ceilings, complete where indicated in Contract Documents.
4. Contractor access doors furnished by the prime trade requiring access; installation of all access doors will be by contract GC. General contractor is to coordinate with other primes as to location and quantity of access doors to be installed at the appropriate time.
5. The GC shall provide and install flooring protection at all schools prior to demolition to protect the owner's property, and to accommodate storage of Owner property Flooring protection shall be 6 Mil plastic sheeting covered by Masonite hardboard of 1/8" thickness installed so as to cover entire floor area of designated spaces, with joints abutting one another and each joint fully taped with duct tape. At the

conclusion of interior work, all interior work areas shall be cleaned and Masonite hardboard and plastic sheeting removed in order for the district to restore the classroom(s) and/or corridors. After the removal of Masonite and plastic sheeting, the exposed existing flooring shall be swept clean by the GC.

6. The GC shall provide one (1) 45' storage containers for the Owner's use, to be placed as directed by the Owner. GC shall provide a Schedule of Values line item in the base bid for storage trailers. If Owner chooses not to utilize this provision, the value of the storage trailers shall be credited back to the Owner at the end of the project.
7. This prime contractor shall provide ALL demolition and new construction of housekeeping pads for MEP contractors for all schools as shown on the contract documents.
8. GC shall conform to phasing and sequencing of interior work as coordinated with the Owner. See Milestone Schedule
9. Environmental Protection: Provide protection, and conduct construction in ways and by methods that comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
    a. Restrict use of noisemaking tools and equipment to hours that will minimize complaints from persons or firms on or near the Project site.
10. Provide dust control within delineated building site while the Work of this Contract is being performed. Limit situations that may create dust contamination while Work of this Contract is idle.
11. Provide all Control Lines and Elevations as required. GC shall transfer lines and elevations to other locations as necessary.
12. Provide cut and patch work related to that of this Prime Contract, and at those areas specifically identified in the Construction Documents, regardless of trade creating the area to be patched.
    a. Each Prime Contract is responsible for all other respective cutting and patching required of their installations (refer to Section 01 73 29 for further information).
13. Provide all access panels indicated, and those not indicated whereas inaccessible installations have been provided by this Prime Contract, located above hard ceilings or in walls. Access panels required for MEP equipment accessibility are to be provided by the MEP contractors and installed by the interior contractor. Coordinate locations for panels with MEP contracts.
14. Provide all prep/paint finishes as indicated in the Construction Documents.
15. Provide finishes including, but not limited to; CMU, gypsum board assemblies, plaster, suspended ceiling systems, and all paint and finish systems including those on all surfaces adjacent to and damaged by renovation work during the Project.
    a. Provide all associated surface preparation for each finish included in this Prime Contract.

b. Provide all plaster wall patch at all removal locations and any locations shown on the contract documents

16. Provide all miscellaneous wood blocking, shimming and supports for items or equipment installed under this Prime Contract, and as coordinated with other Prime Contracts for metal strapping and/or wood blocking for installation of MEP for interior Work.
17. Provide through-penetration fire stop systems in unit masonry assemblies, gypsum wall construction, floor penetrations, and at all structural member penetrations as per contract documents. Contractor shall coordinate with all MEP contractors to complete the scope of work.
18. GC is specifically reminded that there may be miscellaneous asbestos pipe insulation/fittings above some ceilings and inside wall areas. Contractor will investigate above the ceiling and walls prior to demolition and carefully perform the work as necessary to not disturb any insulation/fittings.
19. GC will provide all necessary patching/self-leveling/grinding of flooring substrate to insure a smooth flat floor finish prior to installation of new VCT or urethane flooring.
20. Substantial Completion: Clean all GC installations and provided equipment at the time of Substantial Completion or as directed by Construction Manager.
21. GC to provide negative air machines to properly exhaust all work areas of any odors, dust, fumes.
22. Refer to Division 00 Section "Project Forms" and make use of these forms for the installation and coordination of the Work. These forms are included to assist this Prime Contract with coordinating the installation of Work by others prior to enclosing and/or finishing work. Owner will not compensate Prime Contract for work not properly coordinated that result in added work, or removal of work. Secure the proper signatures or acknowledgements, as indicated, prior to installing/completing the Work.
23. Coordinate all the preceding requirements, accordingly, with all applicable Alternates indicated in Section 01 23 00 "Alternates".

F. Supplemental Temporary Facilities and Controls by GC include, but are not limited to:

1. Waste Disposal Facilities: Provided by each contractor.
2. Temporary Interior Barricades: Provide, maintain and eventually remove all temporary barricades per OSHA Regulations, Industry Standards, or as indicated in the Construction Documents. These include, but are not limited to, the following areas:
   a. To isolate new construction areas.
   b. To isolate renovation areas.
   c. Floor openings/penetrations, including stairwells.

1) Horizontal Openings: close openings in floors and horizontal surfaces with load bearing, wood and/or steel framed construction per applicable regulations.

3. Temporary Doors, Frames & Wall Assemblies: Provide, maintain and eventually remove all temporary installations per OSHA Regulations, Industry Standards, or as indicated in the Construction Documents. Provide fire rated assemblies as required. Provide exit (panic bar/crash bar) devices at locations of egress. Coordinate locations with Construction Exiting Plan, Sequencing/Phasing Plans, and the Construction Manager. Temporary doors shall be constructed using ½" plywood and 2x construction, equipped with hasps, locks, handle and latch mechanism, and spring or counter weight installed to allow door to close after opening. Permanent doors will not be used in temporary conditions.
4. Temporary Sanitary Facilities: Provided by each contractor.
5. Existing Stair Usage: Use of Owner's existing stairs in unoccupied areas will be permitted, provided that at Substantial Completion, stairs are restored to conditions existing before initial use.
    a. Provide photo documentation of existing stair conditions prior to use by all Prime Contracts. Document during use, and at completion of the Renovation Project in order to document any and all damage to the Owner's property.
    b. 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.
6. Indoor air quality management at all areas of Construction, once building is enclosed.
    a. Provide all necessary dust partitions, fans, temporary ducts, and barricades to properly contain and ventilate all work area fumes and odors, created by demolition and new construction or alterations, directly to the outside. Ventilate to an area outside the building, sufficiently away from the building, as not to contaminate other areas. There will be no additional claims honored if the Construction Manager requests additional ventilation or requirements.
    b. Provide and exhaust air system for the project indoor areas that could produce fumes, VOC's, off gasses, dusts, mists, or other emissions.
    c. System Operation:
        1) A sufficient quantity of exhaust fans in existing window openings or other approved locations shall be operated.
        2) Exhaust air system shall operate for a minimum of 72 hours after work is completed or until all materials have cured sufficiently so as to stop out – gassing of fumes or odors and area has been ventilated to remove all detectable traces of odors and fumes.
        3) Maintain 25 feet clearance from all temporary exhaust outlets to all active building outdoor air intakes.

4) Refer to Division 01 Section "Work Restrictions" for further information.

7. Provide all shoring required for Work of this Prime Contract, including but not limited to;
   a. Cutting or altering of existing construction.
   b. Provide protection of all new and existing surfaces during the Work. Do not stand, walk, or work off of any unprotected finished surface above the floor.
8. Maintain temporary fencing and barricading to keep unauthorized persons away from dangerous and hazardous areas for which this Prime Contract is responsible.
9. Traffic Controls: Provide flagman while any operation of this Prime Contract interferes with traffic flow on adjacent roadways.

END OF SECTION 011200

SECTION 01 12 06 – CONTRACT SUMMARY – EC-01

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 includes a summary of each Prime Contract, including responsibilities for coordination and temporary facilities and controls. One set of Construction Documents is issued covering the Work of multiple Prime Contracts. Each Prime Contract is responsible to review all drawings and specifications for specific requirements indicated, and for a general understanding and knowledge of the work of other Prime Contracts. All Prime Contracts are responsible for all Work of their Contract no matter what drawing on which the Work appears. All Prime Contracts are responsible to coordinate their work related to the complete set of drawings and specifications, not limited to each prime contractor scope. **All Bidders should acknowledge that for each contract listed below, each contractor is their own General Contractor and subject to all General Contractor requirements.** B.

1. **Electrical Contract EC-01:** The Electrical Contractor shall be selected based on the bid procedure as described in the Bid Documents. Contract Bidders are responsible for (a) trade work coordination, (b) the scope contained in the drawings listed below and (c) any and all additional scope specifically identified to be performed by the Electrical Contractor in other Bid Packages in the Contract.

    1) Work related to drawings: (*In addition to these drawings, the contractor is required to review all specifications included in the overall contract that may contain related scope or detail for this specific contract.)*
        a) Nanuet Senior High School
            - Security Vestibule Project
            - Science Lab Renovation Project
        b) Barr Middle School
            - Security Vestibule Project
            - STEM Lab Renovation Project

c) Miller Elementary School
- Switchgearand panel replacement project
- Toilet Room Renovations

a. Bid Package Contract No. 01 - Electrical Work: All work related to the Electrical Contractor which includes but is not limited to the following items: (Refer to the Contract Documents for full scope of work.)

1) Provide access panels, fire rating/firestopping, electrical work, line voltage to controllers, provide all temporary power for all trades, power to all MEP equipment, lighting fixture (new, remove and replace),all data, security coordination, all patching and painting related to the installation of this scope, all city filings and permits for any reason and as required.

1.3 Related Sections include, but are not limited to, the following:

A. Division 01 Section "Work Restrictions" for use of the Project site and for requirements for continued Owner occupancy of premises.

B. Division 01 Section "Project Management and Coordination" for general coordination requirements.

C. Division 01 Section "Project Forms" for documents required for Testing and Coordination.

D. Division 01 Section "Temporary Facilities and Controls" for specific requirements for temporary facilities and controls

1.4 DEFINITIONS

A. Building Site: The Building Site shall be defined in the Construction Documents, as the building footprint, and all related construction within a five-foot (5'0") distance of the building's exterior face, unless noted or assigned otherwise. Coordinate with specific exceptions to the 5'0" limit indicated within each Scope of Work outline.

B. Permanent Enclosure: As determined by the Architect: permanent or temporary roofing is complete, insulated, and weathertight; and all openings are closed with permanent construction or substantial temporary closures. All cost associated with failure to maintain described installations that result in any damage or contamination to the Owner's property, shall be borne by the Prime Contract responsible for the installation.

1.5 MANAGEMENT AND COORDINATION

A. The Owner shall provide a Construction Manager.

1. The Construction Manager shall provide a full time construction site representative recognized as the Construction Manager.

1.6 CONSTRUCTION MANAGER

A. The construction manager shall provide on-site administration of the Contracts for Construction in cooperation with the Architect as set in AIA Document A232 ™ – 2019, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition, as modified.

B. The Construction Manager shall provide administrative, management and related services to coordinate scheduled activities and responsibilities of the Multiple Prime Contractors with each other and with those of the Construction Manager, the Owner and the Architect. The Construction Manager shall coordinate the activities of the Multiple Prime Contractors in accordance with the latest approved Project Schedule and the Contract Documents.

C. Utilizing the construction schedules provided by the Prime Contractors, the Construction Manager shall update the Project schedule, incorporating the activities of the Owner, Architect, and Multiple Prime Contractors on the Projects, including activity sequences and durations, allocation of labor and materials, processing of Shop Drawings, Product Data and Samples, and delivery and procurement of products, including those that must be ordered will in advance of construction. The Project schedule shall include the Owner's occupancy requirements showing portions of the Project having occupancy priority.

D. Utilizing information from the Prime Contractors, the Construction Manager shall schedule and coordinate the sequence of construction and assignment of space in areas where the Prime Contractors are performing Work, in accordance with the Contract Documents and the latest approved Project Schedule.

1.7 GENERAL REQUIREMENTS OF PRIME CONTRACTS

A. Prime Contracts: The context used in this Section are separate Prime Contracts that represent significant elements of work that is to be performed concurrently and in close coordination with the work of other Prime Contracts for the benefits of the Owner. Each Prime Contract is recognized to be a major part of the Work.

B. Assignment of Work: Should a conflict be indicated, Section 011200 shall take precedence over all scope of work assignments that may be indicated elsewhere within the Construction Documents.

C. Seismic Requirements: Prime Contracts are to be aware that the building(s) is located within a Seismic Zone indicated in the documents and shall provide installations in compliance with all related code requirements.

D. Layout and Installation: Each Prime Contractor shall schedule, layout and install their Work in such manner as not to delay or interfere with, but to compliment the execution of the work of other Prime Contracts, utility companies and Owner's operations.

E. Extent of Contract: The Contract Documents, drawings and specifications each contain more specific descriptions of the Work facilitating which Prime Contract includes specific elements of the Project.

1. Work provided by each Prime Contract shall mean complete and operable systems and assemblies, including products, components, accessories and installations required by the Construction Documents or indicated otherwise.
2. Prime Contractors shall exercise good judgment and perform all work according to related industry standards.
3. The Owner is exempt from payment of Federal, State and local taxes, including sales and compensating use taxes on all materials and supplies incorporated in completing the Work; these taxes are not to be included in the Bid. This exemption does not apply to tools, machinery, equipment or other property leased by, or to, the Contractor or sub-contractor, or to supplies and materials, which even though consumed are not incorporated into the completed work. Prime Contractors, and
   their sub-contractors, shall be responsible for paying any and all applicable taxes on said tools, machinery, equipment or property, and upon all said unincorporated supplies and materials, whether purchased or leased.
4. Prime Contracts shall understand that time is of the essence, and will adequately staff the Project by employing the appropriate trade's people to perform the Work; these people shall be experienced in their respective trades. A shortage of labor in the industry shall not be accepted as an excuse for not properly staffing the Project; all efforts shall be made to meet or exceed the schedule, including additional staff and/or labor hours necessary. All cost associated with this item shall be included within the Bid.
5. Local custom and trade union jurisdictional settlements will not control the scope of the Work of each Prime Contract.
   a. When a potential jurisdictional dispute or similar interruption of Work is first identified, or threatened, the affected Prime Contracts shall promptly negotiate

a reasonable settlement to avoid or minimize the pending interruption and delays.

b. Contractor's trade-related issues shall not be grounds for modification or extension of scheduled completion date(s).

6. The Work of all Prime Contracts requires close coordination with other Prime Contracts and construction personnel. Maintain flexibility and cooperation through the Project. "Out of Sequence" and "Delay" claims will only be considered when requirements of Division 01 "Administrative Requirements" have been adhered to. Delay claims must be in writing and forwarded to the Architect, per the requirements of the General Conditions of the Contract. Claims not submitted per these requirements will be rejected and/or denied.
7. The intention of the Work is to follow a logical sequence, however, a Prime Contractor may be required by the Architect or Construction Manager, to temporarily install, omit or leave out a section(s) of Work, out of sequence. All such out of sequence work, and come back time, at these areas shall be performed at no additional cost to the Owner.

F. Substitutions: Per Division 01 Section "Substitution Procedures", each Prime Contractor shall cooperate with the other Prime Contractors involved, to coordinate approved substitutions with remainder of the Work. Contractors shall submit all "Substitutions" at least ten (10) days prior to the date for receipt of Bids as specified in the Instructions to Bidders 002113 Section 3.3 Equivalents or bid will be considered per "basis of design".

G. Construction Schedules: Refer to Divisions 01 Section "Construction Progress Documentation", "Preliminary Schedule" and "Project Management and Coordination" for requirements related to meetings and schedules.

H. Construction Sequencing and Phasing: Prime Contractor shall understand that Sequencing and/or Phasing Plans are contingent upon the work areas being complete/occupied, prior to the next area of Work beginning. Should an area of construction not be complete per the Project Preliminary Schedule, the Project Master Construction Schedule/Sequencing Plans will be adjusted accordingly. The Owner will not be responsible for delay claims due to adjustments being no fault of their own.

1. Prime Contracts may be required to re-sequence the phasing of the project as a result of changes to the schedule. Prime Contracts shall provide these adjustments at no additional cost to the Owner.

I. Testing and Inspections by Owner: The Owner shall employ an independent qualified testing and inspection agency for monitoring on-site soils analysis (excluding top soil analysis), soils compaction, cast-in-place concrete, asbestos and lead abatement monitoring and Special Inspections indicated in the Construction Documents (refer to

Division 01 "Quality Requirements" and/or Statement of Special Inspections" for additional specific information)

1. Prime Contractor shall give one week notice as to commencement for these requirements. Once underway, Prime Contractor shall coordinate with the Construction Manager and give 48 hours' notice as to test(s) required, by Owner's Agency, and further verify the need 24 hours in advance. Full cooperation and coordination is expected of all Contractors and their personnel with the Owner's Testing Agency in fulfilling test requirements; provide all data and materials requested for required reports.
2. Other than with regard to compliance with state and federal laws, the testing agency holds no execution authority other than to provide test results. Should testing indicate a discrepancy or non-compliance during execution of the Work, the Testing and Inspection Agent shall promptly notify the Construction Manager and Project Superintendent of such; however, the Prime Contract shall bear full responsibility for making any decision with regard to proceeding with, or stopping, the Work.
3. This assignment of Testing and Inspection responsibilities shall take precedence over any respective responsibilities that are indicated otherwise in the Construction Documents.

J. Testing by Others: All testing requirements not listed in preceding "Testing & Inspections by Owner" or otherwise identified in Division 01 "Quality Requirements" and/or "Statement of Special Inspections" shall be the responsibility of the Prime Contract providing the respective Work as indicated in the Construction Documents.

1. The respective Prime Contract shall have performed testing requirements indicated in individual Specification Sections which may inadvertently indicate "Owner to provide," which are not identified in preceding paragraph "Testing & Inspections by Owner".
2. Prime Contractor shall submit their Testing Agency qualifications to the Architect for approval prior to any test being performed. Construction Manager shall be given 48 hours' notice of any test/inspections to be performed by Prime Contractor's Testing Agency. 24- hour notification shall be given to the Construction Manager for test/inspections requiring his/her presence; 72-hour notification shall be given to the Architect for test/inspections requiring his/her presence.
3. Determinations required of the Architect shall be anticipated by the Prime Contractor to allow ample time for inspection, investigation and reporting.
4. Prime Contractor shall secure a UFPO clearance prior to start of any UG installation work; coordinate with and advise Construction Manager.

K. Existing Conditions: Each Prime Contract shall verify existing conditions in the field prior to work commencing in that area and immediately report conditions to the Architect that are not represented correctly by the Construction Documents.

1. Each Prime Contract is responsible for familiarizing himself with Project Site Logistics and provide a "site logistics plan locating storage area, scaffolds, rubbish areas, stock piles and egress related to all work, included phased construction within 30 days of award.
2. Each Prime Contract has been given ample opportunity to review Existing Conditions related to the Project. Existing Conditions not noted in the Construction Documents that could be easily recognized during pre-bid review that interfere with the respective Prime Contract's work, shall be the responsibility of the respective Prime Contract. This includes all costs associated with removal, patching, relocation or re-fabrication of installations.

L. Hazardous Materials: Each Prime Contract shall familiarize themselves with the Hazardous Materials Sections/Drawings of the Construction Documents and follow DOL/OSHA/EPA/SED regulations while performing their respective Work in these areas. Discovery of non-identified or concealed hazardous materials shall be reported to the Construction Manager immediately and followed up with written documentation of the event.

M. Protection of Installations: Each Prime Contract is responsible for protecting their installations at all times. All costs incurred to repair, replace or clean insufficiently protected materials/installations shall be the responsibility of the installing Prime Contract.

1. Architect shall be notified, in writing, immediately upon material/installation being damaged; notification shall indicate responsible party.
2. Owner will not be liable for damaged materials and/or installations by "others", when "others" cannot be identified.
3. Repair damaged work, clean exposed surfaces or replace construction installations that cannot be repaired.
4. Each Prime Contract shall be responsible for removing all labels not required to remain from their installations.
5. Installations shall be wiped clean and proper protection then installed.
6. Each Prime Contract is responsible to protect another primes work in the event that prime has to work over or on top of that other primes work being complete. The prime working over the completed work takes full responsibility of that other primes completed work both in condition and operation.

N. Daily Cleaning: All Prime Contracts are responsible for any and all debris caused by their Work, including the Work of their subcontractors. A daily clean up and disposal is required by each Prime Contract for the periods which that Prime Contract, or its subcontractors, are performing Work on site.

1. Assign at least one person for a daily clean and sweep of the work area(s). Prime Contractor shall allot sufficient manpower and time for this to be completed by the end of each shift. Submit name of this person(s) to Construction Manager.
    a. Construction Manager shall have the authority to give direction to person(s) on the Project Site identified by the Prime Contract as designated for cleanup tasks. This shall include the safety review/securing of the site-work zone after each shift.
    b. This person has check that no construction debris was dumped in any district dumpers during this end of shift site review, if found the contractor must remove immediately the next morning to avoid back charges costs of $1500 per day not removed.
2. Any Prime Contract not providing personnel for Daily Cleaning will be Back Charged for labor provided by the Owner to complete this task.
3. Contractor working solely in an area shall be responsible for clean/sweep of that area.
4. Daily cleaning will not mean any one Prime Contract is responsible for assisting another Prime Contract with removing major quantities of debris created by a particular Prime Contract's Work.
5. Daily cleaning will be mandated to remove from the building any debris created by day-to-day activities. All Prime shall assist in sweeping shared work areas and shared corridors while working on site. Each Prime shall assist in mopping of shared corridors while working on site or as required by the Owner.
6. All prime contractors and subcontractors are required to provide sweeping compound for daily cleaning in their respective exterior and interior work areas. Each Prime Contract shall provide a sufficient number of brooms or other necessary tools, for use by their personnel to adequately fulfill their obligations.
7. All prime contractors shall provide and maintain garbage cans/refuse containers with liners for each construction area of their respective contracts as directed by the Construction Manager and shall be responsible for disposing of these materials to a dumpster.
8. All prime contractors provide the necessary equipment/containers (lull/skip-box) to move daily clean/sweep debris from the building to a dumpster on a daily basis, for each construction area of their respective contracts. Skip-box shall be emptied to a dumpster by 9:00 a.m. the following day.

9. Cleaning shall be deemed a Safety & Health issue, with Prime Contracts being held accountable for fulfilling their contractual obligations.

O. Final Cleaning: At Substantial Completion of each area of construction, each Prime Contract shall wipe/vacuum clean all of their respective installations; All interior contracts performing work inside the buildings shall mop clean all building surrounding areas and finish flooring and remove all marks/blemishes to the finish, for each construction area of their respective contracts. Each area of construction shall be wiped clean of all construction dust and debris prior to turnover to the Owner.

P. Cutting and Patching: All Primes are responsible for cutting and patching required to complete their Work. All repair of existing finish Work (including finish floors) shall be performed by contract requiring work, meeting or exceeding minimum contract requirements for that particular section, specification, or type of work. All concealed openings (piping, ductwork, conduit, etc.) must be repaired to comply with specified wall or deck conditions as well as required fire and sound ratings. All corridor penetrations require fire safing. If contractor elects to install their new work in an existing unrated wall or floor opening, whereas the wall/floor is a fire rated condition, that contractor is responsible to fire rate that opening to match the wall/floor fire rating with new and all other existing wire, piping, ducts etc. Other areas are noted in drawings and specifications.

1.8 Project Schedule. The nature of this project is to complete all the work listed as Elevator Addition in the schedule by **the Project Closeout Dates specific to each Prime Contract as listed below**. Each Prime Contractor shall include in their bid proper allowances for foul weather.

B. Bids Received: 1/19/2023

C. Anticipated Notice to Proceed: 2/8/2023

D. Submittals: The following items are to be submitted within 60 business days after Notice to Proceed:

1. Submittal List and Submission Schedule– **15 days after NTP**
2. Field Investigations
3. Shop Drawings
4. Long Lead Items– **30 days after NTP**
5. Schedule of Values and Key Submittal List – **15 days after NTP**

D. Mobilization: 4/6/2023

G. Substantial Completion and Project Closeout: Per 01 11 00 Milestone Schedule

1.9 TEMPORARY FACILITIES AND CONTROLS OF PRIME CONTRACTS

A. Conditions of Use: Keep temporary services or conditions clean and neat in appearance. Operate in a safe and efficient manner. Relocate temporary facilities as required as work progresses; do not overload facilities or permit them to interfere with progress. Take necessary fire prevention measures; do not allow hazardous, dangerous, or unsanitary conditions to develop or persist on the Project site.

1. Installation, operation, maintenance, and removal of each temporary service or condition are considered part of the respective Prime Contract's own construction activity, as are costs and use charges associated with each facility.
2. Locate service or condition where they will serve the Project adequately and with minimum interference of the Work, coordinate with the Construction Manager and the other Prime Contracts prior to installation.

B. Temporary Use of Permanent Facilities: Prime Contract, as installer of each permanent service or condition, shall assume responsibility for its operation, maintenance and protection during use as a construction facility prior to the Owner's acceptance, regardless of previously assigned temporary facilities and controls responsibility.

C. Owner's Facilities: Contractors are not allowed to use the Owner's facilities (toilets, telephones, food service, etc.) for their own benefit or convenience. Prime Contract Superintendents shall enforce this policy with their respective work forces.

1. Construction personnel parking will be restricted to area as directed and agreed to by the Owner, and to facilitate the completion of the work. Owner reserves the right to remove from their property, unauthorized vehicles occupying unauthorized areas, at respective vehicle owner's expense.

D. Storage on the Project Site: Each Prime Contract shall provide sufficient secure weathertight storage facilities for their materials and equipment. These storage containers are required to be located on the "site logistics plan." The Owner's facilities and the Project's building areas shall not be used for storage unless agreed upon, in writing, with the Owner via the Construction Manager.

1. Until permanently incorporated into the Work, all materials on the Project site are considered to be the Prime Contract's responsibility for security and protection.
2. Prime contractor is required to check on their onsite stored material periodically to ensure that all material continues to be located in the stored location and that it remains protected from all damage, theft, and endangerment to others and ready to be used on notice for coordination with other contractors. Failure to arrange for materials to be on site to complete coordinated work with other Prime Contractors will result in back charges for delays resulting therefrom.
3. Temporary long-term storage facilities are not available to Prime Contracts by the Owner.
4. Prime Contractors and their subcontractors, shall coordinate deliveries with the Construction Manager to ensure that disruptions and Owner inconvenience are avoided.

E. Tools and Equipment: Each Prime Contractor shall provide all tools and equipment necessary for its own activities; this includes secure lock-up and storage for all items on the Project Site.

1. Provide all construction aids and miscellaneous services and facilities necessary exclusively for its own construction activities; this shall include any additional supplementary power, ventilation, lighting requirements and weather protection.

F. Project Site Communication: Each Prime Contractor shall provide their Project a full time on site at all times Superintendent with a mobile phone for the duration of the Project, as indicated in their Scope of Work. Construction Manager shall be furnished with contact numbers associated with each phone.

G. Safety: Prime Contracts, not the Architect or Construction Manager, are responsible for Project Site Safety, as related to their operations (refer to Section 013150 "Special Procedures" for further requirements).

1. Each Prime Contract shall correct safety hazards and violations immediately. If safety issues are not immediately rectified, the Owner shall secure outside sources to correct the deficiency and back charge the responsible Prime Contract.
2. Maintain unobstructed access/egress to fire extinguishers, fire hydrants, stairways, corridors, ladders and other safety routes/devices.

H. Fire Extinguishers: All Prime Contracts provide and maintain "general use" fire extinguishers for each construction area of their respective contracts; comply with applicable codes for quantities required. Use of the Owner's fire extinguishers to meet this requirement is not permitted. Comply with NFPA for recommended classes for exposure; extinguishers shall be inspected and appropriately tagged prior to being brought on site.

Provide stands, painted bright orange, sturdy enough to carry the extinguisher, and built as not to create a tipping hazard.

1. Each Prime Contract shall supplement this requirement by providing additional fire extinguishers specifically related to their work activity (e.g., welding, soldering, abrasive cutting, etc.).
2. Each Prime Contract shall provide and maintain proper fire extinguishers at/in their respective on site office and storage facilities.
3. Store combustible materials in approved containers in fire-safe locations.

I. Welding: Any Prime Contract performing welding, cutting or other activities with open flames or producing sparks shall at a minimum:

1. Coordinate interruption/shutdown of detection system(s) to avoid creating false alarms.
2. Protect the area and surrounding areas from fire and damage.
3. Maintain fire extinguishers, compatible with activity, at the location of the activity.
4. Provide a continuous Fire Watch during the activity and one-half hour beyond the completion of the activity.
5. Provide all necessary fans and ventilation required for the activity.
6. Any welding, burning and or use of flame the contractor is required to provide all required "hot work permit" to use such equipment prior to start of work. Its mandatory that no "hot work" shall start without these permits issued to the CM and Owner. Failure to this requirement will result to the removal of the project super of that company from all district projects.

J. Temporary Power: Each Prime Contractor shall provide for their own temporary power needs for any scheduled electrical utility shut downs.

K. Each Prime Contractor shall provide for their own temporary generators, power cords and temporary lighting as needed during these periods to continue to perform their work and maintain adherence to the Preliminary Schedule and approved Project Master Schedules. All temporary power equipment shall comply with all applicable codes and regulations.

N. Waste Disposal Facilities:

1. General debris/refuse/construction waste containers (dumpsters) shall be provided by each prime contractor and secured as specified herein this contract.
2. It shall be the responsibility/requirement of each Prime Contract to bring their waste to the dumpsters, including but not limited to all equipment, demolition debris, discarded materials with further identification including the following; construction and demolition debris refers to discarded materials generally considered non-hazardous in nature, including but not limited to steel, glass, brick, concrete, asphalt material, pipe, gypsum wallboard, and lumber, from the construction or destruction

of a structure as part of a construction or demolition project or from the renovation of a structure, including such debris from construction of structures at a site remote from the construction or demolition project site.

3. It shall be the responsibility and requirement of each Prime Contract to recycle metals generated by its Work, and the Work of its subcontracts.
4. Joint-effort recycling by all Prime Contracts is encouraged.

O. Temporary Sanitary Facilities: Provide temporary self-contained toilets units for duration of the project.

1. Temporary Sanitary Facilities:
   a. Each prime contractor is required to provide their own Temporary Sanitary Facilities and secured behind fencing and/or locked after work hours and weekends.
2. Comply with regulations and health codes for type, number, location, operation, and maintenance of fixtures and facilities.
3. Provide separate facilities (minimum of one ea.) for male and female personnel in proportion required by OSHA.
4. Shield toilets to ensure privacy.
5. Coordinate mobilization and demobilization of units with Construction Manager.
6. Toilets shall be cleaned at least once per week, with additional facilities or cleanings provided if requested by Construction Manager.
7. Provide and maintain adequate supply of toilet tissue and hand sanitizer for each facility.

1.10 WORK HOURS & SEQUENCE

A. EC-01 Contract is permitted to work during the school day on non-disruptive work. Sawcutting, jackhammering, power shutdowns, or work that may affect emergency egress must be performed second shift or weekends. The contractor is responsible to factor this into their bids.

B. Unless otherwise approved by the Construction Manager, During the school days, Work is to be performed in this contract during the hours of 3:30pm to 10:00pm on weekdays, and Saturdays and Sundays from 7:00am to 3:30pm. During School breaks, work is to be performed from 7:00am to 10:00pm. There is no additional cost to the owner for working the hours of 3:30pm through 10:00pm, or weekend work during the school year. Any work done during these times MUST BE COMPLETED, CLEANED, AND TESTED AS NECESSARY FOR STUDENT OCCUPANCY BEFORE THE START OF THE NEXT SCHOOL DAY. Contractors are required to schedule work during school breaks, school days off, and school holidays. **NOTE: Security vestibule workings hours are to be 7:00AM – 4:00PM. There will be black-out periods for testing where work cannot**

commence. The contractor is expected to request these dates from the CM and integrate into their milestone schedule.

C. Summer work starts June 28th through August 23rd for 2023. The Summer working hours are from 7:00am to 9:30pm. There is no additional cost to the owner for working the hours of 3:30pm through 9:30pm or on weekends and holidays during the Summer.

D. Contractors are required to start working on site within 30 days of execution of contract, to the extent permitted by contract. Contractors are required to coordinate and perform work simultaneously with other Contractors. Contractors are required to complete their contract work by the designated Substantial Completion and Final Completion end dates as indicated on the Invitation to Bid.

E. Mandatory clean up periods - From August 24th, 2023 to August 31st , 2023 and August 30th , 2022 to September 6th, 2022, contractors shall clean up all interior and exterior areas.

F. Contractors are required per contract to fully staff the project during the work shifts stated above with the required manpower to complete their work within the allowed scheduled time frame. Contractors are required to provide a 72-hour advanced request to the Owner via the Construction Manager for any Saturday and Sunday work. If a project schedule delay has been caused by the fault of the contractor, the contractor is required to provide 3rd shift work from 9pm to 6am to make up the project schedule. All costs for CM, Architect and district personal related to this 3rd shift request will be charged to the contractor at a combined rate for all at $3,000 per 8hr shift.

G. The shifts noted above are not considered overtime or premium time hours.

H. Contract summaries will provide start and end dates for each contractor.

I. Additional requirements:

1. Multiple Crews: Each Prime Contract shall provide multiple crews, supervision, cranes, scaffold and other means necessary to perform the Work, and maintain the Project Master Schedules.
2. Interruption of any utility and/or power must be coordinated with the Owner, via the Construction Manager.
3. Any and all -3rd shift, overtime, weekend and/or holiday work required to meet the Project Master Schedules shall be incorporated in the respective Prime Contract's bid.

4. Should a Contractor's progress fall behind, as to schedule, Prime Contractor shall employ additional – 3rd shift and/or overtime and/or weekend workforce until situation is rectified, to the satisfaction of the Architect and Construction Manager, at no additional cost to the Owner, however subject to charges as stated in section 1.8 C for lack of maintaining schedule
5. Should a Prime Contract feel another Prime Contract is delaying them sufficient time to complete their installations, per the schedule, the Architect and Construction Manager shall be notified in writing immediately of the situation (refer to Conditions of the Contract for protocol). A Prime Contract creating such a delay, that causes a proven burden upon another Prime Contract to maintain schedule, shall bear all costs incurred by the delayed Prime Contract to maintain the schedule.
6. The Architect and Construction Manager shall not be overburdened as to overtime cost, to monitor the work, due to no cause of his or her own. Owner will compensate the Architect and Construction Manager for all additional cost related to the issue of a Prime Contractor's failing to execute the Contract by fully staffing per the work hours and days noted herein. The Owner reserves the right to back charge the responsible Prime Contract for these fees if incurred.
7. All Asbestos and/or Lead Abatement shall take place to meet the requirements of the Preliminary Schedule and Project Master Schedules and shall be coordinated with the other Prime Contractors prior to commencement.

J. The Work shall be conducted to provide the least possible interference to the activities of the Owner's personnel and the surrounding property owners (neighbors).

1. Prime Contracts are hereby notified that: All Prime Contractors and their subcontractors shall limit excessive noise during 2nd shift known as work extending to 10PM weekdays upon approval by owner and city work hour restrictions. These operations shall not create a disturbance to neighboring properties.

K. Construction access to the site shall be limited to personnel, equipment and deliveries by suppliers relative to the Work of Prime Contractors and their subcontractors. Prime Contracts shall keep the Construction Manager advised of persons accessing the site and shall seek assistance with coordinating parking and storage facility locations for all Prime Contracts.

1. Where applicable, Contractors shall provide Building Site perimeter barricades as described herein the project and all temporary exit doors/lockable gates on the Project, securing these doors, fencing and/or gates at the end of each work shift.

2. When a Prime Contract engages in overtime, weekend or 2nd shift work, during the summer months and or during the normal school year, the respective Prime Contract shall notify Construction Manager of such and be responsible for securing the Project Site at the end of that work shift and perform site walk around the outside of construction area/work zone ensuring all debris is pickup up and there are no construction related hazards of any kind present once the responsible person leaves the site for the evening or weekend. This includes that all materials and equipment are fenced in and keys are removed. All interior projects have the same requirement to ensure that outside the work zone is clean from dust-dirt and that no materials are left outside the work area at any time.

3. Required Access doors are to be furnished by EC-01 and installed by GC-01. EC-01 to coordinate location and quantity with GC as to not hinder GC work.

4. Any existing ceiling removal/replacement necessary to install new electrical work to be done by Electrical Contract #1 (e.g. – new conduits for feeders through existing ceilings, etc.).

5. Any wood blocking or panel backboards for electrical items by EC Contract #1.

6. EC specifically notified construction is phased which necessitates that utilities/services will need to be temporarily connected and maintained as necessary to ensure that all occupied areas have the required services. (power, fire alarm, PA, etc.

7. In areas where the GC is removing existing ceilings, the EC will remove any ceiling mounted electrical items, light fixtures, FA devices, Speakers, WAP, exit signs, cameras, etc. EC to reinstall after new ceilings are completed.

8. After GC ceiling removals for areas scheduled to receive new acoustic grid/tile, the EC will properly tie up any sagging wires at 6’ o.c. to be supported above the ceiling grid in accordance with code. EC is to verify with GC before proceeding with any ceiling-mounted fixture installations.

9. All Fire Alam connections, smoke detectors, Carbon monoxide detectors, duct detectors, etc. are provided by EC.

10. Duct detectors are provided by the EC, installed in the duct by MC, and wired by EC. EC is to review E & M drawings for locations and quantities. Consult division 28 in the project specifications.

11. All Mag Holds are provided and mounted by the GC. EC is to run power and FA wiring for all mag holds. Review the A drawings for new doors requiring mag holds.

12. EC is responsible for all trenching at patching associated with their work. Trenches within concrete slabs require type 2 backfill, vapor barrier, and #4 rebar dowels at 16" O.C. epoxy into existing slab. See Div 03 for concrete infill PSI strength.

13. No work may be performed to live panels or connections of live fixtures. The EC is to locate existing main panels and associated circuits and perform lockout tagout procedures to de-energize the sub panel or fixture to which work is being performed.

1.11 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.

1.12 DRAWINGS AND SPECIFICATIONS

A. Construction Documents indicate the sum total of the Contract that make up the complete work for the Project. Through this Section "Summary of Work", the intent of the Contractor's scope of Work and responsibility is generally described. Related requirements and conditions that are indicated in the Contract Documents include but are not limited to the following:

1. General Conditions and Requirements.
2. Referenced and applicable Codes, Regulations and Standards.
3. Scheduling and phasing requirements.
4. Existing conditions and restrictions on use of the site and facilities.

B. Drawings and Specifications are cooperative and supplementary. Portions of the Work, which can best be illustrated by Drawings, are not included in the Specifications and portions best described by Specifications are not depicted on Drawings.
1. All items necessary to complete the work shall be furnished whether written or illustrated.
2. All primes shall exercise good judgment and perform all work according to related industry standards.

PART 2 - SCOPE OF WORK

2.1 PRIME CONTRACTS

A. Scope of Work: Work includes but is not limited to, the following:
1. Provide all work identified in the Contract Documents.

2. Applicable Specification Sections: All specification Sections itemized below are to be provided complete by this Prime Contract, unless noted otherwise. In addition to these specifications, the contractor is required to review all specifications included in the overall contract that may contain related scope or detail for this specific contract.

1. Divisions 00 and 01 – Procurement and Contracting Requirements & General Requirements.
2. Division 02- Existing Conditions
3. Division 03 – Concrete - (for patching of slabs for electrical trenching)
4. Division 10 – Specialties - VISUAL DISPLAY SURFACES (PROVIDED BY OWNER INSTALLED BY CONTRACTOR)
5. Division 26 – Electrical
6. Division 27 – Communications
7. Division 28 – Electronic Safety & Security

NOTE: All abatement drawings provided for reference.

A. Applicable Drawings : All drawings itemized below are to be provided complete by this Prime Contract, unless noted otherwise. In addition to these drawings, the contractor is required to review all drawings included in the overall contract that may contain related scope or detail for this specific contract.

1. **All "HS-E", "MS-E", & "ME-E" drawings**

PART 3 - EXECUTION

3.1 WORK SEQUENCE

A. The Work shall be conducted to provide the least possible interference to the activities of the Owner's personnel, per the Project Preliminary Schedule.

B. Work required during overtime, extended shifts or holidays due to failure of contractor to maintain schedule, will be monitored by Architect/Construction Site representative, and may be monitored by Owners' personnel. Additional costs for

Architect/Construction Site Representative and/or Owner personnel will be borne by the Contractor.

C. Coordination of any utility and power interruption must be done with approval of the Architect/Construction Site Representative. Shutdowns must occur during non-occupied timeframes only.

D. Construction access to the site shall be limited to those designated for personnel, equipment and deliveries by the Owner. All contractor staging, parking and storage shall be coordinated with the Construction Site Representative and subject to change.

E. Payments: Each bid that covers more than one school (i.e. one SED project) shall provide completed AIA G732 & G703 by building (for each SED project).

F. No work shall be installed without approved shop drawings. Any work in place without approved shop drawings will be rejected and removed by that contractor at their expense and backed charge all other costs related to.

G. Any work deemed by CM, Architect and District not properly installed by a contractor per the contract drawings and specifications shall be removed immediately and corrected, with all associated costs to be borne solely by that contractor.

H. All prime contractors shall coordinate their contract work with other primes to meet the project schedule and for a complete operational system or area or work.

I. All contractors are to provide within 3 weeks of award a "base line" construction schedule for their work from commencement to completion including all phasing. This schedule is to be updated monthly to show percentage progress of each item listed. This schedule shall be revised to provide a recovery schedule in the event of a delay for any reason. The recovery schedule shall include the "base line" item and the recovery to show how the delay is affecting the overall project schedule. This schedule is to be provided in MS Project or Primavera. Excel schedules are not accepted.

J. Prime contractor "base line" schedules are to be reviewed by each prime contractor and coordinated where work is related and that each prime's work shall be included in each "base line" contractor's schedule as necessary for coordination.

K. All contractors are to provide 2-week look ahead schedules showing work related to the base line and shall be coordinated with other prime 2-week look ahead schedules. These schedules will be Excel format. Format will be provided by the CM.

L. Contractors to provide a full-time supervisor on site 100% of the time. This is not a working foreman. Supervisors are not working with tools they are supervising their workers and coordinating with other contractors and district/ CM. Failure to provide will be default of your contract and subject costs related to and termination.

M. All prime contractors are the provide a project manpower structure showing names and telephone numbers of each responsible person on the project. This shall be updated as needed if personal changes are made.

N. All site equipment and dumpsters are to be behind temporary chain link fence when stored on site and or within the construction work zone where temporary chain link fence has been providing and installed by the prime. Each prime contractor is responsible to provide and install temporary chain link fence around their own stored equipment and dumpsters on site.

O. No equipment, panels or any services shall be turned off for any reason without written request and approval by the district. Project form shall be used for all shutdowns and required a 3-day notice. Other shutdowns may require more time.

3.2 **CONTRACT ELECTRICAL WORK (EC-01)** – ELECTRICAL PRIME CONTRACT AT NANUET HIGH SCHOOL – SECURITY VESTIBULE AND SCIENCE LABS, BARR MIDDLE SCHOOL SECURITY VESTIBULE AND STEM LABS, MILLER ELEMENTARY SCHOOL SWITCH GEAR, SUB PANELS AND TOILET ROOMS, INCLIDING LIGHTING, POWER, SECURITY, AND DATA WORK.

C. Project Site Superintendent: EC shall provide one (1) full time Project Site Superintendent while any work related to this Contract is being performed on site. Superintendent may be a working Foreman as long as the daily requirements of this Contract are maintained, as they relate to the Construction Documents and the Project Schedule. Construction Manager reserves the right, in their opinion, to revoke this privilege if these requirements are not maintained. Superintendent shall work closely with the Construction Manager, and the other Prime Contract Superintendent(s), in a manner that best promotes the Master Construction Schedule and the objectives of the Project.

1. Superintendent shall be on site while Prime Contractor's own forces, and/or their sub-contractors' forces, are on site; also, while other Prime Contracts are installing work, or require coordination of work, related to this Prime Contract, and/or as requested by the Construction Manager.
2. Superintendent shall be the same individual throughout the Project.
3. Refer to Section 01 31 00 "Project Management and Coordination" for further requirements.

D. Project Foreman: EC shall provide at least one (1) full time Project Foreman during each shift of work for each school; Foreman shall be able to make binding decisions, as they relate to the daily activities of their crew as related to achieving the goals of the Project.

B. Site Communications: EC shall provide Project Superintendent with a mobile phone, all costs and service charges paid for by EC; provide Construction Manager with contact number(s).

C. Project Site Field Office: Provide site office facilities for this Contract's Project Superintendent. Site Office shall be equipped with telephone w/answering machine, fax, and e-mail. Contact information shall be provided to the Construction Manager.
   1. The Owner reserves the right to seek reimbursement for temporary facilities not provided by this Prime Contract.

D. Scope of Work: In addition to Divisions 26, 27 and 28, Work of the EC includes but is not limited to, the following:
   1. Coordination with other Prime Contracts, Owner and Construction Manager as required to adhere to and maintain approved Project Master Schedules. Prior to first payment, this includes submitting the Contractor's Construction Schedule to Construction Manager of the Project Master Schedule.
   2. Electrical scope is identified on the Contract Documents for removal, installation and replacement of all electrical interior and exterior components shown on the Contract Documents for all schools. Including but not limited to coordination and installation of conduits and panels. Provide all removals of existing Electrical Devices, Fixtures & Systems indicated, or required, for Work of this Prime Contract.
      a. Coordinate all removals with Hazardous Materials documents.
   3. **This contract includes furnishing access doors for walls and ceiling as required, which may include fire-rated conditions, and coordinate with General Contractor (GC) for installation. EC shall provide Access Door for GC to install. EC is required to review GC RCP and floor plans to review all locations where junction boxes or other accessible electrical equipment will require access hatches.**
   4. **All duct Detectors are provided by EC contract and Installed by MC contract. All FA Control and power wiring for duct detectors are provided by EC contract. EC is to refer to the HVAC schematic diagrams for quantity of duct detectors to be furnished.**
   5. **EC is to review HVAC drawings and provide power to all Fire Smoke dampers as indicted on the drawings.**
   6. **EC is to provide all wiring and data cabling for security camaras. EC will work with districts preferred vendor A+ Technology & Securuty Solutions to coordinate all power and data for security systems and camara. Districts vendor is to supply, make final connections to, and install all Camaras.**
   7. **EC is to provide intercom system, door remote release, and panic button wired to direct dial to the local police department. Obtain products from districts**

preferred vendor A+ technology & Security solutions. Final connection and programming by A+.

8. **EC to supply and connect all power for flush valves, and sinks. Provide 12V wiring,**
9. **Abatement of switchgear feeder insulators is by GC. EC to coordinate with GC and provide all disconnections at Transformer prior to abatement of switchgear insulators.**
10. Provide all reinstallation of existing Electrical Devices, Fixtures & Systems, replacement or new Electrical Devices, Fixtures & Systems associated the classrooms.
11. EC shall conform to phasing and sequencing of renovations. See Preliminary Schedule for all work as shown on the phasing plans.
12. The Electrical Contractor shall review the Contract Documents in its entirety for complete electrical scope of work in this contract.
    a. EC shall install work in accordance with the National Electrical Code requirements. No additional compensation will be made for extra offsets in conduit or retro-fit work due to improper component location, or lack of Prime Contractor's coordination.
13. Prime Contract shall understand that renovation work may require work to proceed while existing systems are required to be maintained; all cost associated with this sequence shall be anticipated, and incorporated into the Bid.
14. Prime Contractor shall read and familiarized themselves with the Lead Sections of the Construction Documents. Lead-based paint has been identified to exist on specific areas/surfaces of the work located within the building(s), and when encountered the Prime Contractor shall follow all applicable regulations while working with this material.
15. Prime Contractor shall read and familiarized themselves with the Asbestos Sections of the Construction Documents. Asbestos Containing Material is scheduled to be abated throughout specific areas of the building(s). Should ACM be encountered (after Abatement is completed), that may interfere with an installation; Prime Contractor shall cease work, and notify Construction Manager immediately.
    a. Penetrations not coordinated with GC, prior to abatement of these spaces, shall become the responsibility of the respective Prime Contract requiring the penetration.
16. EC shall provide all Work associated with creating structural openings or penetrations requiring lintels whether for their own work (i.e. conduit penetrations). This applies to all openings/penetrations greater than 5-inches through masonry or concrete walls.
    a. Non-structural openings/penetrations, including those for convenience, shall be self-provided by the EC.
    b. This assignment applies to new and existing construction areas.

c. Refer to Structural documents for lintel type/size requirements and Architectural drawings for wall types. Walls not specifically identified in the documents are to be assumed as masonry construction.
d. All openings/penetrations are to be identified on Record Drawings by the Prime Contract requiring the opening.

17. Provide cut and patch work related to that of this Prime Contract, related to that of their Prime Contract, and at those areas specifically identified on the Construction Documents, regardless of trade creating the area to be patched.
    a. Each Prime Contract is responsible for all other respective Cutting & Patching required of their installations (refer to Section 017329 for further information).
18. Provide complete electrical requirements, materials and methods including, but not limited to:
    a. Service and distribution including bus-way, switchgear, panel boards, and disconnect switches.
    b. Provide grounding protection for all circuits and outlets and as required by applicable codes and authorities having jurisdiction. Properly ground building equipment provided by this project.
    c. Coordinate any electrical switchover as to least impact the Project Schedule. This scope is considered "critical path" and is required to be addressed submitted and shop drawing submitted within 2 weeks upon BoE approval.
    d. Provide all power, controls, and standby generator requirements for temporary power that might be required during the renovation upgrade for all other prime contractors working during the shutdown.
    e. Immediately after installation, provide and maintain temporary ID of all circuit breakers and at all shut offs/disconnects until permanent ID is in place.
    f. Exterior lighting and lighting control equipment; provide occupancy sensors and/or timing devices as indicated.
    g. Provide raceways, boxes, cabinets and sleeves through existing and new construction as part of the complete electrical installation.
    h. Provide wire, cable, conduit, boxes, and wiring devices as part of the complete electrical installation.
    i. Provide permanent electrical identification.
       Provide type written panel board schedules.
       Clearly label all panel boards, disconnects, relays, junction boxes, and other electrical devices and equipment.
19. Final connections of utilities are by EC unless noted or assigned otherwise.
20. Final connection of installations or equipment that are provided by others.
    a. Provide final connections to all scheduled equipment furnished by the Owner.
21. Provide Fire Alarm system as indicated in the Construction Documents.

a. EC shall provide Fire Alarm and/ or coordinate as indicated on drawings.

22. Coordinate with Owner and provide confirmation to Construction Manager of low voltage systems, including but not limited to telephone, building access, security, PA/intercom, data and CCTV systems, as indicated in the Construction Documents.
    a. EC shall confirm full operational status of existing low voltage systems following reinstallation of existing devices. Replace and commission all devices and components damaged by construction work.
    b. Provide all components, and their installations required for a complete system.
    c. Provide, terminate, test, and label all point-to-point field wiring.
    d. Provide all associated power circuits and requirements that support these systems, including but not limited to, final connections.
23. Provide sleeves required for piping penetrating walls, slabs and/or decks.
24. Provide through-penetration fire stop systems at all penetrations made by EC. Maintain listed ratings of indicated assemblies. Provide repair of existing through-penetration fire stopping damaged by work of this Prime Contract.
    a. Sleeves with fire stopping are to be installed in sequence with fire-rated construction. This Prime Contract shall be responsible for installing fire stopping material at intersection of sleeve and constructed materials.
25. Provide all testing and adjusting, instruction and guarantees for materials and equipment of this Prime Contract. Refer to Division 00 Section "Project Forms" for applicable documents.
    a. Substantial Completion: Clean all light fixtures and electrical equipment at the time of installation or at Substantial Completion, whichever is later, or as directed by Construction Manager.
26. Coordinate all the preceding requirements, accordingly, with all applicable Alternates indicated in Section 012300 "Alternates."
27. Submission of all required closeout documentation and final application for payment no later than -September 30 2022.
28. **EC-01 is required to work with the districts fire alarm vendor to connect new systems to the existing FA. Contractors pricing shall include all integration into the buildings fire alarm controls. Upon contractor's request, a contact will be provided for coordination.**

E. Supplemental Temporary Facilities and Controls by the EC include, but are not limited to:

1. Waste Disposal Facilities: Provided by each contractor.
2. Temporary Interior Barricades: Provide, maintain and eventually remove all temporary barricades per OSHA Regulations, Industry Standards, or as indicated in the Construction Documents. These include, but are not limited to, the following areas:
    a. Roof openings/penetrations.

b. To isolate Abatement areas.
c. To isolate renovation areas.
d. Floor openings/penetrations, including stairwells.
    1) Horizontal Openings: close openings in floors, roof decks, and horizontal surfaces with load bearing, wood and/or steel framed construction per applicable regulations.

3. Temporary Doors, Frames & Wall Assemblies: Provide, maintain and eventually remove all temporary installations where required per OSHA Regulations, Industry Standards, or as indicated in the Construction Documents. Provide fire rated assemblies as required. Provide exit (panic bar/crash bar) devices at locations of egress. Coordinate locations with Construction Exiting Plan, Sequencing/Phasing Plans, and the Construction Manager. Temporary doors shall be constructed using 1/2' plywood and 2x construction, equipped with hasps, locks, handle and latch mechanism, and spring or counter weight installed to allow door to close after opening. Permanent doors will not be used in temporary conditions.
4. Temporary Heat: The existing heating system and ventilation system in the building area are not to be used for temporary heat or ventilation in construction areas. The contractor for General Construction must provide temporary heat in construction in construction areas. Provide submittal for temporary heat strategy that states what equipment will be used and where fuel will be stored. Fuel source cannot be located in the building. Heaters with self-contained fuel sources are not allowed to be placed in the building.
5. Temporary Window Openings: Window openings shall be enclosed using 2x construction, 1/2' plywood, and reinforced polyethylene. Where window opening start at or near the floor, plywood shall be installed from finish floor to minimum of 42" AFF; reinforced poly may be installed from this point up. Should contractor choose to install plywood across the entire opening, sufficient area will be installed with reinforced poly to allow emergency escape, if required, and to allow natural light into the work area.
    a. Installation shall be insulated if temporary heat or cooling is being employed.
6. Temporary Exterior Wall Enclosure: Provide and maintain temporary enclosures for weather protection and security of the construction in progress, where needed, up until completion of permanent installation specified. Enclosures shall protect the building from exposure, foul weather, other construction operations, and similar activities. Provide temporary weather tight enclosure for building exterior.
    a. Where heating and cooling is needed and permanent enclosure is not complete, provide insulated temporary enclosures. Coordinate enclosure with venting and material drying or curing requirements to avoid dangerous conditions and effects.
    b. Install tarpaulins securely; install fire retardant materials only.

c. Where temporary wood enclosures exceed 100 sq. ft. in area, use fire retardant treated materials for framing and sheathing.
d. All cost incurred to repair and/or replace materials damaged, due to the failure of EC to provide and maintain weather tight enclosure shall be borne by this Prime Contract. This includes any contamination of materials that may lead to the introduction of mold and mildew.
e. Immediately notify the Construction Manager, in writing, as to damage to temporary enclosures by "others"; identify responsible party in the submission. Owner shall not be liable for damages caused by "others" if Prime Contract cannot identify responsible party.

7. Temporary Sanitary Facilities: Provided by each contractor.
8. Existing Stair Usage: Use of Owner's existing stairs in unoccupied areas will be permitted, provided that at Substantial Completion, stairs are restored to conditions existing before initial use.
    a. Provide photo documentation of existing stair conditions prior to use by all Prime Contracts. Document during use, and at completion of the Renovation Project in order to document any and all damage to the Owner's property.
    b. 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.
9. Provide all shoring required for Work of this Prime Contract, including but not limited to;
    a. Cutting or altering of existing construction.
    b. Provide protection of all new and existing surfaces during the Work. Do not stand, walk, or work off of any unprotected finished surface above the floor.
10. Maintain temporary fencing and barricading to keep unauthorized persons away from hazardous areas for which this Prime Contract is responsible.
11. Traffic Controls: Provide flagman while any operations of this Prime Contract interfere with traffic flow on adjacent roadways.

END OF SECTION 01 12 06

SECTION 01 12 09 –CONTRACT SUMMARY – MC-01

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 includes a summary of each Prime Contract, including responsibilities for coordination and temporary facilities and controls. One set of Construction Documents is issued covering the Work of multiple Prime Contracts. Each Prime Contract is responsible to review all drawings and specifications for specific requirements indicated, and for a general understanding and knowledge of the work of other Prime Contracts. All Prime Contracts are responsible for all Work of their Contract no matter what drawing on which the Work appears. All Prime Contracts are responsible to coordinate their work related to the complete set of drawings and specifications, not limited to each prime contractor scope. **All Bidders should acknowledge that for each contract listed below, each contractor is their own General Contractor and subject to all General Contractor requirements.**

1. **Mechanical Contract:** The Mechanical Contractor shall be selected based on the bid procedure as described in the Bid Documents. Contract Bidders are responsible for (a) trade work coordination, (b) the scope contained in drawings listed below and (c) any and all additional scope specifically identified to be performed by the Mechanical Contractor in other Bid Packages in the Contract.

B.

1) Work related to drawings: (*In addition to these drawings, the contractor is required to review all specifications included in the overall contract that may contain related scope or detail for this specific contract.)*
Nanuet Senior High School
   a) Security Vestibule Addition Project
   b) Science Labs Renovation Project

1.3 Related Sections include, but are not limited to, the following:

A. Division 01 Section "Work Restrictions" for use of the Project site and for requirements for continued Owner occupancy of premises.

B. Division 01 Section "Project Management and Coordination" for general coordination requirements.

C. Division 01 Section "Project Forms" for documents required for Testing and Coordination.

D. Division 01 Section "Temporary Facilities and Controls" for specific requirements for temporary facilities and controls

1.4 DEFINITIONS

1.5 MANAGEMENT AND COORDINATION

A. The Owner shall provide a Construction Manager.

1. The Construction Manager shall provide a full time construction site representative recognized as the Construction Manager.

1.6 CONSTRUCTION MANAGER

A. The construction manager shall provide on-site administration of the Contracts for Construction in cooperation with the Architect as set in AIA Document A232 ™ – 2009, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition, as modified.

B. The Construction Manager shall provide administrative, management and related services to coordinate scheduled activities and responsibilities of the Multiple Prime Contractors with each other and with those of the Construction Manager, the Owner and the Architect. The Construction Manager shall coordinate the activities of the Multiple Prime Contractors in accordance with the latest approved Project Schedule and the Contract Documents.

C. Utilizing the construction schedules provided by the Multiple Prime Contractors, the Construction Manager shall update the Project schedule, incorporating the activities of the Owner, Architect, and Multiple Prime Contractors on the Projects, including activity sequences and durations, allocation of labor and materials, processing of Shop Drawings, Product Data and Samples, and delivery and procurement of products, including those

that must be ordered will in advance of construction. The Project schedule shall include the Owner's occupancy requirements showing portions of the Project having occupancy priority.

D. Utilizing information from the Multiple Prime Contractors, the Construction Manager shall schedule and coordinate the sequence of construction and assignment of space in areas where the Multiple Prime Contractors are performing Work, in accordance with the Contract Documents and the latest approved Project Schedule.

1.7 GENERAL REQUIREMENTS OF PRIME CONTRACTS

A. Prime Contracts: The context used in this Section are separate Prime Contracts that represent significant elements of work that is to be performed concurrently and in close coordination with the work of other Prime Contracts for the benefits of the Owner. Each Prime Contract is recognized to be a major part of the Work.

B. Assignment of Work: Should a conflict be indicated, Section 011200 shall take precedence over all scope of work assignments that may be indicated elsewhere within the Construction Documents.

C. Seismic Requirements: Prime Contracts are to be aware that the building(s) is located within a Seismic Zone indicated in the documents and shall provide installations in compliance with all related code requirements.

D. Layout and Installation: Each Prime Contractor shall schedule, layout and install their Work in such manner as not to delay or interfere with, but to compliment the execution of the work of other Prime Contracts, utility companies and Owner's operations.

E. Extent of Contract: The Contract Documents, drawings and specifications each contain more specific descriptions of the Work facilitating which Prime Contract includes specific elements of the Project.

1. Work provided by each Prime Contract shall mean complete and operable systems and assemblies, including products, components, accessories and installations required by the Construction Documents or indicated otherwise.
2. Prime Contractors shall exercise good judgment and perform all work according to related industry standards.
3. The Owner is exempt from payment of Federal, State and local taxes, including sales and compensating use taxes on all materials and supplies incorporated in completing the Work; these taxes are not to be included in the Bid. This exemption does not apply to tools, machinery, equipment or other property leased by, or to, the Contractor or sub-contractor, or to supplies and materials, which even though consumed are not incorporated into the completed work. Prime Contractors, and their sub-contractors, shall be responsible for paying any and all applicable taxes on

said tools, machinery, equipment or property, and upon all said unincorporated supplies and materials, whether purchased or leased.

4. Prime Contracts shall understand that time is of the essence, and will adequately staff the Project by employing the appropriate trade's people to perform the Work; these people shall be experienced in their respective trades. A shortage of labor in the industry shall not be accepted as an excuse for not properly staffing the Project; all efforts shall be made to meet or exceed the schedule, including additional staff and/or labor hours necessary. All cost associated with this item shall be included within the Bid.
5. Local custom and trade union jurisdictional settlements will not control the scope of the Work of each Prime Contract.
    a. When a potential jurisdictional dispute or similar interruption of Work is first identified, or threatened, the affected Prime Contracts shall promptly negotiate a reasonable settlement to avoid or minimize the pending interruption and delays.
    b. Contractor's trade-related issues shall not be grounds for modification or extension of scheduled completion date(s).
6. The Work of all Prime Contracts requires close coordination with other Prime Contracts and construction personnel. Maintain flexibility and cooperation through the Project. "Out of Sequence" and "Delay" claims will only be considered when requirements of Division 01 "Administrative Requirements" have been adhered to. Delay claims must be in writing and forwarded to the Architect, per the requirements of the General Conditions of the Contract. Claims not submitted per these requirements will be rejected and/or denied.
7. The intention of the Work is to follow a logical sequence, however, a Prime Contractor may be required by the Architect or Construction Manager, to temporarily install, omit or leave out a section(s) of Work, out of sequence. All such out of sequence work, and come back time, at these areas shall be performed at no additional cost to the Owner.

F. Substitutions: Per Division 01 Section "Substitution Procedures", each Prime Contractor shall cooperate with the other Prime Contractors involved, to coordinate approved substitutions with remainder of the Work. Contractors shall submit all "Substitutions" at least ten (10) days prior to the date for receipt of Bids as specified in the Instructions to Bidders 002113 Section 3.3 Equivalents or bid will be considered per "basis of design".

G. Construction Schedules: Refer to Divisions 01 Section "Construction Progress Documentation", "Milestone Phasing Schedule" and "Project Management and Coordination" for requirements related to meetings and schedules.

H. Construction Sequencing and Phasing: Prime Contractor shall understand that Sequencing and/or Phasing Plans are contingent upon the work areas being complete/occupied, prior to the next area of Work beginning. Should an area of

construction not be complete per the Project Preliminary Schedule, the Project Master Construction Schedule/Sequencing Plans will be adjusted accordingly. The Owner will not be responsible for delay claims due to adjustments being no fault of their own.

1. Prime Contracts may be required to re-sequence the phasing of the project as a result of changes to the schedule. Prime Contracts shall provide these adjustments at no additional cost to the Owner.

I. Existing Conditions: Each Prime Contract shall verify existing conditions in the field prior to work commencing in that area and immediately report conditions to the Architect that are not represented correctly by the Construction Documents.

1. Each Prime Contract is responsible for familiarizing himself with Project Site Logistics and provide a "site logistics plan locating storage area, scaffolds, rubbish areas, stock piles and egress related to all work, included phased construction within 30 days of award.
2. Each Prime Contract has been given ample opportunity to review Existing Conditions related to the Project. Existing Conditions not noted in the Construction Documents that could be easily recognized during pre-bid review that interfere with the respective Prime Contract's work, shall be the responsibility of the respective Prime Contract. This includes all costs associated with removal, patching, relocation or re-fabrication of installations.

J. Hazardous Materials: Each Prime Contract shall familiarize themselves with the Hazardous Materials Sections/Drawings of the Construction Documents and follow DOL/OSHA/EPA/SED regulations while performing their respective Work in these areas. Discovery of non-identified or concealed hazardous materials shall be reported to the Construction Manager immediately and followed up with written documentation of the event.

K. Protection of Installations: Each Prime Contract is responsible for protecting their installations at all times. All costs incurred to repair, replace or clean insufficiently protected materials/installations shall be the responsibility of the installing Prime Contract.

1. Architect shall be notified, in writing, immediately upon material/installation being damaged; notification shall indicate responsible party.
2. Owner will not be liable for damaged materials and/or installations by "others", when "others" cannot be identified.
3. Repair damaged work, clean exposed surfaces or replace construction installations that cannot be repaired.

4. Each Prime Contract shall be responsible for removing all labels not required to remain from their installations.
5. Installations shall be wiped clean and proper protection then installed.
6. Each Prime Contract is responsible to protect another primes work in the event that prime has to work over or on top of that other primes work being complete. The prime working over the completed work takes full responsibility of that other primes completed work both in condition and operation.

L. Daily Cleaning: All Prime Contracts are responsible for any and all debris caused by their Work, including the Work of their subcontractors. A daily clean up and disposal is required by each Prime Contract for the periods which that Prime Contract, or its sub-contractors, are performing Work on site.

1. Assign at least one person for a daily clean and sweep of the work area(s). Prime Contractor shall allot sufficient manpower and time for this to be completed by the end of each shift. Submit name of this person(s) to Construction Manager.
    a. Construction Manager shall have the authority to give direction to person(s) on the Project Site identified by the Prime Contract as designated for cleanup tasks. This shall include the safety review/securing of the site-work zone after each shift.
    b. This person has check that no construction debris was dumped in any district dumpers during this end of shift site review, if found the contractor must remove immediately the next morning to avoid back charges costs of $1500 per day not removed.
2. Any Prime Contract not providing personnel for Daily Cleaning will be Back Charged for labor provided by the Owner to complete this task.
3. Contractor working solely in an area shall be responsible for clean/sweep of that area.
4. Daily cleaning will not mean any one Prime Contract is responsible for assisting another Prime Contract with removing major quantities of debris created by a particular Prime Contract's Work.
5. Daily cleaning will be mandated to remove from the building any debris created by day-to-day activities. All Prime shall assist in sweeping shared work areas and shared corridors while working on site. Each Prime shall assist in mopping of shared corridors while working on site or as required by the Owner.
6. All prime contractors and subcontractors are required to provide sweeping compound for daily cleaning in their respective exterior and interior work areas. Each Prime Contract shall provide a sufficient number of brooms or other necessary tools, for use by their personnel to adequately fulfill their obligations.
7. All prime contractors shall provide and maintain garbage cans/refuse containers with liners for each construction area of their respective contracts as directed by the

Construction Manager and shall be responsible for disposing of these materials to a dumpster.

8. All prime contractors provide the necessary equipment/containers (lull/skip-box) to move daily clean/sweep debris from the building to a dumpster on a daily basis, for each construction area of their respective contracts. Skip-box shall be emptied to a dumpster by 9:00 a.m. the following day.
9. Cleaning shall be deemed a Safety & Health issue, with Prime Contracts being held accountable for fulfilling their contractual obligations.

M. Final Cleaning: At Substantial Completion of each area of construction, each Prime Contract shall wipe/vacuum clean all of their respective installations; All interior contracts performing work inside the buildings shall mop clean all building surrounding areas and finish flooring and remove all marks/blemishes to the finish, for each construction area of their respective contracts. Each area of construction shall be wiped clean of all construction dust and debris prior to turnover to the Owner.

N. Cutting and Patching: All Primes are responsible for cutting and patching required to complete their Work. All repair of existing finish Work (including finish floors) shall be performed by contract requiring work, meeting or exceeding minimum contract requirements for that particular section, specification, or type of work. All concealed openings (piping, ductwork, conduit, etc.) must be repaired to comply with specified wall or deck conditions as well as required fire and sound ratings. All corridor penetrations require fire safing. If contractor elects to install their new work in an existing unrated wall or floor opening, whereas the wall/floor is a fire rated condition, that contractor is responsible to fire rate that opening to match the wall/floor fire rating with new and all other existing wire, piping, ducts etc. Other areas are noted in drawings and specifications.

1.8 Project Schedule. The nature of this project is to complete all the work listed as Phase 2 in the schedule by **the Project Closeout Dates specific to each Prime Contract as listed below**. Each Prime Contractor shall include in their bid proper allowances for foul weather.

A. Bids Received: 1/19/2023

B. Anticipated Notice to Proceed: 2/8/2023

C. Submittals: The following items are to be submitted within 60 business days after Notice to Proceed:
1. Submittal List and Submission Schedule - **15 days after NTP**

2. Field Investigations

3. Shop Drawings
4. Long Lead Items – **30 days after NTP**
5. Schedule of Values and Key Submittal List – **15 days after NTP**

D. Mobilization: 6/26/2023

Substantial Completion and Project Closeout: Per 01 11 00 Milestone Schedule

1.9 TEMPORARY FACILITIES AND CONTROLS OF PRIME CONTRACTS

A. Conditions of Use: Keep temporary services or conditions clean and neat in appearance. Operate in a safe and efficient manner. Relocate temporary facilities as required as work progresses; do not overload facilities or permit them to interfere with progress. Take necessary fire prevention measures; do not allow hazardous, dangerous, or unsanitary conditions to develop or persist on the Project site.

1. Installation, operation, maintenance, and removal of each temporary service or condition are considered part of the respective Prime Contract's own construction activity, as are costs and use charges associated with each facility.
2. Locate service or condition where they will serve the Project adequately and with minimum interference of the Work, coordinate with the Construction Manager and the other Prime Contracts prior to installation.

B. Temporary Use of Permanent Facilities: Prime Contract, as installer of each permanent service or condition, shall assume responsibility for its operation, maintenance and protection during use as a construction facility prior to the Owner's acceptance, regardless of previously assigned temporary facilities and controls responsibility.

C. Owner's Facilities: Contractors are not allowed to use the Owner's facilities (toilets, telephones, food service, etc.) for their own benefit or convenience. Prime Contract Superintendents shall enforce this policy with their respective work forces.

1. Construction personnel parking will be restricted to area as directed and agreed to by the Owner, and to facilitate the completion of the work. Owner reserves the right to remove from their property, unauthorized vehicles occupying unauthorized areas, at respective vehicle owner's expense.

D. Storage on the Project Site: Each Prime Contract shall provide sufficient secure weather-tight storage facilities for their materials and equipment. These storage containers are required to be located on the "site logistics plan." The Owner's facilities and the Project's building areas shall not be used for storage unless agreed upon, in writing, with the Owner via the Construction Manager.

1. Until permanently incorporated into the Work, all materials on the Project site are considered to be the Prime Contract's responsibility for security and protection.
2. Prime contractor is required to check on their onsite stored material periodically to ensure that all material continues to be located in the stored location and that it remains protected from all damage, theft, and endangerment to others and ready to be used on notice for coordination with other contractors. Failure to arrange for materials to be on site to complete coordinated work with other Prime Contractors will result in back charges for delays resulting therefrom.
3. Temporary long-term storage facilities are not available to Prime Contracts by the Owner.
4. Prime Contractors and their subcontractors, shall coordinate deliveries with the Construction Manager to ensure that disruptions and Owner inconvenience are avoided.

E. Tools and Equipment: Each Prime Contractor shall provide all tools and equipment necessary for its own activities; this includes secure lock-up and storage for all items on the Project Site.

1. Provide all construction aids and miscellaneous services and facilities necessary exclusively for its own construction activities; this shall include any additional supplementary power, ventilation, lighting requirements and weather protection.

F. Project Site Communication: Each Prime Contractor shall provide their Project a full time on site at all times Superintendent with a mobile phone for the duration of the Project, as indicated in their Scope of Work. Construction Manager shall be furnished with contact numbers associated with each phone.

G. Safety: Prime Contracts, not the Architect or Construction Manager, are responsible for Project Site Safety, as related to their operations (refer to Section 013150 "Special Procedures" for further requirements).

1. Each Prime Contract shall correct safety hazards and violations immediately. If safety issues are not immediately rectified, the Owner shall secure outside sources to correct the deficiency and back charge the responsible Prime Contract.
2. Maintain unobstructed access/egress to fire extinguishers, fire hydrants, stairways, corridors, ladders and other safety routes/devices.

H. Fire Extinguishers: All Prime Contracts provide and maintain "general use" fire extinguishers for each construction area of their respective contracts; comply with applicable codes for quantities required. Use of the Owner's fire extinguishers to meet this requirement is not permitted. Comply with NFPA for recommended classes for exposure; extinguishers shall be inspected and appropriately tagged prior to being brought on site. Provide stands, painted bright orange, sturdy enough to carry the extinguisher, and built as not to create a tipping hazard.

1. Each Prime Contract shall supplement this requirement by providing additional fire extinguishers specifically related to their work activity (e.g., welding, soldering, abrasive cutting, etc.).
2. Each Prime Contract shall provide and maintain proper fire extinguishers at/in their respective on site office and storage facilities.
3. Store combustible materials in approved containers in fire-safe locations.

I. Welding: Any Prime Contract performing welding, cutting or other activities with open flames or producing sparks shall at a minimum:

1. Coordinate interruption/shutdown of detection system(s) to avoid creating false alarms.
2. All burning and or welding (all hot work) is to be done from 3:30pm to 10:00pm when the public is not in the building.
3. Protect the area and surrounding areas from fire and damage.
4. Maintain fire extinguishers, compatible with activity, at the location of the activity.
5. Provide a continuous Fire Watch during the activity and one-half hour beyond the completion of the activity.
6. Provide all necessary fans and ventilation required for the activity.
7. Any welding, burning and or use of flame the contractor is required to provide all required "hot work permit" to use such equipment prior to start of work. Its mandatory that no "hot work" shall start without these permits issued to the CM and Owner. Failure to this requirement will result to the removal of the project super of that company from all district projects.

J. Temporary Power: Each Prime Contractor shall provide for their own temporary power needs for any scheduled electrical utility shut downs. Each Prime Contractor shall provide for their own temporary generators, power cords and temporary lighting as needed during these periods to continue to perform their work and maintain adherence to the Preliminary Schedule and approved Project Master Schedules. All temporary power equipment shall comply with all applicable codes and regulations.
    1. In all other schools in this phase, known as High School Elevator Addition, have local electrical work, therefore each prime contractor and their sub-contractors are required to provide their own generator power for equipment and lighting to perform their work during these times with no additional cost to the owner.

K. Waste Disposal Facilities:

1. General debris/refuse/construction waste containers (dumpsters) shall be provided by each prime contractor and secured as specified herein this contract.
2. It shall be the responsibility/requirement of each Prime Contract to bring their waste to the dumpsters, including but not limited to all equipment, demolition debris, discarded materials with further identification including the following; construction and demolition debris refers to discarded materials generally

considered non-hazardous in nature, including but not limited to steel, glass, brick, concrete, asphalt material, pipe, gypsum wallboard, and lumber, from the construction or destruction of a structure as part of a construction or demolition project or from the renovation of a structure, including such debris from construction of structures at a site remote from the construction or demolition project site.

3. It shall be the responsibility and requirement of each Prime Contract to recycle metals generated by its Work, and the Work of its subcontracts.
4. Joint-effort recycling by all Prime Contracts is encouraged.

L. Temporary Sanitary Facilities: Provide temporary self-contained toilets units for duration of the project.
   1. Temporary Sanitary Facilities:
      a. Each prime contractor is required to provide their own Temporary Sanitary Facilities and secured behind fencing and/or locked after work hours and weekends.
   2. Comply with regulations and health codes for type, number, location, operation, and maintenance of fixtures and facilities.
   3. Provide separate facilities (minimum of one ea.) for male and female personnel in proportion required by OSHA.
   4. Shield toilets to ensure privacy.
   5. Coordinate mobilization and demobilization of units with Construction Manager.
   6. Toilets shall be cleaned at least once per week, with additional facilities or cleanings provided if requested by Construction Manager.
   7. Provide and maintain adequate supply of toilet tissue and hand sanitizer for each facility.

1.10 WORK HOURS & SEQUENCE

A. During the school days, Work is to be performed in this contract during the hours of 3:30pm to 10:00pm on weekdays, and Saturdays and Sundays from 7:00am to 3:30pm. During School breaks, work is to be performed from 7:00am to 10:00pm. There is no additional cost to the owner for working the hours of 3:30pm through 10:00pm, or weekend work during the school year. **Any work done during these times MUST BE COMPLETED, CLEANED, AND TESTED AS NECESSARY FOR STUDENT OCCUPANCY BEFORE THE START OF THE NEXT SCHOOL DAY. Contractors are required to schedule work during school breaks, school days off, and school holidays**.

B. Summer work starts June 28th through August 23rd for 2023. The Summer working hours are from 7:00am to 9:30pm. There is no additional cost to the owner for working the hours of 3:30pm through 9:30pm or on weekends and holidays during the Summer.

C. Contractors are required to start working on site within 30 days of execution of contract, to the extent permitted by contract. Contractors are required to coordinate and perform work simultaneously with other Contractors. Contractors are required to complete their contract work by the designated Substantial Completion and Final Completion end dates as indicated on the Invitation to Bid.

D. Mandatory clean up periods - From August 24th, 2022 to August 31st, 2022 and August 30th , 2023 to September 6th, 2023, contractors shall clean up all interior and exterior areas.

E. Contractors are required per contract to fully staff the project during the work shifts stated above with the required manpower to complete their work within the allowed scheduled time frame. Contractors are required to provide a 72-hour advanced request to the Owner via the Construction Manager for any Saturday and Sunday work. If a project schedule delay has been caused by the fault of the contractor, the contractor is required to provide 3rd shift work from 9pm to 6am to make up the project schedule. All costs for CM, Architect and district personal related to this 3rd shift request will be charged to the contractor at a combined rate for all at $3,000 per 8hr shift.

F. The shifts noted above are not considered overtime or premium time hours.

G. Contract summaries will provide start and end date for each contractor.

H. Additional requirements:

1. Multiple Crews: Each Prime Contract shall provide multiple crews, supervision, cranes, scaffold and other means necessary to perform the Work, and maintain the Project Master Schedules.
2. Interruption of any utility and/or power must be coordinated with the Owner, via the Construction Manager.
3. Any and all -3rd shift, overtime, weekend and/or holiday work required to meet the Project Master Schedules shall be incorporated in the respective Prime Contract's bid.
4. Should a Contractor's progress fall behind, as to schedule, Prime Contractor shall employ additional – 3rd shift and/or overtime and/or weekend workforce until situation is rectified, to the satisfaction of the Architect and Construction Manager, at no additional cost to the Owner, however subject to charges as stated in section 1.8 C for lack of maintaining schedule
5. Should a Prime Contract feel another Prime Contract is delaying them enough time to complete their installations, per the schedule, the Architect and Construction Manager shall be notified in writing immediately of the situation (refer to Conditions of the Contract for protocol). A Prime Contract creating such

a delay, that causes a proven burden upon another Prime Contract to maintain schedule, shall bear all costs incurred by the delayed Prime Contract to maintain the schedule.

6. The Architect and Construction Manager shall not be overburdened as to overtime cost, to monitor the work, due to no cause of his or her own. Owner will compensate the Architect and Construction Manager for all additional cost related to the issue of a Prime Contractor's failing to execute the Contract by fully staffing per the work hours and days noted herein. The Owner reserves the right to back charge the responsible Prime Contract for these fees if incurred.
7. All Asbestos and/or Lead Abatement shall take place to meet the requirements of the Preliminary Schedule and Project Master Schedules and shall be coordinated with the other Prime Contractors prior to commencement.

I. The Work shall be conducted to provide the least possible interference to the activities of the Owner's personnel and the surrounding property owners (neighbors).

1. Prime Contracts are hereby notified that: All Prime Contractors and their subcontractors shall limit excessive noise during 2nd shift known as work extending to 10PM weekdays upon approval by owner and city work hour restrictions. These operations shall not create a disturbance to neighboring properties.

J. Construction access to the site shall be limited to personnel, equipment and deliveries by suppliers relative to the Work of Prime Contractors and their subcontractors. Prime Contracts shall keep the Construction Manager advised of persons accessing the site and shall seek assistance with coordinating parking and storage facility locations for all Prime Contracts.

1. Where applicable, Contractors shall provide Building Site perimeter barricades as described herein the project and all temporary exit doors/lockable gates on the Project, securing these doors, fencing and/or gates at the end of each work shift.
2. When a Prime Contract engages in overtime, weekend or 2nd shift work, during the summer months and or during the normal school year, the respective Prime Contract shall notify Construction Manager of such and be responsible for securing the Project Site at the end of that work shift and perform site walk around the outside of construction area/work zone ensuring all debris is pickup up and there are no construction related hazards of any kind present once the responsible person leaves the site for the evening or weekend. This includes that all materials and equipment are fenced in and keys are removed. All interior projects have the same requirement to ensure that outside the work zone is clean from dust-dirt and that no materials are left outside the work area at any time.

1.11 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.

1.12 DRAWINGS AND SPECIFICATIONS

A. Construction Documents indicate the sum total of the Contract that make up the complete work for the Project. Through this Section "Summary of Work", the intent of the Contractor's scope of Work and responsibility is generally described. Related requirements and conditions that are indicated in the Contract Documents include but are not limited to the following:

1. General Conditions and Requirements.
2. Referenced and applicable Codes, Regulations and Standards.
3. Scheduling and phasing requirements.
4. Existing conditions and restrictions on use of the site and facilities.

B. Drawings and Specifications are cooperative and supplementary. Portions of the Work, which can best be illustrated by Drawings, are not included in the Specifications and portions best described by Specifications are not depicted on Drawings.

1. All items necessary to complete the work shall be furnished whether written or illustrated.
2. All primes shall exercise good judgment and perform all work according to related industry standards.

PART 2 - SCOPE OF WORK

2.1 PRIME CONTRACTS

A. Scope of Work: Work includes but is not limited to, the following:
1. Provide all work identified in the Contract Documents.
2. All Specification Sections provided.
3. All abatement drawings provided for reference.

PART 3 - EXECUTION

3.1 WORK SEQUENCE

A. The Work shall be conducted to provide the least possible interference to the activities of the Owner's personnel, per the Project Preliminary Schedule.

B. Work required during overtime, extended shifts or holidays due to failure of contractor to maintain schedule, will be monitored by Architect/Construction Site representative, and may be monitored by Owners' personnel. Additional costs for Architect/Construction Site Representative and/or Owner personnel will be borne by the Contractor.

C. Coordination of any utility and power interruption must be done with approval of the Architect/Construction Site Representative. Shutdowns must occur during non-occupied timeframes only.

D. Construction access to the site shall be limited to those designated for personnel, equipment and deliveries by the Owner. All contractor staging, parking and storage shall be coordinated with the Construction Site Representative and subject to change.

E. Payments: Each bid that covers more than one school (i.e. one SED project) shall provide completed AIA G732 & G703 by building (for each SED project).

F. No work shall be installed without approved shop drawings. Any work in place without approved shop drawings will be rejected and removed by that contractor at their expense and backed charge all other costs related to.

G. Any work deemed by CM, Architect and District not properly installed by a contractor per the contract drawings and specifications shall be removed immediately and corrected, with all associated costs to be borne solely by that contractor.

H. All prime contractors shall coordinate their contract work with other primes to meet the project schedule and for a complete operational system or area or work.

I. All contractors are to provide within 3 weeks of award a "base line" construction schedule for their work from commencement to completion including all phasing. This schedule is to be updated monthly to show percentage progress of each item listed. This schedule shall be revised to provide a recovery schedule in the event of a delay for any reason. The recovery schedule shall include the "base line" item and the recovery to show how the delay is affecting the overall project schedule. This schedule is to be provided in MS Project or Primavera. Excel schedules are not accepted.

J. Prime contractor "base line" schedules are to be reviewed by each prime contractor and coordinated where work is related and that each prime's work shall be included in each "base line" contractor's schedule as necessary for coordination.

K. All contractors are to provide 2-week look ahead schedules showing work related to the base line and shall be coordinated with other prime 2-week look ahead schedules. These schedules will be Excel format. Format will be provided by the CM.

L. Contractors to provide a full-time supervisor on site 100% of the time. This is not a working foreman. Supervisors are not working with tools they are supervising their workers and coordinating with other contractors and district/ CM. Failure to provide will be default of your contract and subject costs related to and termination.

M. All prime contractors are the provide a project manpower structure showing names and telephone numbers of each responsible person on the project. This shall be updated as needed if personal changes are made.

N. All site equipment and dumpsters are to be behind temporary chain link fence when stored on site and or within the construction work zone where temporary chain link fence has been providing and installed by the prime. Each prime contractor is responsible to provide and install temporary chain link fence around their own stored equipment and dumpsters on site.

O. No equipment, panels or any services shall be turned off for any reason without written request and approval by the district. Project form shall be used for all shutdowns and required a 3-day notice. Other shutdowns may require more time.

P. **CONTRACT MC-01 – MECHANICAL WORK & PLUMBING WORK (MC)** — MECHANICAL/PLUMBING PRIME CONTRACT AT, NANUET SENIOR HIGH SCHOOL, FOR (BUT NOT LIMITED TOO), MECHANICAL PIPING, DUCTING, VAV'S, DAMPERS,RTU'S,SPLIT UNIT SYSTEMS,HYDRONIC PIPING, ANY WORK RELATED TO ROOFING SHALL BE COORDINATED WITH ROOFING CONTRACT INSTALLATION. ALL INTERIOR WORK SHALL BE COORDINATED WITH GENERAL CONTRACTS. SEE MILESTONE & PHASING SCHEDULED FOR MORE DETAILS.

Q. NUFSD will provide RTU-HS-1 through a state contract with TRANE. MC-01 is to provide a crane to lift the unit off the delivery vehicle and place on roof top support system as indicated by contract documents. MC-01 is responsible for all other contract connections, ducting, piping, startup, T&B, ETC….

- **RTU-HS-01 will be a Valent Unit VXE-312-74D-30I-0-A1**
- **Trane Contract for coordination and delivery is: Lauren Hayes – lauren.hayes@tranetechnologies.com – 1518-410-9375**

R. All HVAC louvers/vents are supplied by MC-01. Coordinate opening with other primes.

S. HVAC control wiring is provided and installed by MC-01. Power wiring by EC-01.

T. MC-01 is responsible for making their own through wall or through floor piping penetrations and is responsible for associated patching and firestopping as required.

U. Access doors for plumbing is provided by MC-01 and installed by GC-01.

V. To allow sufficient time for install, MC-01 is to provide GC-01 with any foundation sleeves and a coordinated sketch showing exact height/locations with distance from column line and depth below finished slab. If information is not provided in a timely manor, then MC is responsible for all core drilling to install piping if required.

W. All duct detectors are furnished by EC and installed by MC.

X. All fire and or fire/smoke dampers are installed by MC.

Y. NUFSD will provide a Cx for startup review, T&B, review, and post-construction operations review. MC will be required to coordinate with Cx for these project milestone tasks. MC is to give CM advanced notice prior to unit start-up and Testing and Balancing, so CM may schedule Cx review.

A. Project Site Superintendent: MC shall provide one (1) full time Project Site Superintendent while any work related to this Contract is being performed on site. Superintendent may be a working Foreman as lon g as the daily requirements of this Contract are maintained, as they relate to the Construction Documents and the Project Schedule. Construction Manager reserves the right, in their opinion, to revoke this privilege if these requirements are not maintained. Superintendent shall work closely with the Construction Manager, and the other Prime Contract Superintendents and Foremen, in a manner that best promotes the Project Master Schedules and the objectives of the Project.

1. Superintendent shall be on site while Prime Contractor's own forces, and/or their sub-contractors forces, are on site; also while other Prime Contracts are installing work, or require coordination of work, related to this Contract, and/or as requested by the Construction Manager.
2. Superintendent shall be the same individual throughout the Project.
3. Project Site Superintendent shall be an individual with minimum of five (5) years' experience in this field of work.
4. Refer to Section 013100 "Project Management and Coordination" for further requirements.

B. Project Foreman: MC shall provide at least one (1) full time Project Foreman during each shift of work at each school; Foreman shall be able to make binding decisions, as they relate to the daily activities of their crew, as related to achieving the goals of the Project.

C. Site Communications: MC shall provide Project Superintendent with a mobile phone, all costs and service charges paid for by MC; provide Construction Manager with contact number(s).

D. Project Site Field Office: Provide site office facilities for this Contract's Project Superintendent. Site Office shall be equipped with telephone w/answering machine, fax, and e-mail. Contact information shall be provided to the Construction Manager.

1. The Owner reserves the right to seek reimbursement for temporary facilities not provided by this Prime Contract.

E. Scope of Work: Work of the MC includes but is not limited to, the following:

1. Coordination with other Prime Contracts, Owner and Construction Manager as required to adhere to and maintain approved Project Master Schedules. Prior to first payment, this includes submitting the Contractor's Construction Schedule to the Construction Manager for preparation of the Project Master Schedule.
2. All Mechanical demolition and new construction as indicated in the Contract Documents.
3. Mechanical scope is identified in the Contract Documents which include but is not limited to ALL drawings, specifications, this multiple contract summary, etc. This contract includes furnishing and installing access doors for walls and ceiling as required, which may include fire rated conditions., Prior to the submission of shop drawings for mechanical curbs, survey all existing curbs for accurate measurements. Determination of new curb height shall be made in coordination with Contract Documentation..
4. Prior to removal, survey condition of all existing roof top mechanical equipment scheduled to be removed and reinstalled and submit a report of the condition of each piece of existing equipment. Report shall include photographs and a location plan, and be submitted to the Architect and Construction Manager.
5. Removal, safe storage off roof (or outside of work area, as coordinated with BE Contractor), and reinstallation of all existing mechanical roof top equipment as indicated in the Contract Documents. Demolish existing curbs (following asbestos abatement by others) and provide and install new equipment curbs.
6. Reinstallation mechanical scope includes all miscellaneous piping, ductwork extension, low voltage wiring, equipment, hardware and insulation required for a complete and functional reinstallation of existing rooftop equipment. Coordinate any new roof penetrations, if required, with BE Contractor.
7. Reinstallation mechanical scope includes start-up, testing & balancing and recommissioning services for reinstalled mechanical equipment. Submit testing & balancing and commissioning reports to Architect and Construction Manager.

8. Prime Contract shall understand that renovation work may require work to proceed while existing systems are required to be maintained; all cost associated with this sequence shall be anticipated, and incorporated into the Bid.
    a. MC shall be cognizant of phasing and sequencing conditions, that may require MC to make temporary connections or installations of heating system components, in order to maintain operation of existing/new system configuration(s). It shall be the Prime Contract's responsibility to employ its own means and methods of accomplishing any such temporary conditions, at no additional cost to the owner.
    b. All new heating system components must be protected, from potential contamination, by any existing components that are still employed during system operation, should a partial existing/new configuration exist during the required heating period, September 15th – May 31st.
9. Prime Contractor shall read and familiarized themselves with the Lead Sections of the Construction Documents. Lead-based paint has been identified to exist on specific areas/surfaces of the work located within the building(s), and when encountered the Prime Contractor shall follow all applicable regulations while working with this material.
10. Prime Contractor shall read and familiarized themselves with the Asbestos Sections of the Construction Documents. Asbestos Containing Material is scheduled to be abated throughout specific areas of the building(s). Should ACM be encountered (after Abatement is completed), that may interfere with an installation; Prime Contractor shall cease work, and notify Construction Manager immediately.
    a. Penetrations not coordinated with the Prime Contractor responsible for asbestos abatement, prior to abatement of these spaces, shall become the responsibility of the respective Prime Contract requiring the penetration.
    b. Contractor is required to review their work in the field prior to starting and advise if ACM is suspect on the work they intend to alter in anyway. There is no delay claim for lack of inspection of work.
11. Environmental Protection: Provide protection, and conduct construction in ways and by methods that comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
    a. Restrict use of noisemaking tools and equipment to hours that will minimize complaints from persons or firms on or near the Project site.
12. The HVAC drawings are schematic in nature, and the MC will make adequate provisions to accommodate the actual field conditions without additional cost to the Owner.
13. Document on the Record Drawings all ductwork openings and penetrations larger than 2 inches in diameter.
14. Provide all demolition of Mechanical Systems indicated in the Construction Documents, and/or required for Work of this Prime Contract.
    a. Coordinate all demolition with Hazardous Materials documents.

b. Coordinate with all other Prime Contracts regarding all removals required for the Project.
c. Demolition of a system shall mean any and all components, removed in their entirety, to the point of origin or source.

15. Provide valves, whether permanent or temporary, to permit shutoff and/or capping of systems to achieve the Work of this Prime Contract.
16. Each Prime Contract shall be responsible for all respective SOG/SOD removals, and related infill thereof (doweled with #4 bar 16"o.c. unless otherwise detailed), that are not indicated on the Architectural Demolition plans.
    a. All concrete/masonry demolition shall be completed using wet saw methods.
17. MC Contractor shall provide all Work associated with creating structural openings or penetrations requiring lintels, for their own work (i.e. ductwork and pipe or conduit penetrations). This applies to all openings/penetrations greater than 5-inches through masonry or concrete walls.
    a. MC shall provide lintels and shop drawings for such openings for review by Design Team. MC shall indicate all required openings/penetrations requiring lintels on their Shop Drawings. Mechanical contractor is required to provide openings/penetrations on the coordination drawings that will require structural openings in accordance with the contract documents at no additional cost. Non-structural openings/penetrations, including those for convenience, shall be self-provided by the respective Prime Contractor.
    b. This assignment applies to new and existing construction areas.
    c. Refer to Structural documents for lintel type/size requirements and Architectural drawings for wall types. Walls not specifically identified in the documents are to be assumed as masonry construction.
    d. All openings/penetrations are to be identified on Record Drawings by the Prime Contract requiring the opening.
    e. All scheduled exterior wall louver openings indicated on Architectural and/or Structural documents are to be created by this MC Contractor. MC shall supply and install louver.
    f. Exact physical locations shall be laid-out by MC for coordinated sequencing with other respective Prime Contractors.
18. Provide cut and patch work related to that of this Prime Contract,, related to that of their Prime Contract, and at those areas specifically identified on the Construction Documents, regardless of trade creating the area to be patched.
    a. Each Prime Contract is responsible for all other respective Cutting & Patching required of their installations. Refer to Section 017329 "Cutting and Patching" for further information.
    b. Provide cut and patch for all affected materials at building interiors as required to provide access for relocation of existing or installation of new roof drains and rood drain leaders, to point of connection to existing piping or to building exterior, as indicated in Contract Documents.

19. Provide new HVAC system(s), or modifications of existing system(s) as indicated in the Construction Documents, complete and fully operational.
    a. Furnish all disconnects and motor starters (including related "heaters, fuses, and phase protection relays") for all equipment provided under this contract, for coordinated installation by EC.
    b. Provide Instrumentation and Controls (Energy Management System) complete as indicated on the drawings or specifications:
        1) Electrical Contractor shall provide line voltage power wiring to the control panels as indicated in the Contract Documents.
        2) EMS installer shall provide all low voltage wiring of controls, transformers, actuated dampers, motors, etc., as required for a complete operational system.
    c. Provide thermal insulation of all HVAC components provided by this Prime Contract.
20. Final connections of utilities are by MC, EC or PC, unless noted or assigned otherwise.
21. Provide sleeves required for piping penetrating walls, slabs and/or decks.
22. Provide through-penetration fire stop systems at all penetrations made by MC. MC Contractor shall maintain listed ratings of indicated assemblies. Provide repair of existing through-penetration fire stopping damaged by work of this Prime Contract.
    a. Sleeves with fire stopping are to be installed in sequence with fire-rated construction. This Prime Contract shall be responsible for installing fire stopping material at intersection of sleeve and constructed materials.
23. Provide coordination with, and notification to, the Construction Manager for all specified testing, training, commissioning, etc., of the Work of this Prime Contract. Refer to Division 00 Section "Project Forms" for applicable documentation documents.
24. Substantial Completion: Clean all mechanical and plumbing installations and provided equipment at the time of Substantial Completion or as directed by Construction Manager.
25. Coordinate all the preceding requirements, accordingly, with all applicable Alternates indicated in Section 012300 "Alternates".

F. Applicable Specification Sections: All specification Sections itemized below are to be provided complete by this Prime Contract, unless noted otherwise. In addition to these specifications, the contractor is required to review all specifications included in the overall contract that may contain related scope or detail for this specific contract.

    i) All Division 00 and 01 – Procurement and Contracting Requirements & General Requirements
    ii) Division 03 – Concrete Division
    iii) Division 09 – Finishes

iv) Division 23 – Heating, Ventilating, and Air Conditioning

A. Applicable Drawings : All drawings itemized below are to be provided complete by this Prime Contract, unless noted otherwise. In addition to these drawings, the contractor is required to review all drawings included in the overall contract that may contain related scope or detail for this specific contract.

1. **All "HS-M",drawings**

END OF SECTION 01 12 09

SECTION 01 12 10 –CONTRACT SUMMARY – MC-02

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 includes a summary of each Prime Contract, including responsibilities for coordination and temporary facilities and controls. One set of Construction Documents is issued covering the Work of multiple Prime Contracts. Each Prime Contract is responsible to review all drawings and specifications for specific requirements indicated, and for a general understanding and knowledge of the work of other Prime Contracts. All Prime Contracts are responsible for all Work of their Contract no matter what drawing on which the Work appears. All Prime Contracts are responsible to coordinate their work related to the complete set of drawings and specifications, not limited to each prime contractor scope. **All Bidders should acknowledge that for each contract listed below, each contractor is their own General Contractor and subject to all General Contractor requirements.**

1. **Mechanical Contract:** The Mechanical Contractor shall be selected based on the bid procedure as described in the Bid Documents. Contract Bidders are responsible for (a) trade work coordination, (b) the scope contained in drawings listed below and (c) any and all additional scope specifically identified to be performed by the Mechanical Contractor in other Bid Packages in the Contract.

B.

1) Work related to drawings: (*In addition to these drawings, the contractor is required to review all specifications included in the overall contract that may contain related scope or detail for this specific contract.)*

Barr Middle School

a) Security Vestibule Project
b) STEM Labs Renovation Project

Miller Elementary School

c) Toilet Room Renovation Projects

1.3 Related Sections include, but are not limited to, the following:

A. Division 01 Section "Work Restrictions" for use of the Project site and for requirements for continued Owner occupancy of premises.

B. Division 01 Section "Project Management and Coordination" for general coordination requirements.

C. Division 01 Section "Project Forms" for documents required for Testing and Coordination.

D. Division 01 Section "Temporary Facilities and Controls" for specific requirements for temporary facilities and controls

1.4 DEFINITIONS

1.5 MANAGEMENT AND COORDINATION

A. The Owner shall provide a Construction Manager.

1. The Construction Manager shall provide a full time construction site representative recognized as the Construction Manager.

1.6 CONSTRUCTION MANAGER

A. The construction manager shall provide on-site administration of the Contracts for Construction in cooperation with the Architect as set in AIA Document A232 ™ – 2009, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition, as modified.

B. The Construction Manager shall provide administrative, management and related services to coordinate scheduled activities and responsibilities of the Multiple Prime Contractors with each other and with those of the Construction Manager, the Owner and the Architect. The Construction Manager shall coordinate the activities of the Multiple Prime Contractors in accordance with the latest approved Project Schedule and the Contract Documents.

C. Utilizing the construction schedules provided by the Multiple Prime Contractors, the Construction Manager shall update the Project schedule, incorporating the activities of the Owner, Architect, and Multiple Prime Contractors on the Projects, including activity sequences and durations, allocation of labor and materials, processing of Shop Drawings, Product Data and Samples, and delivery and procurement of products, including those that must be ordered will in advance of construction. The Project schedule shall include the Owner's occupancy requirements showing portions of the Project having occupancy priority.

D. Utilizing information from the Multiple Prime Contractors, the Construction Manager shall schedule and coordinate the sequence of construction and assignment of space in areas where the Multiple Prime Contractors are performing Work, in accordance with the Contract Documents and the latest approved Project Schedule.

1.7 GENERAL REQUIREMENTS OF PRIME CONTRACTS

A. Prime Contracts: The context used in this Section are separate Prime Contracts that represent significant elements of work that is to be performed concurrently and in close coordination with the work of other Prime Contracts for the benefits of the Owner. Each Prime Contract is recognized to be a major part of the Work.

B. Assignment of Work: Should a conflict be indicated, Section 011200 shall take precedence over all scope of work assignments that may be indicated elsewhere within the Construction Documents.

C. Seismic Requirements: Prime Contracts are to be aware that the building(s) is located within a Seismic Zone indicated in the documents and shall provide installations in compliance with all related code requirements.

D. Layout and Installation: Each Prime Contractor shall schedule, layout and install their Work in such manner as not to delay or interfere with, but to compliment the execution of the work of other Prime Contracts, utility companies and Owner's operations.

E. Extent of Contract: The Contract Documents, drawings and specifications each contain more specific descriptions of the Work facilitating which Prime Contract includes specific elements of the Project.

1. Work provided by each Prime Contract shall mean complete and operable systems and assemblies, including products, components, accessories and installations required by the Construction Documents or indicated otherwise.
2. Prime Contractors shall exercise good judgment and perform all work according to related industry standards.
3. The Owner is exempt from payment of Federal, State and local taxes, including sales and compensating use taxes on all materials and supplies incorporated in

completing the Work; these taxes are not to be included in the Bid. This exemption does not apply to tools, machinery, equipment or other property leased by, or to, the Contractor or sub-contractor, or to supplies and materials, which even though consumed are not incorporated into the completed work. Prime Contractors, and their sub-contractors, shall be responsible for paying any and all applicable taxes on said tools, machinery, equipment or property, and upon all said unincorporated supplies and materials, whether purchased or leased.

4. Prime Contracts shall understand that time is of the essence, and will adequately staff the Project by employing the appropriate trade's people to perform the Work; these people shall be experienced in their respective trades. A shortage of labor in the industry shall not be accepted as an excuse for not properly staffing the Project; all efforts shall be made to meet or exceed the schedule, including additional staff and/or labor hours necessary. All cost associated with this item shall be included within the Bid.
5. Local custom and trade union jurisdictional settlements will not control the scope of the Work of each Prime Contract.
    a. When a potential jurisdictional dispute or similar interruption of Work is first identified, or threatened, the affected Prime Contracts shall promptly negotiate a reasonable settlement to avoid or minimize the pending interruption and delays.
    b. Contractor's trade-related issues shall not be grounds for modification or extension of scheduled completion date(s).
6. The Work of all Prime Contracts requires close coordination with other Prime Contracts and construction personnel. Maintain flexibility and cooperation through the Project. "Out of Sequence" and "Delay" claims will only be considered when requirements of Division 01 "Administrative Requirements" have been adhered to. Delay claims must be in writing and forwarded to the Architect, per the requirements of the General Conditions of the Contract. Claims not submitted per these requirements will be rejected and/or denied.
7. The intention of the Work is to follow a logical sequence, however, a Prime Contractor may be required by the Architect or Construction Manager, to temporarily install, omit or leave out a section(s) of Work, out of sequence. All such out of sequence work, and come back time, at these areas shall be performed at no additional cost to the Owner.

F. Substitutions: Per Division 01 Section "Substitution Procedures", each Prime Contractor shall cooperate with the other Prime Contractors involved, to coordinate approved substitutions with remainder of the Work. Contractors shall submit all "Substitutions" at least ten (10) days prior to the date for receipt of Bids as specified in the Instructions to Bidders 002113 Section 3.3 Equivalents or bid will be considered per "basis of design".

G. Construction Schedules: Refer to Divisions 01 Section "Construction Progress Documentation", "Milestone Phasing Schedule" and "Project Management and Coordination" for requirements related to meetings and schedules.

H. Construction Sequencing and Phasing: Prime Contractor shall understand that Sequencing and/or Phasing Plans are contingent upon the work areas being complete/occupied, prior to the next area of Work beginning. Should an area of construction not be complete per the Project Preliminary Schedule, the Project Master Construction Schedule/Sequencing Plans will be adjusted accordingly. The Owner will not be responsible for delay claims due to adjustments being no fault of their own.

1. Prime Contracts may be required to re-sequence the phasing of the project as a result of changes to the schedule. Prime Contracts shall provide these adjustments at no additional cost to the Owner.

I. Existing Conditions: Each Prime Contract shall verify existing conditions in the field prior to work commencing in that area and immediately report conditions to the Architect that are not represented correctly by the Construction Documents.

1. Each Prime Contract is responsible for familiarizing himself with Project Site Logistics and provide a "site logistics plan locating storage area, scaffolds, rubbish areas, stock piles and egress related to all work, included phased construction within 30 days of award.
2. Each Prime Contract has been given ample opportunity to review Existing Conditions related to the Project. Existing Conditions not noted in the Construction Documents that could be easily recognized during pre-bid review that interfere with the respective Prime Contract's work, shall be the responsibility of the respective Prime Contract. This includes all costs associated with removal, patching, relocation or re-fabrication of installations.

J. Hazardous Materials: Each Prime Contract shall familiarize themselves with the Hazardous Materials Sections/Drawings of the Construction Documents and follow DOL/OSHA/EPA/SED regulations while performing their respective Work in these areas. Discovery of non-identified or concealed hazardous materials shall be reported to the Construction Manager immediately and followed up with written documentation of the event.

K. Protection of Installations: Each Prime Contract is responsible for protecting their installations at all times. All costs incurred to repair, replace or clean insufficiently protected materials/installations shall be the responsibility of the installing Prime Contract.

1. Architect shall be notified, in writing, immediately upon material/installation being damaged; notification shall indicate responsible party.
2. Owner will not be liable for damaged materials and/or installations by "others", when "others" cannot be identified.
3. Repair damaged work, clean exposed surfaces or replace construction installations that cannot be repaired.
4. Each Prime Contract shall be responsible for removing all labels not required to remain from their installations.
5. Installations shall be wiped clean and proper protection then installed.
6. Each Prime Contract is responsible to protect another primes work in the event that prime has to work over or on top of that other primes work being complete. The prime working over the completed work takes full responsibility of that other primes completed work both in condition and operation.

L. Daily Cleaning: All Prime Contracts are responsible for any and all debris caused by their Work, including the Work of their subcontractors. A daily clean up and disposal is required by each Prime Contract for the periods which that Prime Contract, or its sub-contractors, are performing Work on site.

1. Assign at least one person for a daily clean and sweep of the work area(s). Prime Contractor shall allot sufficient manpower and time for this to be completed by the end of each shift. Submit name of this person(s) to Construction Manager.
    a. Construction Manager shall have the authority to give direction to person(s) on the Project Site identified by the Prime Contract as designated for cleanup tasks. This shall include the safety review/securing of the site-work zone after each shift.
    b. This person has check that no construction debris was dumped in any district dumpers during this end of shift site review, if found the contractor must remove immediately the next morning to avoid back charges costs of $1500 per day not removed.
2. Any Prime Contract not providing personnel for Daily Cleaning will be Back Charged for labor provided by the Owner to complete this task.
3. Contractor working solely in an area shall be responsible for clean/sweep of that area.
4. Daily cleaning will not mean any one Prime Contract is responsible for assisting another Prime Contract with removing major quantities of debris created by a particular Prime Contract's Work.
5. Daily cleaning will be mandated to remove from the building any debris created by day-to-day activities. All Prime shall assist in sweeping shared work areas and shared corridors while working on site. Each Prime shall assist in mopping of shared corridors while working on site or as required by the Owner.

6. All prime contractors and subcontractors are required to provide sweeping compound for daily cleaning in their respective exterior and interior work areas. Each Prime Contract shall provide a sufficient number of brooms or other necessary tools, for use by their personnel to adequately fulfill their obligations.
7. All prime contractors shall provide and maintain garbage cans/refuse containers with liners for each construction area of their respective contracts as directed by the Construction Manager and shall be responsible for disposing of these materials to a dumpster.
8. All prime contractors provide the necessary equipment/containers (lull/skip-box) to move daily clean/sweep debris from the building to a dumpster on a daily basis, for each construction area of their respective contracts. Skip-box shall be emptied to a dumpster by 9:00 a.m. the following day.
9. Cleaning shall be deemed a Safety & Health issue, with Prime Contracts being held accountable for fulfilling their contractual obligations.

M. Final Cleaning: At Substantial Completion of each area of construction, each Prime Contract shall wipe/vacuum clean all of their respective installations; All interior contracts performing work inside the buildings shall mop clean all building surrounding areas and finish flooring and remove all marks/blemishes to the finish, for each construction area of their respective contracts. Each area of construction shall be wiped clean of all construction dust and debris prior to turnover to the Owner.

N. Cutting and Patching: All Primes are responsible for cutting and patching required to complete their Work. All repair of existing finish Work (including finish floors) shall be performed by contract requiring work, meeting or exceeding minimum contract requirements for that particular section, specification, or type of work. All concealed openings (piping, ductwork, conduit, etc.) must be repaired to comply with specified wall or deck conditions as well as required fire and sound ratings. All corridor penetrations require fire safing. If contractor elects to install their new work in an existing unrated wall or floor opening, whereas the wall/floor is a fire rated condition, that contractor is responsible to fire rate that opening to match the wall/floor fire rating with new and all other existing wire, piping, ducts etc. Other areas are noted in drawings and specifications.

1.8 Project Schedule. The nature of this project is to complete all the work listed as Phase 2 in the schedule by **the Project Closeout Dates specific to each Prime Contract as listed below**. Each Prime Contractor shall include in their bid proper allowances for foul weather.

A. Bids Received: 1/19/2023

B. Anticipated Notice to Proceed: 2/8/2023

C. Submittals: The following items are to be submitted within 60 business days after Notice to Proceed:
   1. Submittal List and Submission Schedule - **15 days after NTP**
   2. Field Investigations
   3. Shop Drawings
   4. Long Lead Items – **30 days after NTP**
   5. Schedule of Values and Key Submittal List – **15 days after NTP**

D. Mobilization: 6/26/2023

E. Substantial Completion and Project Closeout: Per 01 11 00 Milestone Schedule

1.9 TEMPORARY FACILITIES AND CONTROLS OF PRIME CONTRACTS

A. Conditions of Use: Keep temporary services or conditions clean and neat in appearance. Operate in a safe and efficient manner. Relocate temporary facilities as required as work progresses; do not overload facilities or permit them to interfere with progress. Take necessary fire prevention measures; do not allow hazardous, dangerous, or unsanitary conditions to develop or persist on the Project site.
   1. Installation, operation, maintenance, and removal of each temporary service or condition are considered part of the respective Prime Contract's own construction activity, as are costs and use charges associated with each facility.
   2. Locate service or condition where they will serve the Project adequately and with minimum interference of the Work, coordinate with the Construction Manager and the other Prime Contracts prior to installation.

B. Temporary Use of Permanent Facilities: Prime Contract, as installer of each permanent service or condition, shall assume responsibility for its operation, maintenance and protection during use as a construction facility prior to the Owner's acceptance, regardless of previously assigned temporary facilities and controls responsibility.

C. Owner's Facilities: Contractors are not allowed to use the Owner's facilities (toilets, telephones, food service, etc.) for their own benefit or convenience. Prime Contract Superintendents shall enforce this policy with their respective work forces.
   1. Construction personnel parking will be restricted to area as directed and agreed to by the Owner, and to facilitate the completion of the work. Owner reserves the right to remove from their property, unauthorized vehicles occupying unauthorized areas, at respective vehicle owner's expense.

D. Storage on the Project Site: Each Prime Contract shall provide sufficient secure weather-tight storage facilities for their materials and equipment. These storage containers are required to be located on the "site logistics plan." The Owner's facilities and the Project's building areas shall not be used for storage unless agreed upon, in writing, with the Owner via the Construction Manager.

1. Until permanently incorporated into the Work, all materials on the Project site are considered to be the Prime Contract's responsibility for security and protection.
2. Prime contractor is required to check on their onsite stored material periodically to ensure that all material continues to be located in the stored location and that it remains protected from all damage, theft, and endangerment to others and ready to be used on notice for coordination with other contractors. Failure to arrange for materials to be on site to complete coordinated work with other Prime Contractors will result in back charges for delays resulting therefrom.
3. Temporary long-term storage facilities are not available to Prime Contracts by the Owner.
4. Prime Contractors and their subcontractors, shall coordinate deliveries with the Construction Manager to ensure that disruptions and Owner inconvenience are avoided.

E. Tools and Equipment: Each Prime Contractor shall provide all tools and equipment necessary for its own activities; this includes secure lock-up and storage for all items on the Project Site.

1. Provide all construction aids and miscellaneous services and facilities necessary exclusively for its own construction activities; this shall include any additional supplementary power, ventilation, lighting requirements and weather protection.

F. Project Site Communication: Each Prime Contractor shall provide their Project a full time on site at all times Superintendent with a mobile phone for the duration of the Project, as indicated in their Scope of Work. Construction Manager shall be furnished with contact numbers associated with each phone.

G. Safety: Prime Contracts, not the Architect or Construction Manager, are responsible for Project Site Safety, as related to their operations (refer to Section 013150 "Special Procedures" for further requirements).

1. Each Prime Contract shall correct safety hazards and violations immediately. If safety issues are not immediately rectified, the Owner shall secure outside sources to correct the deficiency and back charge the responsible Prime Contract.
2. Maintain unobstructed access/egress to fire extinguishers, fire hydrants, stairways, corridors, ladders and other safety routes/devices.

H. Fire Extinguishers: All Prime Contracts provide and maintain "general use" fire extinguishers for each construction area of their respective contracts; comply with applicable codes for quantities required. Use of the Owner's fire extinguishers to meet this requirement is not permitted. Comply with NFPA for recommended classes for exposure; extinguishers shall be inspected and appropriately tagged prior to being brought on site. Provide stands, painted bright orange, sturdy enough to carry the extinguisher, and built as not to create a tipping hazard.

1. Each Prime Contract shall supplement this requirement by providing additional fire extinguishers specifically related to their work activity (e.g., welding, soldering, abrasive cutting, etc.).
2. Each Prime Contract shall provide and maintain proper fire extinguishers at/in their respective on site office and storage facilities.
3. Store combustible materials in approved containers in fire-safe locations.

I. Welding: Any Prime Contract performing welding, cutting or other activities with open flames or producing sparks shall at a minimum:

1. Coordinate interruption/shutdown of detection system(s) to avoid creating false alarms.
2. All burning and or welding (all hot work) is to be done from 3:30pm to 10:00pm when the public is not in the building.
3. Protect the area and surrounding areas from fire and damage.
4. Maintain fire extinguishers, compatible with activity, at the location of the activity.
5. Provide a continuous Fire Watch during the activity and one-half hour beyond the completion of the activity.
6. Provide all necessary fans and ventilation required for the activity.
7. Any welding, burning and or use of flame the contractor is required to provide all required "hot work permit" to use such equipment prior to start of work. Its mandatory that no "hot work" shall start without these permits issued to the CM and Owner. Failure to this requirement will result to the removal of the project super of that company from all district projects.

J. Temporary Power: Each Prime Contractor shall provide for their own temporary power needs for any scheduled electrical utility shut downs. Each Prime Contractor shall provide for their own temporary generators, power cords and temporary lighting as needed during these periods to continue to perform their work and maintain adherence to the Preliminary Schedule and approved Project Master Schedules. All temporary power equipment shall comply with all applicable codes and regulations.

1. In schools in this phase, have local electrical work, therefore each prime contractor and their sub-contractors are required to provide their own generator power for equipment and lighting to perform their work during these times with no additional cost to the owner.

K. Waste Disposal Facilities:

1. General debris/refuse/construction waste containers (dumpsters) shall be provided by each prime contractor and secured as specified herein this contract.
2. It shall be the responsibility/requirement of each Prime Contract to bring their waste to the dumpsters, including but not limited to all equipment, demolition debris, discarded materials with further identification including the following; construction and demolition debris refers to discarded materials generally considered non-hazardous in nature, including but not limited to steel, glass, brick, concrete, asphalt material, pipe, gypsum wallboard, and lumber, from the construction or destruction of a structure as part of a construction or demolition project or from the renovation of a structure, including such debris from construction of structures at a site remote from the construction or demolition project site.
3. It shall be the responsibility and requirement of each Prime Contract to recycle metals generated by its Work, and the Work of its subcontracts.
4. Joint-effort recycling by all Prime Contracts is encouraged.

L. Temporary Sanitary Facilities: Provide temporary self-contained toilets units for duration of the project.
    1. Temporary Sanitary Facilities:
        a. Each prime contractor is required to provide their own Temporary Sanitary Facilities and secured behind fencing and/or locked after work hours and weekends.
    2. Comply with regulations and health codes for type, number, location, operation, and maintenance of fixtures and facilities.
    3. Provide separate facilities (minimum of one ea.) for male and female personnel in proportion required by OSHA.
    4. Shield toilets to ensure privacy.
    5. Coordinate mobilization and demobilization of units with Construction Manager.
    6. Toilets shall be cleaned at least once per week, with additional facilities or cleanings provided if requested by Construction Manager.
    7. Provide and maintain adequate supply of toilet tissue and hand sanitizer for each facility.

1.10 WORK HOURS & SEQUENCE

A. During the school days, Work is to be performed in this contract during the hours of 3:30pm to 10:00pm on weekdays, and Saturdays and Sundays from 7:00am to 3:30pm. During School breaks, work is to be performed from 7:00am to 10:00pm. There is no additional cost to the owner for working the hours of 3:30pm through 10:00pm, or weekend work during the school year. **Any work done during these times MUST BE**

COMPLETED, CLEANED, AND TESTED AS NECESSARY FOR STUDENT OCCUPANCY BEFORE THE START OF THE NEXT SCHOOL DAY. Contractors are required to schedule work during school breaks, school days off, and school holidays.

B. Summer work starts June 28th through August 23rd for 2023. The Summer working hours are from 7:00am to 9:30pm. There is no additional cost to the owner for working the hours of 3:30pm through 9:30pm or on weekends and holidays during the Summer.

C. Contractors are required to start working on site within 30 days of execution of contract, to the extent permitted by contract. Contractors are required to coordinate and perform work simultaneously with other Contractors. Contractors are required to complete their contract work by the designated Substantial Completion and Final Completion end dates as indicated on the Invitation to Bid.

D. Mandatory clean up periods - From August 24th, 2022 to August 31st, 2022 and August 30th , 2023 to September 6th, 2023, contractors shall clean up all interior and exterior areas.

E. Contractors are required per contract to fully staff the project during the work shifts stated above with the required manpower to complete their work within the allowed scheduled time frame. Contractors are required to provide a 72-hour advanced request to the Owner via the Construction Manager for any Saturday and Sunday work. If a project schedule delay has been caused by the fault of the contractor, the contractor is required to provide 3rd shift work from 9pm to 6am to make up the project schedule. All costs for CM, Architect and district personal related to this 3rd shift request will be charged to the contractor at a combined rate for all at $3,000 per 8hr shift.

F. The shifts noted above are not considered overtime or premium time hours.

G. Contract summaries will provide start and end date for each contractor.

H. Additional requirements:

1. Multiple Crews: Each Prime Contract shall provide multiple crews, supervision, cranes, scaffold and other means necessary to perform the Work, and maintain the Project Master Schedules.
2. Interruption of any utility and/or power must be coordinated with the Owner, via the Construction Manager.
3. Any and all -3rd shift, overtime, weekend and/or holiday work required to meet the Project Master Schedules shall be incorporated in the respective Prime Contract's bid.
4. Should a Contractor's progress fall behind, as to schedule, Prime Contractor shall employ additional – 3rd shift and/or overtime and/or weekend workforce until

situation is rectified, to the satisfaction of the Architect and Construction Manager, at no additional cost to the Owner, however subject to charges as stated in section 1.8 C for lack of maintaining schedule

5. Should a Prime Contract feel another Prime Contract is delaying them enough time to complete their installations, per the schedule, the Architect and Construction Manager shall be notified in writing immediately of the situation (refer to Conditions of the Contract for protocol). A Prime Contract creating such a delay, that causes a proven burden upon another Prime Contract to maintain schedule, shall bear all costs incurred by the delayed Prime Contract to maintain the schedule.
6. The Architect and Construction Manager shall not be overburdened as to overtime cost, to monitor the work, due to no cause of his or her own. Owner will compensate the Architect and Construction Manager for all additional cost related to the issue of a Prime Contractor's failing to execute the Contract by fully staffing per the work hours and days noted herein. The Owner reserves the right to back charge the responsible Prime Contract for these fees if incurred.
7. All Asbestos and/or Lead Abatement shall take place to meet the requirements of the Preliminary Schedule and Project Master Schedules and shall be coordinated with the other Prime Contractors prior to commencement.

I. The Work shall be conducted to provide the least possible interference to the activities of the Owner's personnel and the surrounding property owners (neighbors).

1. Prime Contracts are hereby notified that: All Prime Contractors and their subcontractors shall limit excessive noise during 2nd shift known as work extending to 10PM weekdays upon approval by owner and city work hour restrictions. These operations shall not create a disturbance to neighboring properties.

J. Construction access to the site shall be limited to personnel, equipment and deliveries by suppliers relative to the Work of Prime Contractors and their subcontractors. Prime Contracts shall keep the Construction Manager advised of persons accessing the site and shall seek assistance with coordinating parking and storage facility locations for all Prime Contracts.

1. Where applicable, Contractors shall provide Building Site perimeter barricades as described herein the project and all temporary exit doors/lockable gates on the Project, securing these doors, fencing and/or gates at the end of each work shift.
2. When a Prime Contract engages in overtime, weekend or 2nd shift work, during the summer months and or during the normal school year, the respective Prime Contract shall notify Construction Manager of such and be responsible for securing the Project Site at the end of that work shift and perform site walk around the outside of construction area/work zone ensuring all debris is pickup

up and there are no construction related hazards of any kind present once the responsible person leaves the site for the evening or weekend. This includes that all materials and equipment are fenced in and keys are removed. All interior projects have the same requirement to ensure that outside the work zone is clean from dust-dirt and that no materials are left outside the work area at any time.

1.11 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.

1.12 DRAWINGS AND SPECIFICATIONS

A. Construction Documents indicate the sum total of the Contract that make up the complete work for the Project. Through this Section "Summary of Work", the intent of the Contractor's scope of Work and responsibility is generally described. Related requirements and conditions that are indicated in the Contract Documents include but are not limited to the following:

1. General Conditions and Requirements.
2. Referenced and applicable Codes, Regulations and Standards.
3. Scheduling and phasing requirements.
4. Existing conditions and restrictions on use of the site and facilities.

B. Drawings and Specifications are cooperative and supplementary. Portions of the Work, which can best be illustrated by Drawings, are not included in the Specifications and portions best described by Specifications are not depicted on Drawings.

1. All items necessary to complete the work shall be furnished whether written or illustrated.
2. All primes shall exercise good judgment and perform all work according to related industry standards.

PART 2 - SCOPE OF WORK

2.1 PRIME CONTRACTS

A. Scope of Work: Work includes but is not limited to, the following:
1. Provide all work identified in the Contract Documents.
2. All Specification Sections provided.

3. All abatement drawings provided for reference.

PART 3 - EXECUTION

3.1 WORK SEQUENCE

A. The Work shall be conducted to provide the least possible interference to the activities of the Owner's personnel, per the Project Preliminary Schedule.

B. Work required during overtime, extended shifts or holidays due to failure of contractor to maintain schedule, will be monitored by Architect/Construction Site representative, and may be monitored by Owners' personnel. Additional costs for Architect/Construction Site Representative and/or Owner personnel will be borne by the Contractor.

C. Coordination of any utility and power interruption must be done with approval of the Architect/Construction Site Representative. Shutdowns must occur during non-occupied timeframes only.

D. Construction access to the site shall be limited to those designated for personnel, equipment and deliveries by the Owner. All contractor staging, parking and storage shall be coordinated with the Construction Site Representative and subject to change.

E. Payments: Each bid that covers more than one school (i.e. one SED project) shall provide completed AIA G732 & G703 by building (for each SED project).

F. No work shall be installed without approved shop drawings. Any work in place without approved shop drawings will be rejected and removed by that contractor at their expense and backed charge all other costs related to.

G. Any work deemed by CM, Architect and District not properly installed by a contractor per the contract drawings and specifications shall be removed immediately and corrected, with all associated costs to be borne solely by that contractor.

H. All prime contractors shall coordinate their contract work with other primes to meet the project schedule and for a complete operational system or area or work.

I. All contractors are to provide within 3 weeks of award a "base line" construction schedule for their work from commencement to completion including all phasing. This schedule is to be updated monthly to show percentage progress of each item listed.

This schedule shall be revised to provide a recovery schedule in the event of a delay for any reason. The recovery schedule shall include the "base line" item and the recovery to show how the delay is affecting the overall project schedule. This schedule is to be provided in MS Project or Primavera. Excel schedules are not accepted.

J. Prime contractor "base line" schedules are to be reviewed by each prime contractor and coordinated where work is related and that each prime's work shall be included in each "base line" contractor's schedule as necessary for coordination.

K. All contractors are to provide 2-week look ahead schedules showing work related to the base line and shall be coordinated with other prime 2-week look ahead schedules. These schedules will be Excel format. Format will be provided by the CM.

L. Contractors to provide a full-time supervisor on site 100% of the time. This is not a working foreman. Supervisors are not working with tools they are supervising their workers and coordinating with other contractors and district/ CM. Failure to provide will be default of your contract and subject costs related to and termination.

M. All prime contractors are the provide a project manpower structure showing names and telephone numbers of each responsible person on the project. This shall be updated as needed if personal changes are made.

N. All site equipment and dumpsters are to be behind temporary chain link fence when stored on site and or within the construction work zone where temporary chain link fence has been providing and installed by the prime. Each prime contractor is responsible to provide and install temporary chain link fence around their own stored equipment and dumpsters on site.

O. No equipment, panels or any services shall be turned off for any reason without written request and approval by the district. Project form shall be used for all shutdowns and required a 3-day notice. Other shutdowns may require more time.

P. **CONTRACT MC-02 – MECHANICALWORK (MC)** — MECHANICAL PRIME CONTRACT AT, BARR MIDDLE SCHOOL & MILLER ELEMENTARY SCHOOL, FOR (BUT NOT LIMITED TO), MECHANICAL PIPING, DUCTING, DAMPERS, MAU'S,SPLIT UNIT SYSTEMS,HYDRONIC PIPING, ANY WORK RELATED TO ROOFING SHALL BE COORDINATED WITH ROOFING CONTRACT INSTALLATION. ALL INTERIOR WORK SHALL BE COORDINATED WITH GENERAL CONTRACTS. SEE MILESTONE & PHASING SCHEDULED FOR MORE DETAILS.

Q. All HVAC louvers/vents are supplied by MC-02. Coordinate opening with other primes.

R. HVAC control wiring is provided and installed by MC-02. Power wiring by EC.

S. MC-02 is responsible for making their own through wall or through floor piping penetrations and is responsible for associated patching and firestopping as required.

T. Access doors for plumbing is provided by MC-02 and installed by GC.

U. To allow sufficient time for install, MC-02 is to provide GC with any foundation sleeves and a coordinated sketch showing exact height/locations with distance from column line and depth below finished slab. If information is not provided in a timely manor, then MC is responsible for all core drilling to install piping if required.

V. All duct detectors are furnished by EC and installed by MC.

W. All fire and or fire/smoke dampers are installed by MC.

A. Project Site Superintendent: MC shall provide one (1) full time Project Site Superintendent while any work related to this Contract is being performed on site. Superintendent may be a working Foreman as lon g as the daily requirements of this Contract are maintained, as they relate to the Construction Documents and the Project Schedule. Construction Manager reserves the right, in their opinion, to revoke this privilege if these requirements are not maintained. Superintendent shall work closely with the Construction Manager, and the other Prime Contract Superintendents and Foremen, in a manner that best promotes the Project Master Schedules and the objectives of the Project.

1. Superintendent shall be on site while Prime Contractor's own forces, and/or their sub-contractors forces, are on site; also while other Prime Contracts are installing work, or require coordination of work, related to this Contract, and/or as requested by the Construction Manager.
2. Superintendent shall be the same individual throughout the Project.
3. Project Site Superintendent shall be an individual with minimum of five (5) years' experience in this field of work.
4. Refer to Section 013100 "Project Management and Coordination" for further requirements.

B. Project Foreman: MC shall provide at least one (1) full time Project Foreman during each shift of work at each school; Foreman shall be able to make binding decisions, as they relate to the daily activities of their crew, as related to achieving the goals of the Project.

C. Site Communications: MC shall provide Project Superintendent with a mobile phone, all costs and service charges paid for by MC; provide Construction Manager with contact number(s).

D. Project Site Field Office: Provide site office facilities for this Contract's Project Superintendent. Site Office shall be equipped with telephone w/answering machine, fax, and e-mail. Contact information shall be provided to the Construction Manager.

1. The Owner reserves the right to seek reimbursement for temporary facilities not provided by this Prime Contract.

E. Scope of Work: Work of the MC includes but is not limited to, the following:

1. Coordination with other Prime Contracts, Owner and Construction Manager as required to adhere to and maintain approved Project Master Schedules. Prior to first payment, this includes submitting the Contractor's Construction Schedule to the Construction Manager for preparation of the Project Master Schedule.
2. All Mechanical demolition and new construction as indicated in the Contract Documents.
3. Mechanical scope is identified in the Contract Documents which include but is not limited to ALL drawings, specifications, this multiple contract summary, etc. This contract includes furnishing and installing access doors for walls and ceiling as required, which may include fire rated conditions., Prior to the submission of shop drawings for mechanical curbs, survey all existing curbs for accurate measurements. Determination of new curb height shall be made in coordination with Contract Documentation..
4. Prior to removal, survey condition of all existing roof top mechanical equipment scheduled to be removed and reinstalled and submit a report of the condition of each piece of existing equipment. Report shall include photographs and a location plan, and be submitted to the Architect and Construction Manager.
5. Removal, safe storage off roof (or outside of work area, as coordinated with BE Contractor), and reinstallation of all existing mechanical roof top equipment as indicated in the Contract Documents. Demolish existing curbs (following asbestos abatement by others) and provide and install new equipment curbs.
6. Reinstallation mechanical scope includes all miscellaneous piping, ductwork extension, low voltage wiring, equipment, hardware and insulation required for a complete and functional reinstallation of existing rooftop equipment. Coordinate any new roof penetrations, if required, with BE Contractor.
7. Reinstallation mechanical scope includes start-up, testing & balancing and recommissioning services for reinstalled mechanical equipment. Submit testing & balancing and commissioning reports to Architect and Construction Manager.
8. Prime Contract shall understand that renovation work may require work to proceed while existing systems are required to be maintained; all cost associated with this sequence shall be anticipated, and incorporated into the Bid.
    a. MC shall be cognizant of phasing and sequencing conditions, that may require MC to make temporary connections or installations of heating system components, in order to maintain operation of existing/new system configuration(s). It shall be the Prime Contract's responsibility to employ its own means and methods of accomplishing any such temporary conditions, at no additional cost to the owner.

b. All new heating system components must be protected, from potential contamination, by any existing components that are still employed during system operation, should a partial existing/new configuration exist during the required heating period, September 15th – May 31st.

9. Prime Contractor shall read and familiarized themselves with the Lead Sections of the Construction Documents. Lead-based paint has been identified to exist on specific areas/surfaces of the work located within the building(s), and when encountered the Prime Contractor shall follow all applicable regulations while working with this material.
10. Prime Contractor shall read and familiarized themselves with the Asbestos Sections of the Construction Documents. Asbestos Containing Material is scheduled to be abated throughout specific areas of the building(s). Should ACM be encountered (after Abatement is completed), that may interfere with an installation; Prime Contractor shall cease work, and notify Construction Manager immediately.
    a. Penetrations not coordinated with the Prime Contractor responsible for asbestos abatement, prior to abatement of these spaces, shall become the responsibility of the respective Prime Contract requiring the penetration.
    b. Contractor is required to review their work in the field prior to starting and advise if ACM is suspect on the work they intend to alter in anyway. There is no delay claim for lack of inspection of work.
11. Environmental Protection: Provide protection, and conduct construction in ways and by methods that comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
    a. Restrict use of noisemaking tools and equipment to hours that will minimize complaints from persons or firms on or near the Project site.
12. The HVAC drawings are schematic in nature, and the MC will make adequate provisions to accommodate the actual field conditions without additional cost to the Owner.
13. Document on the Record Drawings all ductwork openings and penetrations larger than 2 inches in diameter.
14. Provide all demolition of Mechanical Systems indicated in the Construction Documents, and/or required for Work of this Prime Contract.
    a. Coordinate all demolition with Hazardous Materials documents.
    b. Coordinate with all other Prime Contracts regarding all removals required for the Project.
    c. Demolition of a system shall mean any and all components, removed in their entirety, to the point of origin or source.
15. Provide valves, whether permanent or temporary, to permit shutoff and/or capping of systems to achieve the Work of this Prime Contract.
16. Each Prime Contract shall be responsible for all respective SOG/SOD removals, and related infill thereof (doweled with #4 bar 16”o.c. unless otherwise detailed), that are not indicated on the Architectural Demolition plans.

a. All concrete/masonry demolition shall be completed using wet saw methods.

17. MC Contractor shall provide all Work associated with creating structural openings or penetrations requiring lintels, for their own work (i.e. ductwork and pipe or conduit penetrations). This applies to all openings/penetrations greater than 5-inches through masonry or concrete walls.
    a. MC shall provide lintels and shop drawings for such openings for review by Design Team. MC shall indicate all required openings/penetrations requiring lintels on their Shop Drawings. Mechanical contractor is required to provide openings/penetrations on the coordination drawings that will require structural openings in accordance with the contract documents at no additional cost. Non-structural openings/penetrations, including those for convenience, shall be self-provided by the respective Prime Contractor.
    b. This assignment applies to new and existing construction areas.
    c. Refer to Structural documents for lintel type/size requirements and Architectural drawings for wall types. Walls not specifically identified in the documents are to be assumed as masonry construction.
    d. All openings/penetrations are to be identified on Record Drawings by the Prime Contract requiring the opening.
    e. All scheduled exterior wall louver openings indicated on Architectural and/or Structural documents are to be created by this MC Contractor. MC shall supply and install louver.
    f. Exact physical locations shall be laid-out by MC for coordinated sequencing with other respective Prime Contractors.
18. Provide cut and patch work related to that of this Prime Contract,, related to that of their Prime Contract, and at those areas specifically identified on the Construction Documents, regardless of trade creating the area to be patched.
    a. Each Prime Contract is responsible for all other respective Cutting & Patching required of their installations. Refer to Section 017329 "Cutting and Patching" for further information.
    b. Provide cut and patch for all affected materials at building interiors as required to provide access for relocation of existing or installation of new roof drains and rood drain leaders, to point of connection to existing piping or to building exterior, as indicated in Contract Documents.
19. Provide new HVAC system(s), or modifications of existing system(s) as indicated in the Construction Documents, complete and fully operational.
    a. Furnish all disconnects and motor starters (including related "heaters, fuses, and phase protection relays") for all equipment provided under this contract, for coordinated installation by EC.
    b. Provide Instrumentation and Controls (Energy Management System) complete as indicated on the drawings or specifications:
        1) Electrical Contractor shall provide line voltage power wiring to the control panels as indicated in the Contract Documents.

2) EMS installer shall provide all low voltage wiring of controls, transformers, actuated dampers, motors, etc., as required for a complete operational system.

c. Provide thermal insulation of all HVAC components provided by this Prime Contract.

20. Final connections of utilities are by MC, EC or PC, unless noted or assigned otherwise.
21. Provide sleeves required for piping penetrating walls, slabs and/or decks.
22. Provide through-penetration fire stop systems at all penetrations made by MC. MC Contractor shall maintain listed ratings of indicated assemblies. Provide repair of existing through-penetration fire stopping damaged by work of this Prime Contract.
    a. Sleeves with fire stopping are to be installed in sequence with fire-rated construction. This Prime Contract shall be responsible for installing fire stopping material at intersection of sleeve and constructed materials.
23. Provide coordination with, and notification to, the Construction Manager for all specified testing, training, commissioning, etc., of the Work of this Prime Contract. Refer to Division 00 Section "Project Forms" for applicable documentation documents.
24. Substantial Completion: Clean all mechanical and plumbing installations and provided equipment at the time of Substantial Completion or as directed by Construction Manager.
25. Coordinate all the preceding requirements, accordingly, with all applicable Alternates indicated in Section 012300 "Alternates".

F. Applicable Specification Sections: All specification Sections itemized below are to be provided complete by this Prime Contract, unless noted otherwise. In addition to these specifications, the contractor is required to review all specifications included in the overall contract that may contain related scope or detail for this specific contract.

i) All Division 00 and 01 – Procurement and Contracting Requirements & General Requirements
ii) Division 03 – Concrete Division
iii) Division 09 – Finishes
iv) Division 23 – Heating, Ventilating, and Air Conditioning

A. Applicable Drawings : All drawings itemized below are to be provided complete by this Prime Contract, unless noted otherwise. In addition to these drawings, the contractor is required to review all drawings included in the overall contract that may contain related scope or detail for this specific contract.

1. **All "ME-M", & "MS-M" drawings**

END OF SECTION 01 12 09

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SECTION 01 12 11 –CONTRACT SUMMARY – PC-01

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 includes a summary of each Prime Contract, including responsibilities for coordination and temporary facilities and controls. One set of Construction Documents is issued covering the Work of multiple Prime Contracts. Each Prime Contract is responsible to review all drawings and specifications for specific requirements indicated, and for a general understanding and knowledge of the work of other Prime Contracts. All Prime Contracts are responsible for all Work of their Contract no matter what drawing on which the Work appears. All Prime Contracts are responsible to coordinate their work related to the complete set of drawings and specifications, not limited to each prime contractor scope. **All Bidders should acknowledge that for each contract listed below, each contractor is their own General Contractor and subject to all General Contractor requirements.**

B.

1. **Plumbing Work Contract :** The Plumbing Contractor shall be selected based on the bid procedure as described in the Bid Documents. Contract Bidders are responsible for (a) trade work coordination, (b) the scope contained in drawings listed below and (c) any and all additional scope specifically identified to be performed by the Plumbing Contractor in other Bid Packages in the Contract.

C.

1) Work related to drawings: (In addition to these drawings, the contractor is required to review all specifications included in the overall contract that may contain related scope or detail for this specific contract.)

a) Nanuet High Shool, Barr Middle School, Miller Elementary School
   - HS Science Labs
   - Barr MS STEM labs
   - Miller Toilet Room Renovations

a. Bid Package Contract No. 11 - Plumbing Work: All work related to mechanical construction which includes but is not limited to the following items: (Refer to the Contract Documents for full scope of work.)
   i. Provide access panels, fire rating/firestopping, All plumbing work, except underground services on site plans. Contract includes but not limited to, sprinkler piping and head replacements, all concrete demo and interior pads related to PC Equipment, all demo and discard of, piping, insulation and fittings, domestic water, cold water grounding reconnections, controls for any meters and equipment related to the water main work, feed water, all patching and painting related to the installation of their scope, all city filings and permits for any reason and as required, West Chester County Department of Health, throughout the District Wide Project (DW).
   ii. All work related to drawings; (*In addition to these drawings, the contractor is required to review all specifications included in the overall contract that may contain related scope or detail for this specific contract.)*

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2) Related Sections include, but are not limited to, the following:

2. Division 01 Section "Work Restrictions" for use of the Project site and for requirements for continued Owner occupancy of premises.
3. Division 01 Section "Project Management and Coordination" for general coordination requirements.
4. Division 01 Section "Project Forms" for documents required for Testing and Coordination.
5. Division 01 Section "Temporary Facilities and Controls" for specific requirements for temporary facilities and controls.

1.3 DEFINITIONS

A. Building Site: The Building Site shall be defined in the Construction Documents, as the building footprint, and all related construction within a five-foot (5'0") distance of the building's exterior face, unless noted or assigned otherwise. Coordinate with specific exceptions to the 5'0" limit indicated within each Scope of Work outline.

B. Permanent Enclosure: As determined by the Architect: permanent or temporary roofing is complete, insulated, and weathertight; and all openings are closed with permanent construction or substantial temporary closures. All cost associated with failure to maintain described installations that result in any damage or contamination to the Owner's property, shall be borne by the Prime Contract responsible for the installation.

1.4 MANAGEMENT AND COORDINATION

A. The Owner shall provide a Construction Manager.

1. The Construction Manager shall provide a full time construction site representative recognized as the Construction Manager.

1.5 CONSTRUCTION MANAGER

A. The construction manager shall provide on-site administration of the Contracts for Construction in cooperation with the Architect as set in AIA Document A232 ™ – 2009, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition, as modified.

B. The Construction Manager shall provide administrative, management and related services to coordinate scheduled activities and responsibilities of the Multiple Prime Contractors with each other and with those of the Construction Manager, the Owner and the Architect. The Construction Manager shall coordinate the activities of the Multiple Prime Contractors in accordance with the latest approved Project Schedule and the Contract Documents.

C. Utilizing the construction schedules provided by the Multiple Prime Contractors, the Construction Manager shall update the Project schedule, incorporating the activities of the Owner, Architect, and Multiple Prime Contractors on the Projects, including activity sequences and durations, allocation of labor and materials, processing of Shop Drawings, Product Data and Samples, and delivery and procurement of products, including those that must be ordered will in advance of construction. The Project schedule shall include the Owner's occupancy requirements showing portions of the Project having occupancy priority.

D. Utilizing information from the Multiple Prime Contractors, the Construction Manager shall schedule and coordinate the sequence of construction and assignment of space in

areas where the Multiple Prime Contractors are performing Work, in accordance with the Contract Documents and the latest approved Project Schedule.

1.6 GENERAL REQUIREMENTS OF PRIME CONTRACTS

A. Prime Contracts: The context used in this Section are separate Prime Contracts that represent significant elements of work that is to be performed concurrently and in close coordination with the work of other Prime Contracts for the benefits of the Owner. Each Prime Contract is recognized to be a major part of the Work.

B. Assignment of Work: Should a conflict be indicated, Section 011200 shall take precedence over all scope of work assignments that may be indicated elsewhere within the Construction Documents.

C. Seismic Requirements: Prime Contracts are to be aware that the building(s) is located within a Seismic Zone indicated in the documents and shall provide installations in compliance with all related code requirements.

D. Layout and Installation: Each Prime Contractor shall schedule, layout and install their Work in such manner as not to delay or interfere with, but to compliment the execution of the work of other Prime Contracts, utility companies and Owner's operations.

E. Extent of Contract: The Contract Documents, drawings and specifications each contain more specific descriptions of the Work facilitating which Prime Contract includes specific elements of the Project.

1. Work provided by each Prime Contract shall mean complete and operable systems and assemblies, including products, components, accessories and installations required by the Construction Documents or indicated otherwise.
2. Prime Contractors shall exercise good judgment and perform all work according to related industry standards.
3. The Owner is exempt from payment of Federal, State and local taxes, including sales and compensating use taxes on all materials and supplies incorporated in completing the Work; these taxes are not to be included in the Bid. This exemption does not apply to tools, machinery, equipment or other property leased by, or to, the Contractor or sub-contractor, or to supplies and materials, which even though consumed are not incorporated into the completed work. Prime Contractors, and their sub-contractors, shall be responsible for paying any and all applicable taxes on said tools, machinery, equipment or property, and upon all said unincorporated supplies and materials, whether purchased or leased.
4. Prime Contracts shall understand that time is of the essence, and will adequately staff the Project by employing the appropriate trade's people to perform the Work; these people shall be experienced in their respective trades. A shortage of labor in

the industry shall not be accepted as an excuse for not properly staffing the Project; all efforts shall be made to meet or exceed the schedule, including additional staff and/or labor hours necessary. All cost associated with this item shall be included within the Bid.

5. Local custom and trade union jurisdictional settlements will not control the scope of the Work of each Prime Contract.
   a. When a potential jurisdictional dispute or similar interruption of Work is first identified, or threatened, the affected Prime Contracts shall promptly negotiate a reasonable settlement to avoid or minimize the pending interruption and delays.
   b. Contractor's trade-related issues shall not be grounds for modification or extension of scheduled completion date(s).
6. The Work of all Prime Contracts requires close coordination with other Prime Contracts and construction personnel. Maintain flexibility and cooperation through the Project. "Out of Sequence" and "Delay" claims will only be considered when requirements of Division 01 "Administrative Requirements" have been adhered to. Delay claims must be in writing and forwarded to the Architect, per the requirements of the General Conditions of the Contract. Claims not submitted per these requirements will be rejected and/or denied.
7. The intention of the Work is to follow a logical sequence, however, a Prime Contractor may be required by the Architect or Construction Manager, to temporarily install, omit or leave out a section(s) of Work, out of sequence. All such out of sequence work, and come back time, at these areas shall be performed at no additional cost to the Owner.

F. Substitutions: Per Division 01 Section "Substitution Procedures", each Prime Contractor shall cooperate with the other Prime Contractors involved, to coordinate approved substitutions with remainder of the Work. Contractors shall submit all "Substitutions" at least ten (10) days prior to the date for receipt of Bids as specified in the Instructions to Bidders 002113 Section 3.3 Equivalents or bid will be considered per "basis of design".

G. Construction Schedules: Refer to Divisions 01 Section "Construction Progress Documentation", "Milestone and Phasing Schedule" and "Project Management and Coordination" for requirements related to meetings and schedules.

H. Construction Sequencing and Phasing: Prime Contractor shall understand that Sequencing and/or Phasing Plans are contingent upon the work areas being complete/occupied, prior to the next area of Work beginning. Should an area of construction not be complete per the Milestone and Phasing Schedule, the Project Master Construction Schedule/Sequencing Plans will be adjusted accordingly. The Owner will not be responsible for delay claims due to adjustments being no fault of their own.

1. Prime Contracts may be required to re-sequence the phasing of the project as a result of changes to the schedule. Prime Contracts shall provide these adjustments at no additional cost to the Owner.

I. Prime Contract shall verify existing conditions in the field prior to work commencing in that area and immediately report conditions to the Architect that are not represented correctly by the Construction Documents.

1. Each Prime Contract is responsible for familiarizing himself with Project Site Logistics and provide a "site logistics plan locating storage area, scaffolds, rubbish areas, stock piles and egress related to all work, included phased construction within 30 days of award.
2. Each Prime Contract has been given ample opportunity to review Existing Conditions related to the Project. Existing Conditions not noted in the Construction Documents that could be easily recognized during pre-bid review that interfere with the respective Prime Contract's work, shall be the responsibility of the respective Prime Contract. This includes all costs associated with removal, patching, relocation or re-fabrication of installations.

J. Hazardous Materials: Each Prime Contract shall familiarize themselves with the Hazardous Materials Sections/Drawings of the Construction Documents, and follow DOL/OSHA/EPA/SED regulations while performing their respective Work in these areas. Discovery of non-identified or concealed hazardous materials shall be reported to the Construction Manager immediately and followed up with written documentation of the event.

K. Protection of Installations: Each Prime Contract is responsible for protecting their installations at all times. All costs incurred to repair, replace or clean insufficiently protected materials/installations shall be the responsibility of the installing Prime Contract.

1. Architect shall be notified, in writing, immediately upon material/installation being damaged; notification shall indicate responsible party.
2. Owner will not be liable for damaged materials and/or installations by "others", when "others" cannot be identified.
3. Repair damaged work, clean exposed surfaces or replace construction installations that cannot be repaired.
4. Each Prime Contract shall be responsible for removing all labels not required to remain from their installations.
5. Installations shall be wiped clean and proper protection then installed.
6. Each Prime Contract is responsible to protect another primes work in the event that prime has to work over or on top of that other primes work being complete. The

prime working over the completed work takes full responsibility of that other primes completed work both in condition and operation.

L. Daily Cleaning: All Prime Contracts are responsible for any and all debris caused by their Work, including the Work of their subcontractors. A daily clean up and disposal is required by each Prime Contract for the periods which that Prime Contract, or its sub-contractors, are performing Work on site.

1. Assign at least one person for a daily clean and sweep of the work area(s). Prime Contractor shall allot sufficient manpower and time for this to be completed by the end of each shift. Submit name of this person(s) to Construction Manager.
    a. Construction Manager shall have the authority to give direction to person(s) on the Project Site identified by the Prime Contract as designated for cleanup tasks. This shall included the safety review/securing of the site-work zone after each shift.
    b. This person has check that no construction debris was dumped in any district dumpers during this end of shift site review, if found the contractor must remove immediately the next morning to avoid back charges costs of $1500 per day not removed.
2. Any Prime Contract not providing personnel for Daily Cleaning will be Back Charged for labor provided by the Owner to complete this task.
3. Contractor working solely in an area shall be responsible for clean/sweep of that area.
4. Daily cleaning will not mean any one Prime Contract is responsible for assisting another Prime Contract with removing major quantities of debris created by a particular Prime Contract's Work.
5. Daily cleaning will be mandated to remove from the building any debris created by day-to-day activities. All Prime shall assist in sweeping shared work areas and shared corridors while working on site. Each Prime shall assist in mopping of shared corridors while working on site or as required by the Owner.
6. All prime contractors and subcontractors are required to provide sweeping compound for daily cleaning in their respective exterior and interior work areas. Each Prime Contract shall provide a sufficient number of brooms or other necessary tools, for use by their personnel to adequately fulfill their obligations.
7. All prime contractors shall provide and maintain garbage cans/refuse containers with liners for each construction area of their respective contracts as directed by the Construction Manager and shall be responsible for disposing of these materials to a dumpster.
8. All prime contractors provide the necessary equipment/containers (lull/skip-box) to move daily clean/sweep debris from the building to a dumpster on a daily basis, for each construction area of their respective contracts. Skip-box shall be emptied to a dumpster by 9:00 a.m. the following day.

9. Cleaning shall be deemed a Safety & Health issue, with Prime Contracts being held accountable for fulfilling their contractual obligations.
10. Final Cleaning: At Substantial Completion of each area of construction, each Prime Contract shall wipe/vacuum clean all of their respective installations; All interior contracts performing work inside the buildings shall mop clean all building surrounding areas and finish flooring and remove all marks/blemishes to the finish, for each construction area of their respective contracts. Each area of construction shall be wiped clean of all construction dust and debris prior to turnover to the Owner.

M. Cutting and Patching: All Primes are responsible for cutting and patching required to complete their Work. All repair of existing finish Work (including finish floors) shall be performed by contract requiring work, meeting or exceeding minimum contract requirements for that particular section, specification, or type of work. All concealed openings (piping, ductwork, conduit, etc.) must be repaired to comply with specified wall or deck conditions as well as required fire and sound ratings. All corridor penetrations require fire safing. If contractor elects to install their new work in an existing unrated wall or floor opening, whereas the wall/floor is a fire rated condition, that contractor is responsible to fire rate that opening to match the wall/floor fire rating with new and all other existing wire, piping, ducts etc. Other areas are noted in drawings and specifications.

1.7 Project Schedule. The nature of this project is to complete all the work listed as Phase 3 in the schedule by **the Project Closeout Dates specific to each Prime Contract as listed below**. Each Prime Contractor shall include in their bid proper allowances for foul weather.

A. Bids Received: 1/19/2023

B. Anticipated Notice to Proceed: 2/8/2023

C. Submittals: The following items are to be submitted within 60 business days after Notice to Proceed:
1. Submittal List and Submission Schedule– **15 days after NTP**
2. Field Investigations
3. Shop Drawings
4. Long Lead Items– **30 days after NTP**
5. Schedule of Values and Key Submittal List – **15 days after NTP**

D. Mobilization: 6/26/2023

E. Substantial Completion and Project Closeout: Per 01 11 00 Milestone Schedule

1.7 TEMPORARY FACILITIES AND CONTROLS OF PRIME CONTRACTS

A. Conditions of Use: Keep temporary services or conditions clean and neat in appearance. Operate in a safe and efficient manner. Relocate temporary facilities as required as work progresses; do not overload facilities or permit them to interfere with progress. Take necessary fire prevention measures; do not allow hazardous, dangerous, or unsanitary conditions to develop or persist on the Project site.

1. Installation, operation, maintenance, and removal of each temporary service or condition are considered part of the respective Prime Contract's own construction activity, as are costs and use charges associated with each facility.
2. Locate service or condition where they will serve the Project adequately and with minimum interference of the Work, coordinate with the Construction Manager and the other Prime Contracts prior to installation.

B. Temporary Use of Permanent Facilities: Prime Contract, as installer of each permanent service or condition, shall assume responsibility for its operation, maintenance and protection during use as a construction facility prior to the Owner's acceptance, regardless of previously assigned temporary facilities and controls responsibility.

C. Owner's Facilities: Contractors are not allowed to use the Owner's facilities (toilets, telephones, food service, etc.) for their own benefit or convenience. Prime Contract Superintendents shall enforce this policy with their respective work forces.

1. Construction personnel parking will be restricted to area as directed and agreed to by the Owner, and to facilitate the completion of the work. Owner reserves the right to remove from their property, unauthorized vehicles occupying unauthorized areas, at respective vehicle owner's expense.

D. Storage on the Project Site: Each Prime Contract shall provide sufficient secure weather-tight storage facilities for their materials and equipment. These storage containers are required to be located on the "site logistics plan" The Owner's facilities and the Project's building areas shall <u>not</u> be used for storage unless agreed upon, in writing, with the Owner via the Construction Manager.

1. Until permanently incorporated into the Work, all materials on the Project site are considered to be the Prime Contract's responsibility for security and protection.
2. Prime contractor is required to check on their onsite stored material periodically to ensure that all material continues to be located in the stored location and that it

remains protected from all damage, theft, and endangerment to others and ready to be used on notice for coordination with other contractors. Failure to arrange for materials to be on site to complete coordinated work with other Prime Contractors will result in back charges for delays resulting therefrom.

3. Temporary long-term storage facilities are not available to Prime Contracts by the Owner.
4. Prime Contractors and their subcontractors, shall coordinate deliveries with the Construction Manager to ensure that disruptions and Owner inconvenience are avoided.

E. Tools and Equipment: Each Prime Contractor shall provide all tools and equipment necessary for its own activities; this includes secure lock-up and storage for all items on the Project Site.

1. Provide all construction aids and miscellaneous services and facilities necessary exclusively for its own construction activities; this shall include any additional supplementary power, ventilation, lighting requirements and weather protection.

F. Project Site Communication: Each Prime Contractor shall provide their Project a full time on site at all times Superintendent with a mobile phone for the duration of the Project, as indicated in their Scope of Work. Construction Manager shall be furnished with contact numbers associated with each phone.

G. Safety: Prime Contracts, not the Architect or Construction Manager, are responsible for Project Site Safety, as related to their operations (refer to Section 013150 "Special Procedures" for further requirements).

1. Each Prime Contract shall correct safety hazards and violations immediately. If safety issues are not immediately rectified, the Owner shall secure outside sources to correct the deficiency and back charge the responsible Prime Contract.
2. Maintain unobstructed access/egress to fire extinguishers, fire hydrants, stairways, corridors, ladders and other safety routes/devices.

H. Fire Extinguishers: All Prime Contracts provide and maintain "general use" fire extinguishers for each construction area of their respective contracts; comply with applicable codes for quantities required. Use of the Owner's fire extinguishers to meet this requirement is not permitted. Comply with NFPA for recommended classes for exposure; extinguishers shall be inspected and appropriately tagged prior to being brought on site. Provide stands, painted bright orange, sturdy enough to carry the extinguisher, and built as not to create a tipping hazard.

1. Each Prime Contract shall supplement this requirement by providing additional fire extinguishers specifically related to their work activity (e.g., welding, soldering, abrasive cutting, etc.).
2. Each Prime Contract shall provide and maintain proper fire extinguishers at/in their respective on site office and storage facilities.
3. Store combustible materials in approved containers in fire-safe locations.

I. Welding: Any Prime Contract performing welding, cutting or other activities with open flames or producing sparks shall at a minimum:

1. Coordinate interruption/shutdown of detection system(s) to avoid creating false alarms.
2. Protect the area and surrounding areas from fire and damage.
3. Maintain fire extinguishers, compatible with activity, at the location of the activity.
4. Provide a continuous Fire Watch during the activity and one-half hour beyond the completion of the activity.
5. Provide all necessary fans and ventilation required for the activity.
6. Any welding, burning and or use of flame the contractor is required to provide all required "hot work permit" to use such equipment prior to start of work. Its mandatory that no "hot work" shall start without these permits issued to the CM and Owner. Failure to this requirement will result to the removal of the project super of that company from all district projects.

J. Remove each temporary facility when it can be replaced by the authorized permanent facility no later than Substantial Completion, or as directed by the Architect and/or Construction Manager. Complete or restore permanent facilities that may have been delayed due to interim use of a temporary barrier or condition.

K. Temporary Power: Each Prime Contractor shall provide for their own temporary power needs for any scheduled electrical utility shut downs. Each Prime Contractor shall provide for their own temporary generators, power cords and temporary lighting as needed during these periods to continue to perform their work and maintain adherence to the Milestone Phasing Schedule and approved Project Master Schedules. All temporary power equipment shall comply with all applicable codes and regulations.
    1. In all other schools in this phase 4, known as HBE; GMD; WBW & DWE have local electrical panel replacements, therefore each prime contractor and their sub-contractors are required to provide their own generator power for equipment and lighting to perform their work during these times with no additional cost to the owner.

L. Waste Disposal Facilities:

1. General debris/refuse/construction waste containers (dumpsters) shall be provided by each prime contractor and secured as specified herein this contract.
2. It shall be the responsibility/requirement of each Prime Contract to bring their waste to the dumpsters, including but not limited to all equipment, demolition debris, discarded materials with further identification including the following; construction and demolition debris refers to discarded materials generally considered non-hazardous in nature, including but not limited to steel, glass, brick, concrete, asphalt material, pipe, gypsum wallboard, and lumber, from the construction or destruction of a structure as part of a construction or demolition project or from the renovation of a structure, including such debris from construction of structures at a site remote from the construction or demolition project site.
3. It shall be the responsibility and requirement of each Prime Contract to recycle metals generated by its Work, and the Work of its subcontracts.
4. Joint-effort recycling by all Prime Contracts is encouraged.

M. Temporary Sanitary Facilities: Provide temporary self-contained toilets units for duration of the project.
   a. Temporary Sanitary Facilities:
      1) Each prime contractor is required to provide their own Temporary Sanitary Facilities and secured behind fencing and/or locked after work hours and weekends.
   b. Comply with regulations and health codes for type, number, location, operation, and maintenance of fixtures and facilities.
   c. Provide separate facilities (minimum of one ea.) for male and female personnel in proportion required by OSHA.
   d. Shield toilets to ensure privacy.
   e. Coordinate mobilization and demobilization of units with Construction Manager.
   f. Toilets shall be cleaned at least once per week, with additional facilities or cleanings provided if requested by Construction Manager.
   g. Provide and maintain adequate supply of toilet tissue and hand sanitizer for each facility.

1.8 WORK HOURS & SEQUENCE

A. During the school days, Work is to be performed in this contract during the hours of 3:30pm to 10:00pm on weekdays, and Saturdays and Sundays from 7:00am to 3:30pm. During School breaks, work is to be performed from 7:00am to 10:00pm. There is no additional cost to the owner for working the hours of 3:30pm through 10:00pm, or weekend work during the school year. **Any work done during these times MUST BE**

COMPLETED, CLEANED, AND TESTED AS NECESSARY FOR STUDENT OCCUPANCY BEFORE THE START OF THE NEXT SCHOOL DAY. Contractors are required to schedule work during school breaks, school days off, and school holidays.

B. Summer work starts June 28th through August 23rd for 2023 The Summer working hours are from 7:00am to 9:30pm. There is no additional cost to the owner for working the hours of 3:30pm through 9:30pm or on weekends and holidays during the Summer.

C. Contractors are required to start working on site within 30 days of execution of contract, to the extent permitted by contract. Contractors are required to coordinate and perform work simultaneously with other Contractors. Contractors are required to complete their contract work by the designated Substantial Completion and Final Completion end dates as indicated on the Invitation to Bid.

D. Mandatory clean up periods - From August 24th, 2023 to August 31st , 2023 and August 30th , 2023 to September 6th, 2023, contractors shall clean up all interior and exterior areasContractors are required per contract to fully staff the project during the work shifts stated above with the required manpower to complete their work within the allowed scheduled time frame. Contractors are required to provide a 72-hour advanced request to the Owner via the Construction Manager for any Saturday and Sunday work. If a project schedule delay has been caused by the fault of the contractor, the contractor is required to provide 3rd shift work from 9pm to 6am to make up the project schedule. All costs for CM, Architect and district personal related to this 3rd shift request will be charged to the contractor at a combined rate for all at $3,000 per 8hr shift.

E. The shifts noted above are not considered overtime or premium time hours.

F. Contract summaries will provide start and end dates for each contractor.

G. Additional requirements:

1. Multiple Crews: Each Prime Contract shall provide multiple crews, supervision, cranes, scaffold and other means necessary to perform the Work, and maintain the Project Master Schedules.
2. Interruption of any utility and/or power must be coordinated with the Owner, via the Construction Manager.
3. Any and all overtime, weekend and/or holiday work required to meet the Project Master Schedules shall be incorporated in the respective Prime Contract's bid.
4. Should a Contractor's progress fall behind, as to schedule, Prime Contractor shall employ additional – 3rd shift and/or overtime and/or weekend workforce until situation is rectified, to the satisfaction of the Architect and Construction Manager, at no additional cost to the Owner, however subject to charges as

stated in section 1.10 E for lack of maintaining schedule

5. Should a Prime Contract feel another Prime Contract is delaying them sufficient time to complete their installations, per the schedule, the Architect and Construction Manager shall be notified in writing immediately of the situation (refer to Conditions of the Contract for protocol). A Prime Contract creating such a delay, that causes a proven burden upon another Prime Contract to maintain schedule, shall bear all costs incurred by the delayed Prime Contract to maintain the schedule.
6. The Architect and Construction Manager shall not be overburdened as to overtime cost, to monitor the work, due to no cause of his or her own. Owner will compensate the Architect and Construction Manager for all additional cost related to the issue of a Prime Contractor's failing to execute the Contract by fully staffing per the work hours and days noted herein. The Owner reserves the right to back charge the responsible Prime Contract for these fees if incurred.
7. All Asbestos and/or Lead Abatement shall take place to meet the requirements of the Milestone Phasing Schedule and Project Master Schedules and shall be coordinated with the other Prime Contractors prior to commencement.

H. The Work shall be conducted to provide the least possible interference to the activities of the Owner's personnel and the surrounding property owners (neighbors).

1. Prime Contracts are hereby notified that: All Prime Contractors and their subcontractors shall limit excessive noise during 2nd shift known as work extending to 10PM weekdays upon approval by owner and city work hour restrictions. These operations shall not create a disturbance to neighboring properties.

I. Construction access to the site shall be limited to personnel, equipment and deliveries by suppliers relative to the Work of Prime Contractors and their subcontractors. Prime Contracts shall keep the Construction Manager advised of persons accessing the site and shall seek assistance with coordinating parking and storage facility locations for all Prime Contracts.

1. Where applicable, Contractors shall provide Building Site perimeter barricades as described herein the project and all temporary exit doors/lockable gates on the Project, securing these doors, fencing and/or gates at the end of each work shift.
2. When a Prime Contract engages in overtime, weekend or 2nd shift work, during the summer months and or during the normal school year, the respective Prime Contract shall notify Construction Manager of such and be responsible for securing the Project Site at the end of that work shift and perform site walk around the outside of construction area/work zone ensuring all debris is pickup up and there are no construction related hazards of any kind present once the

responsible person leaves the site for the evening or weekend. This includes that all materials and equipment are fenced in and keys are removed. All interior projects have the same requirement to ensure that outside the work zone is clean from dust-dirt and that no materials are left outside the work area at any time.

1.11 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.

1.9 DRAWINGS AND SPECIFICATIONS

A. Construction Documents indicate the sum total of the Contract that make up the complete work for the Project. Through this Section "Summary of Work", the intent of the Contractor's scope of Work and responsibility is generally described. Related requirements and conditions that are indicated in the Contract Documents include but are not limited to the following:

1. General Conditions and Requirements.
2. Referenced and applicable Codes, Regulations and Standards.
3. Scheduling and phasing requirements.
4. Existing conditions and restrictions on use of the site and facilities.

B. Drawings and Specifications are cooperative and supplementary. Portions of the Work, which can best be illustrated by Drawings, are not included in the Specifications and portions best described by Specifications are not depicted on Drawings.

1. All items necessary to complete the work shall be furnished whether written or illustrated.
2. All primes shall exercise good judgment and perform all work according to related industry standards.

PART 2 - SCOPE OF WORK

2.1 PRIME CONTRACTS

A. Scope of Work: Work includes but is not limited to, the following:
   1. Provide all work identified in the Contract Documents.
   2. All Specification Sections provided.
   3. All abatement drawings provided for reference.

PART 3 - EXECUTION

3.1 WORK SEQUENCE

A. The Work shall be conducted to provide the least possible interference to the activities of the Owner's personnel, per the Project Milestone Phasing Schedule.

B. Work required during overtime, extended shifts or holidays due to failure of contractor to maintain schedule, will be monitored by Architect/Construction Site representative, and may be monitored by Owners' personnel. Additional costs for Architect/Construction Site Representative and/or Owner personnel will be borne by the Contractor.

C. Coordination of any utility and power interruption must be done with approval of the Architect/Construction Site Representative. Shutdowns must occur during non-occupied timeframes only.

D. Construction access to the site shall be limited to those designated for personnel, equipment and deliveries by the Owner. All contractor staging, parking and storage shall be coordinated with the Construction Site Representative and subject to change.

E. Payments: Each bid that covers more than one school (i.e. one SED project) shall provide completed AIA G702 & G703 by building (for each SED project).

F. No work shall be installed without approved shop drawings. Any work in place without approved shop drawings will be rejected and removed by that contractor at their expense and backed charge all other costs related to.

G. Any work deemed by CM, Architect and District not properly installed by a contractor per the contract drawings and specifications shall be removed immediately and corrected, with all associated costs to be borne solely by that contractor.

H. All prime contractors shall coordinate their contract work with other primes to meet the project schedule and for a complete operational system or area or work.

I. All contractors are to provide within 3 weeks of award a "base line" construction schedule for their work from commencement to completion including all phasing. This schedule is to be updated monthly to show percentage progress of each item listed.

This schedule shall be revised to provide a recovery schedule in the event of a delay for any reason. The recovery schedule shall include the "base line" item and the recovery to show how the delay is affecting the overall project schedule. This schedule is to be provided in MS Project or Primavera. Excel schedules are not accepted.

J. Prime contractor "base line" schedules are to be reviewed by each prime contractor and coordinated where work is related and that each prime's work shall be included in each "base line" contractor's schedule as necessary for coordination.

K. All contractors are to provide 2-week look ahead schedules showing work related to the base line and shall be coordinated with other prime 2-week look ahead schedules. These schedules will be Excel format. Format will be provided by the CM.

L. Contractors to provide a full time supervisor on site 100% of the time. This is not a working foreman. Supervisors are not working with tools they are supervising their workers and coordinating with other contractors and district/ CM. Failure to provide will be default of your contract and subject costs related to and termination.

M. All prime contractors are the provide a project manpower structure showing names and telephone numbers of each responsible person on the project. This shall be updated as needed if personal changes are made.

N. All site equipment and dumpsters are to be behind temporary chain link fence when stored on site and or within the construction work zone where temporary chain link fence has been providing and installed by the prime. Each prime contractor is responsible to provide and install temporary chain link fence around their own stored equipment and dumpsters on site.

O. No equipment, panels or any services shall be turned off for any reason without written request and approval by the district. Project form shall be used for all shutdowns and required a 3-day notice. Other shutdowns may require more time.

3.1 **CONTRACT NO. 11 PLUMBING WORK** (PC-01) —PLUMBING PRIME CONTRACT AT NANUET HGH SCHOOL, BARR MIDDLE SCHOOL , MILLER ELEMENTARY SCHOOL

A. Project Site Superintendent: PC shall provide one (1) full time Project Site Superintendent while any work related to this Contract is being performed on site. Superintendent may be a working Foreman as long as the daily requirements of this Contract are maintained, as they relate to the Construction Documents and the Project Schedule. Construction Manager reserves the right, in their opinion, to revoke this privilege if these requirements are not maintained. Superintendent shall work closely with the Construction Manager, and the other Prime Contract Superintendents and Foremen, in a manner that best promotes the Project Master Schedules and the objectives of the Project.

1. Superintendent shall be on site while Prime Contractor's own forces, and/or their sub-contractors forces, are on site; also while other Prime Contracts are installing work, or require coordination of work, related to this Contract, and/or as requested by the Construction Manager.
2. Superintendent shall be the same individual throughout the Project.
3. Project Site Superintendent shall be an individual with minimum of five (5) years' experience in this field of work.
4. Refer to Section 013100 "Project Management and Coordination" for further requirements.

B. Project Foreman: PC shall provide at least one (1) full time Project Foreman during each shift of Work at each school; Foreman shall be able to make binding decisions, as they relate to the daily activities of their crew, as related to achieving the goals of the Project.

C. Site Communications: PC shall provide Project Superintendent with a mobile phone, all costs and service charges paid for by PC; provide Construction Manager with contact number(s).

D. Project Site Field Office: Provide site office facilities for this Contract's Project Superintendent. Site Office shall be equipped with telephone w/answering machine, fax, and e-mail. Contact information shall be provided to the Construction Manager.

1. The Owner reserves the right to seek reimbursement for temporary facilities not provided by this Prime Contract.

E. Scope of Work: In addition to Divisions 22 & 23, Work of the PC includes but is not limited to, the following:

1. Coordination with other Prime Contracts, Owner and Construction Manager as required to adhere to and maintain approved Project Master Schedules. Prior to first payment, this includes submitting the Contractor's Construction Schedule to the Lead Contractors for preparation of the Project Master Schedules for all work related noted in the Contract Documents. All Plumbing demolition and new construction as indicated in the Contract Documents.
2. All Plumbing scope is identified on the drawings as noted on the Contract Documents. Prior to the submission of shop drawings for work related to this contract and as shown on the Contract Documents.
3. All housekeeping pads for mechanical equipment shall be furnish and installed by this prime contract.
4. This contract includes furnishing access doors for walls and ceiling as required, which may include fire rated conditions, and coordinate with Interior Contractor (IC) for installation.

5. Removal, safe storage off roof (or outside of work area, as coordinated with BE), and reinstallation of all existing roof mounted piping as indicated in the Contract Documents. Seal all penetrations upon removal of piping to protect building from weather. New supports for piping will be supplied by PC, coordinate with BE for installation of supports. Provide new roof mounted piping as indicated in the Contract Documents, inclusive of all supports, painting and labeling.
6. All new roof drains as shown on the Construction Documents are to be coordinated with BE Contractor.
7. Temporary connection and disconnection of domestic water as required to facilitate asbestos abatement by others.
8. This contract includes the removal and furnishing and installation of new sprinkler heads as per the Contract Documents.
9. Work delineation between building and site is at five feet (5') outside of the face of building, existing and new, unless noted or assigned otherwise. The new underground water service final connection outside the structure shall be completed by this PC contractor and coordinated with the SW contractor for location and final connection.
10. Prime Contract shall understand that renovation work may require work to proceed while existing systems are required to be maintained; all cost associated with this sequence shall be anticipated, and incorporated into the Bid.
    a. PC shall be cognizant of phasing and sequencing conditions, that may require PC to make temporary connections or installations of plumbing components, in order to maintain operation of existing/new system configuration(s). It shall be the Prime Contract's responsibility to employ its own means and methods of accomplishing any such temporary conditions, at no additional cost to the owner.
11. Prime Contractor shall read and familiarized themselves with the Lead Sections of the Construction Documents. Lead-based paint has been identified to exist on specific areas/surfaces of the work located within the building(s), and when encountered the Prime Contractor shall follow all applicable regulations while working with this material.
12. Prime Contractor shall read and familiarized themselves with the Asbestos Sections of the Construction Documents. Asbestos Containing Material is scheduled to be abated throughout specific areas of the building(s). Should ACM be encountered (after Abatement is completed), that may interfere with an installation; Prime Contractor shall cease work, and notify Construction Manager immediately.
    a. Penetrations not coordinated with the Prime Contractor responsible for asbestos abatement, prior to abatement of these spaces, shall become the responsibility of the respective Prime Contract requiring the penetration.

13. Environmental Protection: Provide protection, and conduct construction in ways and by methods that comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
    a. Restrict use of noisemaking tools and equipment to hours that will minimize complaints from persons or firms on or near the Project site.
14. The Plumbing Drawings are schematic in nature, and the PC will make adequate provisions to accommodate the actual field conditions without additional cost to the Owner.
15. **Plumbing contractor provides and installs flushometers and drills holes. PC supplies the associated transformer to the EC. All wiring of Flushometers is by EC.**
16. **All access doors for plumbing items provided by PC and installed by GC. PC is to review GC drawings and coordinate areas that will require access panels per building code.**
17. **PC is responsible for all cutting, trenching, and patching for new plumbing as required.**
18. **PC is required to/cut raise any floor drains to meet new FFL.**
19. **All wall carriers are to be furnished and installed by PC. Coordinated with GC for FFL to adjust carrier height.**
20. Document on the Record Drawings all openings and penetrations larger than 2 inches in diameter.
21. Provide all demolition of Plumbing Systems indicated in the Construction Documents, and/or required for Work of this Prime Contract.
    a. Coordinate all demolition with Hazardous Materials documents.
    b. Coordinate with all other Prime Contracts regarding all removals required for the Project.
    c. Demolition of a system shall mean any and all components, removed in their entirety, to the point of origin or source.
22. Provide valves, whether permanent, chlorination, or temporary, to permit shutoff and/or capping of systems to achieve the Work of this Prime Contract.
23. Each Prime Contract shall be responsible for all respective SOG/SOD removals, and related infill thereof (doweled with #4 bar 16" o.c. unless otherwise detailed), that are <u>not</u> indicated on the Architectural Demolition plans.
    a. All concrete/masonry demolition shall be completed using wet saw methods.
24. PC shall coordinate housekeeping pads for new equipment with Interior Contractor. PC shall provide all shop drawings and information of new equipment.
25. PC shall provide all Work associated with creating structural openings or penetrations requiring lintels for their own work (i.e. ductwork and pipe penetrations). This applies to all openings/penetrations greater than 5-inches through masonry or concrete walls.

a. MC, EC and PC shall indicate all required openings/penetrations requiring lintels on Coordination Drawings. Failure to note required openings/penetrations on the coordination drawings will require that the respective MC, EC and PC provide their own structural openings in accordance with the contract documents at no additional cost.
b. Non-structural openings/penetrations, including those for convenience, shall be self-provided by the respective MC, EC and PC.
c. This assignment applies to new and existing construction areas.
d. Refer to Structural documents for lintel type/size requirements and Architectural drawings for wall types. Walls not specifically identified in the documents are to be assumed as masonry construction.
e. All openings/penetrations are to be identified on Record Drawings by the Prime Contract requiring the opening.
f. Exact physical locations shall be laid-out by PC for coordinated sequencing with all other prime contracts.

26. Provide cut and patch work related to that of this Prime Contract,, related to that of their Prime Contract, and at those areas specifically identified on the Construction Documents, regardless of trade creating the area to be patched.
    a. Each Prime Contract is responsible for all other respective Cutting & Patching required of their installations. Refer to Section 017329 "Cutting and Patching" for further information.
    b. Provide cut and patch for all affected materials at building interiors as required to provide access for relocation of existing or installation of new roof drains and roof drain leaders, to point of connection to existing piping or to building exterior, as indicated in Contract Documents.
27. Provide new Plumbing system(s), or modifications of existing system(s) as indicated in the Construction Documents, complete and fully operational.
28. Final connections of utilities are by MC, EC or PC unless noted or assigned otherwise.
29. Provide sleeves required for piping penetrating walls, slabs and/or decks.
30. Provide through-penetration fire stop systems at all penetrations made by PC.. This Prime Contract shall maintain listed ratings of indicated assemblies. Provide repair of existing through-penetration fire stopping damaged by work of this Prime Contract.
    a. Sleeves with fire stopping are to be installed in sequence with fire-rated construction. This Prime Contract shall be responsible for installing fire stopping material at intersection of sleeve and constructed materials.
31. Provide coordination with, and notification to, the Construction Manager for all specified testing, training, commissioning, etc., of the Work of this Prime Contract. Refer to Division 00 Section "Project Forms" for applicable documentation documents.

32. Substantial Completion: Clean all mechanical and plumbing installations and provided equipment at the time of Substantial Completion or as directed by Construction Manager.
33. Coordinate all the preceding requirements, accordingly, with all applicable Alternates indicated in Section 012300 "Alternates".

F. Applicable Specification Sections: All specification Sections itemized below are to be provided complete by this Prime Contract, unless noted otherwise. In addition to these specifications, the contractor is required to review all specifications included in the overall contract that may contain related scope or detail for this specific contract.

29. All plumbing work, except underground services on site plans. Contract includes but not limited to, sprinkler piping and head replacements, all concrete demo and interior pads related to PC Equipment, all demo and discard of, piping, insulation and fittings, domestic water, cold water grounding reconnections, controls for any meters and equipment related to the water main work, feed water, all patching and painting related to the installation of their scope, all city filings and permits for any reason and as required, West Chester County Department of Health, throughout the District Wide Project (DW).

1. All Division 00 and 01 – Procurement and Contracting Requirements & General Requirements
2. Division 03 – Concrete Division 07 – Thermal and Moisture Protection
3. Division 22 – Plumbing
4. Division 26 – Electrical, as related to installations of this Prime Contract specifically identified herein

G. Applicable Drawings : All drawings itemized below are to be provided complete by this Prime Contract, unless noted otherwise. In addition to these drawings, the contractor is required to review all drawings included in the overall contract that may contain related scope or detail for this specific contract.

H. **All "HS-P, "ME-P", & "MS-P" drawings**

I. Supplemental Temporary Facilities and Controls by PC include, but are not limited to:

1. Waste Disposal Facilities: Provided by each contractor.

2. Temporary Interior Barricades: Provide, maintain and eventually remove all temporary barricades per OSHA Regulations, Industry Standards, or as indicated in the Construction Documents. These include, but are not limited to, the following areas:
   a. To isolate new construction areas.
   b. To isolate renovation areas.
   c. Floor openings/penetrations, including stairwells.
      1) Horizontal Openings: close openings in floors and horizontal surfaces with load bearing, wood and/or steel framed construction per applicable regulations.
3. Temporary Doors, Frames & Wall Assemblies: Provide, maintain and eventually remove all temporary installations per OSHA Regulations, Industry Standards, or as indicated in the Construction Documents. Provide fire rated assemblies as required. Provide exit (panic bar/crash bar) devices at locations of egress. Coordinate locations with Construction Exiting Plan, Sequencing/Phasing Plans, and the Construction Manager. Temporary doors shall be constructed using ½" plywood and 2x construction, equipped with hasps, locks, handle and latch mechanism, and spring or counter weight installed to allow door to close after opening. Permanent doors will not be used in temporary conditions.
4. Temporary Sanitary Facilities: Provided by each contractor.
5. Existing Stair Usage: Use of Owner's existing stairs in unoccupied areas will be permitted, provided that at Substantial Completion, stairs are restored to conditions existing before initial use.
   a. Provide photo documentation of existing stair conditions prior to use by all Prime Contracts. Document during use, and at completion of the Renovation Project in order to document any and all damage to the Owner's property.
   b. 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.
6. Indoor air quality management at all areas of Construction, once building is enclosed.
   a. Provide all necessary dust partitions, fans, temporary ducts, and barricades to properly contain and ventilate all work area fumes and odors, created by demolition and new construction or alterations, directly to the outside. Ventilate to an area outside the building, sufficiently away from the building, as not to contaminate other areas. There will be no additional claims honored if the Construction Manager requests additional ventilation or requirements.

b. Provide and exhaust air system for the project indoor areas that could produce fumes, VOC's, off gasses, dusts, mists, or other emissions.

c. System Operation:

1) A sufficient quantity of exhaust fans in existing window openings or other approved locations shall be operated.

2) Exhaust air system shall operate for a minimum of 72 hours after work is completed or until all materials have cured sufficiently so as to stop out – gassing of fumes or odors and area has been ventilated to remove all detectable traces of odors and fumes.

3) Maintain 25 feet clearance from all temporary exhaust outlets to all active building outdoor air intakes.

4) Refer to Division 01 Section "Work Restrictions" for further information.

7. Provide all shoring required for Work of this Prime Contract, including but not limited to;

a. Cutting or altering of existing construction.

b. Provide protection of all new and existing surfaces during the Work. Do not stand, walk, or work off of any unprotected finished surface above the floor.

8. Maintain temporary fencing and barricading to keep unauthorized persons away from dangerous and hazardous areas for which this Prime Contract is responsible.

9. Traffic Controls: Provide flagman while any operation of this Prime Contract interferes with traffic flow on adjacent roadways.

END OF SECTION 01 12 11

SECTION 01 21 00 – ALLOWANCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes administrative and procedural requirements governing allowances.
   1. Selected materials and equipment are specified in the Contract Documents by allowances. In some cases, these allowances include installation. Allowances have been established in lieu of additional requirements and to defer selection of actual materials and equipment to a later date when additional information is available for evaluation. If necessary, additional requirements will be issued by Change Order.

B. Types of allowances include the following:
   1. Lump-sum allowances.
   2. Contingency allowances.

C. Related Sections: The following Sections contain requirements that relate to this Section:
   1. Division 1 Section "Modification Procedures" specifies procedures for submitting and handling Change Orders.
   2. Division 1 Section "Quality Control Services" specifies procedures governing the use of allowances for inspection and testing.

1.3 SELECTION AND PURCHASE

A. At the earliest practical date after award of the Contract, advise the Architect of the date when the final selection and purchase of each product or system described by an allowance must be completed to avoid delaying the Work.

B. At the Architect's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.

C. Purchase products and systems selected by the Architect from the designated supplier

1.4 SUBMITTALS

A. Submit proposals for purchase of products or systems included in allowances, in the form specified for Change Orders.

B. Submit invoices or delivery slips to show the actual quantities of materials delivered to the site for use in fulfillment of each allowance.

1.5 CONTINGENCY ALLOWANCES

A. Use the contingency allowance only as directed for the Owner's purposes and only by Change Orders that indicate amounts to be charged to the allowance.

B. The Contractor's overhead and profit, including costs for bonds and insurance, delivery, equipment rental and similar costs, for these allowances shall be included in the values of the general requirements of contract sum and are not chargeable under allowance disbursement.

C. At Project closeout, credit unused amounts remaining in the contingency allowance to the Owner by Change Order.

1.6 UNUSED MATERIALS

A. Return unused materials to the manufacturer or supplier for credit to the Owner, after installation has been completed and accepted.
   1. When requested by the Architect, prepare unused material for storage by Owner where it is not economically practical to return the material for credit. When directed by the Architect, deliver unused material to the Owner's storage space. Otherwise, disposal of unused material is the Contractor's responsibility.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine products covered by an allowance promptly upon delivery for damage or defects.

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.

3.3 SCHEDULE OF ALLOWANCES

A. Include a contingency allowance for each Base Bid according to the following schedule:

   1. Contract BE-01 – General Contract Work: Provide a Contingency Allowance of $40,000 for use according to Owner’s instructions.
   2. Contract SW-01 – General Contract Work: Provide a Contingency Allowance of $50,000 for use according to Owner’s instructions.
   3. Contract GC-01 – General Contract Work: Provide a Contingency Allowance of $75,000 for use according to Owner’s instructions.
   4. Contract GC-02 – General Contract Work: Provide a Contingency Allowance of $40,000 for use according to Owner’s instructions.
   5. Contract GC-03 – General Contract Work: Provide a Contingency Allowance of $25,000 for use according to Owner’s instructions.
   6. Contract EC-01 – General Contract Work: Provide a Contingency Allowance of $64,000 for use according to Owner’s instructions.
   7. for use according to Owner’s instructions.
   8. Contract MC-01 – General Contract Work: Provide a Contingency Allowance of $94,000 for use according to Owner’s instructions.
   9. Contract MC-02 – General Contract Work: Provide a Contingency Allowance of $24,000 for use according to Owner’s instructions.
   10. Contract PC-01 – General Contract Work: Provide a Contingency Allowance of $58,000 for use according to Owner’s instructions.

END OF SECTION 012100

SECTION 01 22 00 - UNIT PRICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for unit prices.

B. Related Requirements:

1. Section 01 26 00 "Contract Modification Procedures" for procedures for submitting and handling Change Orders.
2. Section 01 45 00 "Quality Requirements" for general testing and inspecting requirements.

1.3 DEFINITIONS

A. Unit price is an amount incorporated in the Agreement, applicable during the duration of the Work as a price per unit of measurement for materials, equipment, or services, or a portion of the Work, added to or deducted from the Contract Sum by appropriate modification, if the scope of Work or estimated quantities of Work required by the Contract Documents are increased or decreased.

1.4 PROCEDURES

A. Unit prices include all necessary material, plus cost for delivery, installation, insurance, overhead, and profit.

B. Measurement and Payment: See individual Specification Sections for work that requires establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections.

C. Owner reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent surveyor acceptable to Contractor.

D. List of Unit Prices: A schedule of unit prices is included in Part 3. Specification Sections referenced in the schedule contain requirements for materials described under each unit price.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF UNIT PRICES

General Contractor – GC-01, GC-02, & GC-03

A. Unit Price GC #1: Abatement of VAT
   1. Description: Abatement of ACM floor Tile & Mastic (VAT) to be used as an add or deduct from base bid quantities.
   2. Unit of Measurement: Per Linear Foot (SF) of flooring

B. Unit Price GC #2: Abatement of ACM pipe insulation
   1. Description: Abatement of ACM pipe insulation (including elbows) to be used as an add or deduct from base bid quantities.
   2. Unit of Measurement: Per Linear Foot (LF) of insulation

Building Envelope Contractor – BE

C. Unit Price BE #1: Masonry Repointing
   1. Description: All labor and material to repoint existing masonry as indicated in the contract documents.
   2. Unit of Measurement: Per Square foot (SF)

D. Unit Price BE #2: Masonry Cleaning
   1. Description: All labor and material to clean existing masonry. Removal of grime and efflorescence.
   2. Unit of Measurement: Per Square foot (SF)

E. Unit Price BE #3: New Brick Furnish and Install
   1. Description: All labor and material to remove old brick and provide and install new brick as indicated in the contract documents.
   2. Unit of Measurement: Per Square foot (SF)

F. Unit Price BE #4: Scrape and Paint Steel Lintels
   1. Description: All labor and material to repoint existing masonry as indicated in the contract documents.
   2. Unit of Measurement: Per Square foot (SF)

G. Unit Price BE #5: Window Caulking with backer rod
   1. Description: All labor and material to repoint existing masonry as indicated in the contract documents.
   2. Unit of Measurement: Per Linear foot (LF)

Site Work Contractor – SW

H. Unit Price SW #1: Unsuitable Soil Removal
   1. Description: All labor and material to excavate, haul, and dispose of any identified unsuitable soil off site to be used as an add to base bid quantities. NOTE: Unsuitable soil is not anticipated.
   2. Unit of Measurement: Per Cubic Yard (CY) of unsuitable soil.

I. Unit Price SW #2: Trench Rock Removal
   1. Description: All labor and material to excavate, haul, and dispose of any identified trench rock off site to be used as an add to base bid quantities. NOTE: Test pits do not indicate the presence of rock.
   2. Unit of Measurement: Per Cubic Yard (CY) of trench rock.

J. Unit Price SW #3: Concrete Sidewalks
   1. Description: All labor and material to excavate, form, and pour concrete sidewalk per the contract documents, add to base bid quantities.
   2. Unit of Measurement: Per Square Foot (SF) of sidewalk.

K. Unit Price SW #4: Concrete Curb
   1. Description: All labor and material to excavate, form, and pour concrete curb per the contract documents, add to base bid quantities.
   2. Unit of Measurement: Per Linear Foot (LF) of Curb

Electrical Contractor – EC-01

L. Unit Price EC #1: Abatement of ACM wire insulation
   1. Description: Abatement of ACM wire insulation (including elbows) to be used as an add or deduct from base bid quantities. As identified by the electrical contractor.
   2. Unit of Measurement: Per Linear Foot (LF) of insulation

Mechanical Contractor – MC

A. NONE NOTED

END OF SECTION 01 22 00

Plumbing Contractor – PC

B. NONE NOTED

End of Section 01 22 00

SECTION 01 23 00 - 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. This Section includes administrative and procedural requirements for alternates.

1.3 DEFINITIONS

A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the Bidding Requirements that may be added to or deducted from the Base Bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.

1. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

1.4 PROCEDURES

A. Coordination: Modify or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.

1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.

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

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

D. Schedule: A Schedule of Alternates is included at the end of this Section identifying each Alternate by number and describes basic changes to be incorporated into the Work only when that Alternate is made part of the Work by specific provision in the Owner/Contractor Agreement. 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

3.1 SCHEDULE OF ALTERNATES:

A. CONTRACT#1 GC-1-GENERAL CONSTRUCTION WORK:
1. Add Alternate HS GC-1: Furnish and Install new flooring and room painting as called out on Architectural drawings HS-A105, HS-A111, HS-A114 and HS- A803.

END OF SECTION 012300

SECTION 012500 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for handling requests for substitutions made after award of the Contract.
   1. Single General Contracts: Provisions of this Section apply to the construction activities of General Contractor.

B. Related Sections: The following Sections contain requirements that relate to this Section:
   1. Division 1 Section "Submittals" specifies requirements for submitting the Contractor's Construction Schedule and the Submittal Schedule.
   2. Division 1 Section "Materials and Equipment" specifies requirements governing the Contractor's selection of products and product options.

1.3 DEFINITIONS

A. Definitions in this Article do not change or modify the meaning of other terms used in the Contract Documents.

B. Substitutions: Changes in products, materials, equipment, and methods of construction required by the Contract Documents proposed by the Contractor after award of the Contract are considered to be requests for substitutions. The following are not considered to be requests for substitutions:
   1. Substitutions requested during the bidding period, and accepted by Addendum prior to award of the Contract, are included in the Contract Documents and are not subject to requirements specified in this Section for substitutions.
   2. Revisions to the Contract Documents requested by the Owner or Architect.
   3. Specified options of products and construction methods included in the Contract Documents.
   4. The Contractor's determination of and compliance with governing regulations and orders issued by governing authorities.

1.4 SUBMITTALS

A. Substitution Request Submittal: The Architect will consider requests for substitution if received within 15 days after commencement of the Work. Requests received more than 15 days after commencement of the Work may be considered or rejected at the discretion of the Architect.
   1. Submit 3 copies of each request for substitution for consideration. Submit requests in the form and according to procedures required for change-order proposals. See 00 43 25 for the Substitution Request From.
   2. Identify the product or the fabrication or installation method to be replaced in each request. Include related Specification Section and Drawing numbers.
   3. Provide complete documentation showing compliance with the requirements for substitutions, and the following information, as appropriate:

a. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by the Owner and separate contractors, that will be necessary to accommodate the proposed substitution.
b. A detailed comparison of significant qualities of the proposed substitution with those of the Work specified. Significant qualities may include elements, such as performance, weight, size, durability, and visual effect.
c. Product Data, including Drawings and descriptions of products and fabrication and installation procedures.
d. Samples, where applicable or requested.
e. A statement indicating the substitution's effect on the Contractor's Construction Schedule compared to the schedule without approval of the substitution. Indicate the effect of the proposed substitution on overall Contract Time.
f. Cost information, including a proposal of the net change, if any in the Contract Sum.
g. The Contractor's certification that the proposed substitution conforms to requirements in the Contract Documents in every respect and is appropriate for the applications indicated.
h. The Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of the failure of the substitution to perform adequately.

4. Architect's Action: If necessary, the Architect will request additional information or documentation for evaluation within one week of receipt of a request for substitution. The Architect will notify the Contractor of acceptance or rejection of the substitution within 2 weeks of receipt of the request, or one week of receipt of additional information or documentation, whichever is later. Acceptance will be in the form of a change order.
   a. Use the product specified if the Architect cannot make a decision on the use of a proposed substitute within the time allocated.

PART 2 - PRODUCTS

2.1 SUBSTITUTIONS

A. Conditions: The Architect will receive and consider the Contractor's request for substitution when one or more of the following conditions are satisfied, as determined by the Architect. If the following conditions are not satisfied, the Architect will return the requests without action except to record noncompliance with these requirements.

1. Extensive revisions to the Contract Documents are not required.
2. Proposed changes are in keeping with the general intent of the Contract Documents.
3. The request is timely, fully documented, and properly submitted.
4. The specified product or method of construction cannot be provided within the Contract Time. The Architect will not consider the request if the product or method cannot be provided as a result of failure to pursue the Work promptly or coordinate activities properly.
5. The request is directly related to an "or-equal" clause or similar language in the Contract Documents.
6. The requested substitution offers the Owner a substantial advantage, in cost, time, energy conservation, or other considerations, after deducting additional responsibilities the Owner must assume. The Owner's additional responsibilities may include compensation to the Architect for redesign and evaluation services, increased cost of other construction by the Owner, and similar considerations.

7. The specified product or method of construction cannot receive necessary approval by a governing authority, and the requested substitution can be approved.
8. The specified product or method of construction cannot be provided in a manner that is compatible with other materials and where the Contractor certifies that the substitution will overcome the incompatibility.
9. The specified product or method of construction cannot be coordinated with other materials and where the Contractor certifies that the proposed substitution can be coordinated.
10. The specified product or method of construction cannot provide a warranty required by the Contract Documents and where the Contractor certifies that the proposed substitution provides the required warranty.
11. Where a proposed substitution involves more than one general contractor, each contractor shall cooperate with the other contractors involved to coordinate the Work, provide uniformity and consistency, and assure compatibility of products.

B. The Contractor's submittal and the Architect's acceptance of Shop Drawings, Product Data, or Samples for construction activities not complying with the Contract Documents do not constitute an acceptable or valid request for substitution, nor do they constitute approval.

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 012500

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SECTION 012600 – CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

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

1. Multiple Prime Contracts: Provisions of this Section apply to the work of each prime contractor.

B. Related Sections: The following Sections contain requirements that relate to this Section:

1. Division 1 Section "Submittals" for requirements for the Contractor's Construction Schedule.
2. Division 1 Section "Applications for Payment" for administrative procedures governing Applications for Payment.
3. Division 1 Section "Substitutions" for administrative procedures for handling requests for substitutions made after award of the Contract.

1.3 MINOR CHANGES IN THE WORK

A. The Architect will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or Contract Time, on AIA Form G710, Architect's Supplemental Instructions.

1.4 SUBMITTALS

A. Every change or allowance proposal (regardless of whom initiated) will be accompanied by the following information:

1. Labor Rate worksheet (attached at the end of this section) must be filled out for each trade and notarized with the required supporting documentation.

2. Full itemized breakdown: All proposals to be broken down by material, labor, man hours, quantities, unit prices, overhead, profit, subcontractor, and supplier quotes attached.

3. If the contractor fails to submit this required information timely, it will be cause for delay and will be addressed as such under the applicable sections of the contract.

1.5 CHANGE ORDER PROPOSAL REQUESTS

A. Owner-Initiated Proposal Requests: The Architect will issue a detailed description of proposed changes in the Work that will require adjustment to the Contract Sum or Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.

1. Proposal requests issued by the Architect are for information only. Do not consider them as an instruction either to stop work in progress or to execute the proposed change.

2. Within 10 days of receipt of a proposal request, submit an estimate of cost necessary to execute the change to the Architect for the Owner's review.

a. Include an itemized list of quantities of products required and unit costs, with the total amount of purchases to be made. Furnish survey data and backup paperwork to substantiate quantities. Separate labor hours by trade and indicate labor rate.
b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.

c. Include a statement indicating the effect the proposed change in the Work will have on the Contract Time.

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

1. Include a statement outlining the reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and Contract Time.
2. Include an itemized list of quantities of products required and unit costs, with the total amount of purchases to be made. Furnish survey data to substantiate quantities.
3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
4. Comply with requirements in Section "Product Substitutions" if the proposed change requires substitution of one product or system for a product or system specified.

C. Proposal Request Form: Use AIA Document G731 for Change Order Proposal Requests.

1.6 ALLOWANCES

A. Allowance Adjustment: For allowance-cost adjustment, base each Change Order Proposal on the difference between the actual purchase amount and the allowance, multiplied by the final measurement of work-in-place. Where applicable, include reasonable allowances for cutting losses, tolerances, mixing wastes, normal product imperfections, and similar margins.

1. Include installation costs in the purchase amount only where indicated as part of the allowance.

2. When requested, prepare explanations and documentation to substantiate the margins claimed.
3. Submit substantiation of a change in scope of work claimed in the Change Orders related to unit-cost allowances.
4. The Owner reserves the right to establish the actual quantity of work-in-place by independent quantity survey, measure, or count.
5. Contractor's overhead and profit, including costs for bonds & insurances, for these allowances shall be included in the values of the general requirements of contract sum and are not chargeable under allowance disbursement.

B. Submit claims for increased costs because of a change in scope or nature of the allowance described in the Contract Documents, whether for the purchase order amount or the Contractor's handling, labor, installation, overhead, and profit. Submit claims within 15 days of receipt of the Change Order or Construction Change Directive authorizing work to proceed. The Owner will reject claims submitted later than 15 days.

1. Do not include the Contractor's or subcontractor's indirect expense in the Change Order cost amount unless it is clearly shown that the nature or extent of work has changed from what could have been foreseen from information in Contract Documents.
2. No change to the Contractor's indirect expense is permitted for selection of higher or lower-priced materials or systems of the same scope and nature as originally indicated.

1.7 CONSTRUCTION CHANGE DIRECTIVE

A. Construction Change Directive: When the Owner and the Contractor disagree on the terms of a Proposal Request, the Architect may issue a Construction Change Directive on AIA Form G733. The Construction Change Directive instructs the Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.

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

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

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

1.8 CHANGE ORDER PROCEDURES

A. Upon the Owner's approval of a Proposal Request, the Architect will issue a Change Order for signatures of the Owner and the Contractor on AIA Form G731.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 012600

SECTION 012900 – PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section specifies administrative and procedural requirements governing each prime contractor's Applications for Payment.

1. Coordinate the Schedule of Values and Applications for Payment with the Contractor's Construction Schedule, Submittal Schedule, and List of Subcontracts.

B. Related Sections: The following Sections contain requirements that relate to this Section.

1. Schedules: The Contractor's Construction Schedule and Submittal Schedule are specified in Division 1 Section "Submittals."

1.3 SCHEDULE OF VALUES

A. Coordination: Each prime Contractor shall coordinate preparation of its Schedule of Values for its part of the Work with preparation of the Contractors' Construction Schedule.

1. Correlate line items in the Schedule of Values with other required administrative schedules and forms, including:

a. Contractor's Construction Schedule.
b. Application for Payment forms, including Continuation Sheets.
c. List of subcontractors.
d. Schedule of allowances.
e. Schedule of alternates.
f. Schedule of submittals.

2. Submit the Schedule of Values to the Construction Manager within 10 days of receipt of Letter of Intent but no later than 7 days before the date scheduled for submittal of the initial Applications for Payment.

B. Format and Content: Use the Project Manual table of contents as a guide to establish the format 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 the Architect.
c. Name of the Construction manager
d. Project number.
e. Contractor's name and address and contract number.
f. Date of submittal.

2. Arrange the Schedule of Values in tabular form with separate columns to indicate the following for each item listed:

a. Related Specification Section or Division.
b. Description of Work.
c. Name of subcontractor.
d. Name of manufacturer or fabricator.
e. Name of supplier.
f. Change Orders (numbers) that affect value.
g. Dollar value.
    1) Percentage of Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.

3. Provide a breakdown of the Contract Sum in sufficient detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Break principal subcontract amounts down into several line items. All items to have separate material and labor lines. Front end items will be broken out separately and have categories for bonds, insurance, submittals, field supervision, project management, cleanup, final cleanup (allowance – last page / entry). Balance of items separated by spec section and / or work activity (as directed by ARCHITECT).
4. Round amounts to nearest whole dollar; the total shall equal the Contract Sum.
5. Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include materials or equipment, purchased or fabricated and stored, but not yet installed.

6. General Conditions shall be broken out in the contractor's SOV in the following format:
    a. Project Administration – 2%
    b. Supervision – 2%
    c. Meetings – 1%
    d. Submittals – 2%
    e. Cleanup – 1%
    f. Punchlist – 2%
    g. Closeout – 2%

7. Bonds and Insurance shall be a separate line items.

8. Differentiate between items stored on-site and items stored off-site. Include requirements for insurance and bonded warehousing, if required.

9. Provide separate line items on the Schedule of Values for initial cost of the materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
10. Unit-Cost Allowances: Show the line-item value of unit-cost allowances, as a product of the unit cost, multiplied by the measured quantity. Estimate quantities from the best indication in the Contract Documents.
11. Margins of Cost: Show line items for indirect costs and margins on actual costs only when such items are listed individually in Applications for Payment. Each item in the Schedule of

Values and Applications for Payment shall be complete. Include the total cost and proportionate share of general overhead and profit margin 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 the Contractor's option.

12. Schedule Updating: Update and resubmit the Schedule of Values prior to the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.4 APPLICATIONS FOR PAYMENT

A. Each Application for Payment shall be consistent with previous applications and payments as certified by the Architect and paid for by the Owner.

1. The initial Application for Payment, the Application for Payment at time of Substantial Completion, and the final Application for Payment involve additional requirements.

B. Payment-Application Times: Each progress-payment date is indicated in the Agreement. The period of construction Work covered by each Application for Payment is the period indicated in the Agreement.

C. Payment-Application Times: The date for each progress payment is as designated by the Owner – typically the last Friday of the month). The period covered by each Application for Payment is the previous month. Contractors will submit their pencil copy of the 25th of the month. Late applications will not be processed until the next months billing period.

D. Payment-Application Forms: Use AIA Document G732/CMa and Continuation Sheets G703 as the form for Applications for Payment.

1. Separate Continuation Sheets shall be provided for work which takes place on each building, which will detail that portion of the contract which is attributable to the specific building. The appropriate S.E.D. project number shall be shown on the top of each continuation form.

E. Application Preparation: Complete every entry on the form. Include notarization and execution by a person authorized to sign legal documents on behalf of the Contractor. The Architect will return incomplete applications without action.

1. Entries shall match data on the Schedule of Values and the Contractor's Construction Schedule. Use updated schedules if revisions were made.
2. Include amounts of Change Orders and Construction Change Directives issued prior to the last day of the construction period covered by the application.
3. Provide copies of payrolls which are signed and notarized documenting compliance with prevailing wage laws. Payroll for Prime Contractors is required from the 25th of the previous month to the 24th of the current month. Payroll for Subcontractors is required from the 16th of the previous month to the 15th of the current month.
4. Provide copies of lien waivers for the previous payment. Include certificate of monthly payment for subcontractors for the previous month.
5. CONTRACTOR MUST SUBMIT AIA G706 & G706A with each payment application or the application will not be processed.

6. Provide tool box talks for pay period.
7. Provide OSHA Cards
8. Provide receipts and photos for any stored material being billed.

F. Transmittal: Submit 1 digital signed and notarized original copy of each Application for Payment to the Construction Manager by a method ensuring receipt within 24 hours. Each copy shall be complete, including waivers of lien, affidavit of debts and claims, certified payroll, OSHA 10 cards, tool box talks, and similar attachments, when required. Application for payments without the required backup will not be signed by the Architect, CM, or owner and thus will not be processed.

G. Waivers of Mechanics Lien: With each Application for Payment, submit waivers of mechanics liens (G706A) from subcontractors, sub-subcontractors and suppliers for the construction period covered by the previous application.

1. Submit partial waivers on each item for the amount requested, prior to deduction for retainage, on each item.
2. When an application shows completion of an item, submit final or full waivers.
3. The Owner reserves the right to designate which entities involved in the Work must submit waivers.

    a. Submit final Applications for Payment with or preceded by final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.

4. Waiver Forms: Submit waivers of lien on forms, and executed in a manner, acceptable to the Owner.

H. Initial Application for Payment: Administrative actions and submittals, that must precede or coincide with submittal of the first Application for Payment include the following. The initial payment application will not be processed until all of these actions and submittals have been received by the Architect. When preliminary submissions are received with the initial application (items 4 and 7), the final submission for these items must be received and approved by the Architect prior to submission of the second application for payment.

1. List of subcontractors.
2. List of principal suppliers and fabricators.
3. Schedule of Values.
4. Contractor's Construction Schedule (preliminary if not final).
5. Schedule of principal products.
6. Schedule of unit prices.
7. Submittal Schedule (preliminary if not final).
8. List of Contractor's staff assignments.
9. List of Contractor's principal consultants.
10. Copies of building permits.
11. Copies of authorizations and licenses from governing authorities for performance of the Work.
12. Initial progress report.
13. Report of preconstruction meeting.
14. Certificates of insurance and insurance policies.
15. Performance and payment bonds.
16. Data needed to acquire the Owner's insurance.
17. Initial settlement survey and damage report, if required.

I. Application for Payment at Substantial Completion: Following issuance of the Certificate of Substantial Completion, submit an Application for Payment.

1. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
2. Administrative actions and submittals that shall precede or coincide with this application include:

a. Occupancy permits and similar approvals.
b. Warranties (guarantees) and maintenance agreements.
c. Test/adjust/balance records.
d. Maintenance instructions.
e. Meter readings.
f. Startup performance reports.
g. Changeover information related to Owner's occupancy, use, operation, and maintenance.
h. Final cleaning.
i. Application for reduction of retainage and consent of surety.
j. Advice on shifting insurance coverages.
k. Final progress photographs.
l. List of incomplete Work, recognized as exceptions to Architect's Certificate of Substantial Completion.

J. Final Payment Application: Administrative actions and submittals that must precede or coincide with submittal of the final Application for Payment include the following:

1. Completion of Project closeout requirements.
2. Completion of items specified for completion after Substantial Completion.
3. Ensure that unsettled claims will be settled.
4. Ensure that incomplete Work is not accepted and will be completed without undue delay.
5. Transmittal of required Project construction records to the Owner.
6. Certified property survey.
7. Proof that taxes, fees, and similar obligations were paid.
8. Removal of temporary facilities and services.
9. Removal of surplus materials, rubbish, and similar elements.
10. Change of door locks to Owner's access.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

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 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and supervisory requirements necessary for coordinating construction operations including, but not necessarily limited to, the following:

1. General project coordination procedures.
2. Conservation.
3. Coordination Drawings.
4. Administrative and supervisory personnel.
5. Cleaning and protection.

B. Related Sections: The following Sections contain requirements that relate to this Section:

1. Division 1 Section "Project Meetings" for progress meetings, coordination meetings, and pre-installation conferences.
2. Division 1 Section "Submittals" for preparing and submitting the Contractor's Construction Schedule.
3. Division 1 Section "Materials and Equipment" for coordinating general installation.
4. Division 1 Section "Contract Closeout" for coordinating contract closeout.

1.3 COORDINATION

A. Coordinate construction operations included in various Sections of these Specifications to assure efficient and orderly installation of each part of the Work. Coordinate construction operations included under different Sections that depend on each other for proper installation, connection, and operation.

1. Schedule construction operations in the 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 assure maximum accessibility for required maintenance, service, and repair.
3. Make provisions to accommodate items scheduled for later installation.
4. Each Prime Contractor is required to coordinate with the General Contract #1, and be on site as walls are being built to lay out all penetrations to walls under construction and install their roughing as the walls are progressing.

B. Where necessary, prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and attendance at meetings.

1. Prepare similar memoranda for the Owner and separate contractors where coordination of their work is required.

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

1. Preparation of schedules.
2. Installation and removal of temporary facilities.
3. Processing of submittals and photocopying/delivery to affected contractors.
4. Progress meetings.
5. Project closeout activities.

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

1. Salvage materials and equipment involved in performance of, but not actually incorporated in, the Work.

1.4 SUBMITTALS

A. Coordination Drawings: Prepare coordination drawings where careful coordination is needed for installation of products and materials fabricated by separate entities. Prepare coordination drawings where limited space availability necessitates maximum utilization of space for efficient installation of different components.

1. Show the relationship of components shown on separate Shop Drawings.
2. Indicate required installation sequences.
3. Comply with requirements contained in Section "Submittals."
4. A coordination meeting with all Prime Contractors to review completed coordination drawings will be held within 30 days of Contract award.

B. Staff Names: Within 15 days of commencement of construction operations, submit a list of the Contractor's principal staff assignments, including the superintendent and other personnel in attendance at the Project Site. Identify individuals and their duties and responsibilities. List their addresses and telephone numbers.

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

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 GENERAL COORDINATION PROVISIONS

A. Inspection of Conditions: Require the Installer of each major component to inspect both the substrate and conditions under which Work is to be performed. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.

B. Coordinate temporary enclosures with required inspections and tests to minimize the necessity of uncovering completed construction for that purpose.

3.2 CLEANING AND PROTECTION

A. Each Prime Contractor is to clean and protect construction in progress and adjoining materials in place, during handling and installation. Apply protective covering where required to assure protection from damage or deterioration at Substantial Completion.

B. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to assure operability without damaging effects.

C. 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. Where applicable, such exposures include, but are not limited to, the following:

1. Excessive static or dynamic loading.
2. Excessive internal or external pressures.
3. Excessively high or low temperatures.
4. Thermal shock.
5. Excessively high or low humidity.
6. Air contamination or pollution.
7. Water or ice.
8. Solvents.
9. Chemicals.
10. Light.
11. Radiation.
12. Puncture.
13. Abrasion.
14. Heavy traffic.
15. Soiling, staining, and corrosion.
16. Bacteria.
17. Rodent and insect infestation.
18. Combustion.
19. Electrical current.
20. High-speed operation.
21. Improper lubrication.
22. Unusual wear or other misuse.
23. Contact between incompatible materials.
24. Destructive testing.
25. Misalignment.
26. Excessive weathering.
27. Unprotected storage.
28. Improper shipping or handling.
29. Theft.
30. Vandalism.

END OF SECTION 013100

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SECTION 013119 - PROJECT MEETINGS

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. This Section specifies administrative and procedural requirements for project meetings, including, but not limited to, the following:

1. Preconstruction conferences.
2. Preinstallation conferences.
3. Progress meetings.
4. Coordination meetings.

B. Related Sections: The following Sections contain requirements that relate to this Section:

1. Division 1 Section "Coordination" for procedures for coordinating project meetings with other construction activities.
2. Division 1 Section "Submittals" for submitting the Contractor's Construction Schedule.

1.3 PRECONSTRUCTION CONFERENCE

A. A preconstruction conference will be scheduled before starting construction, at a time convenient to the Owner and the Architect and construction manager, but no later than 14 days after execution of the Agreement. The conference will be held at the Project Site or another convenient location.

B. Attendees: Authorized representatives of the Owner, Architect, construction manager and their consultants; the Contractor and its superintendent; major subcontractors; manufacturers; suppliers; and other concerned parties shall attend the conference. All participants at the conference shall be familiar with the Project and authorized to conclude matters relating to the Work.

C. Agenda: Discuss items of significance that could affect progress, including the following:

1. Tentative construction schedule.
2. Critical work sequencing.
3. Designation of responsible personnel.
4. Procedures for processing field decisions and Change Orders.
5. Procedures for processing Applications for Payment.
6. Distribution of Contract Documents.
7. Submittal of Shop Drawings, Product Data, and Samples.
8. Preparation of record documents.

9. Use of the premises.
10. Parking availability.
11. Office, work, and storage areas.
12. Equipment deliveries and priorities.
13. Safety procedures.
14. First aid.
15. Security.
16. Housekeeping.
17. Working hours.

D. Reporting: Construction Manager shall prepare and issue minutes to attendees and interested parties.

1.4 PREINSTALLATION CONFERENCES

A. Conduct a pre-installation conference at the Project Site before each construction activity that requires coordination with other construction.

B. Attendees: The Installer and representatives of the Prime Contractor, manufacturers and fabricators involved in or affected by the installation, and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise the Construction Manager of scheduled meeting dates.

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

a. Contract Documents.
b. Options.
c. Related Change Orders.
d. Purchases.
e. Deliveries.
f. Shop Drawings, Product Data, and quality-control samples.
g. Review of mockups.
h. Possible conflicts.
i. Compatibility problems.
j. Time schedules.
k. Weather limitations.
l. Manufacturer's recommendations.
m. Warranty requirements.
n. Compatibility of materials.
o. Acceptability of substrates.
p. Temporary facilities.
q. Space and access limitations.
r. Governing regulations.
s. Safety.
t. Inspecting and testing requirements.
u. Required performance results.
v. Recording requirements
w. Protection.

2. Record significant discussions and agreements and disagreements of each conference and the approved schedule. Promptly distribute the record of the meeting to everyone concerned, including the Owner and the Architect.
3. Do not proceed with the installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of Work and reconvene the conference at the earliest feasible date.
4. Reporting: Prime Contractor or Installer shall issue minutes to attendees, Owner and Architect, and construction manager.

1.5 PROGRESS MEETINGS

A. Progress meetings will be held at the Project Site on a weekly basis.

B. Attendees: In addition to representatives of the Owner and the Architect and Construction Manager, each Prime Contractor shall be represented at these meetings. **Attendance is mandatory at each meeting and a penalty sum of $500.00 per missed meeting will be assessed to the Prime Contractor not attending without prior written authorization from the Architect. This sum can be deducted from the contractors Schedule of Values.** Subcontractors, suppliers, or other entities will be invited at the discretion of the Owner and the Architect. All participants at the conference shall be familiar with the Project and authorized to conclude matters relating to the Work.

C. Agenda: Review and correct or approve minutes of the previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to the status of the Project.

1. Contractor's Construction Schedule: Review progress since the last meeting. Determine where each activity is in relation to the Contractor's Construction Schedule, whether on time or ahead or behind schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to insure that current and subsequent activities will be completed within the Contract Time.
2. Review the present and future needs of each entity present, including the following:

    a. Interface requirements.
    b. Time.
    c. Sequences.
    d. Status of submittals.
    e. Deliveries.
    f. Off-site fabrication problems.
    g. Access.
    h. Site utilization.
    i. Temporary facilities and services.
    j. Hours of work.
    k. Hazards and risks.
    l. Housekeeping.
    m. Quality and work standards.
    n. Change Orders.
    o. Documentation of information for payment requests.

D. Reporting: Approximately 5 days after each meeting, Construction Manager will prepare and distribute minutes of the meeting to each party present and to parties who should have been

present. Include a brief summary, in narrative form, of progress since the previous meeting and report.

1.6 COORDINATION MEETINGS

A. Conduct project coordination meetings at regular intervals convenient for all parties involved. Project coordination meetings are in addition to specific meetings held for other purposes, such as regular progress meetings and special pre-installation meetings.

B. Request representation at each meeting by every party currently involved in coordination or planning for the construction activities involved.

C. Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

D. The Owner's Field Manager will conduct daily meetings with all prime contractors performing work. The purpose of the meeting is to provide the opportunity for each prime contractor to communicate to the Field Manager any items relating to their respective construction activity for that day (request for shutdown, deliveries, etc.) The meetings will commence from 7:00 o'clock am until 7:30 o'clock am. The foreman of each Prime Contractor must attend. These meetings are generally informal. The Field Manager will keep minutes of these meetings when appropriate and will be available upon request.

1.7 SAFETY MEETINGS

A. Each Prime Contractor will be responsible to conduct safety meetings on a regular basis (but not less than three times during any thirty day period.)

B. Minutes of the Safety Meeting must be submitted to the construction manager within 4 business days. Failure to conduct and submit meeting minutes will be grounds to reject the Prime Contractor's progress payment.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 013119

SECTION 01 31 50 - SAFETY AND HEALTH

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 PROJECT SITE SAFETY

A. The Prime Contractor, not the Architect, is responsible for Project site safety.

1.3 SAFETY AND HEALTH REGULATIONS

A. The Prime Contractor, and any entity working for the Prime Contractor, shall comply with the U.S. Department of Labor Safety and Health Regulations for construction promulgated under the Occupational Safety and Health Act of 1970 (PL 91-54), latest revisions and with the latest requirements of the "Right to Know" laws and the New York State Labor Law.

B. In order to protect the general public and the lives and health of his/her employees under the Contract, the Prime Contractor shall comply with all pertinent provisions of the latest issues of the Federal Register, Bureau of Labor Standards, Safety and Health Regulations; New York State Industrial Code Rule 30 pertaining to Tunneling Operations; New York State Industrial Code Rule 23 pertaining to Trenching Operations; and the "Manual of Accident Prevention in Construction" issued by the Associated General Contractors of America, Inc., and shall maintain an accurate record of all cases of death, occupational disease, and injury requiring medical attention or causing loss of time from work under this Contract. In case of a conflict between the above noted authorities the most stringent shall prevail.

C. The Prime Contractor shall have on the project site at all times, while work is in progress, at least one person skilled in safety and health procedures and familiar with State and Federal safety and health regulations whose responsibility shall be to observe methods and procedures. He shall have the duty and authority to stop and correct all unsafe and unhealthy conditions.

D. Toxic, noxious or otherwise hazardous fumes, gases or dusts, etc. from welding, cadwelding, painting, grinding, sawing, sweeping or any other operations shall be kept to the absolute minimum and shall be vented directly to the outside by the Contractor, and only used when authorized by the Architect.

E. The Prime Contractor to submit to the Architect, prior to first payment application approval, 2 copies of Material Safety and Data Sheets (MSDS) for all material used on site. The Prime Contractor shall also keep one (1) complete set of Material Safety and Data Sheets (MSDS) onsite at all times.

1. These reference materials shall be updated continuously throughout the Project, as additional materials are added to/brought to the Project site.

1.4 SAFETY AND FIRST AID

A. The Prime Contractor shall at all times exercise caution of his/her operations and shall be responsible for the safety and protection of all persons on or about the site arising out of or relating to his/her Work. All hazards shall be avoided or guarded in accordance with the provisions of the Manual of Accident Prevention in Construction of the AGCA, unless such provisions contravene local law. The safety provisions of all applicable laws, codes and ordinances shall be observed.

B. The Prime Contractor shall provide and maintain at the Site, at each location where work is in progress, as part of his/her plant, an approved first aid kit. Ready access thereto shall be provided at all times when persons are employed on the work site.

C. The Prime Contractor shall take due precautions against infectious diseases and shall arrange for the immediate isolation and removal from the Site of any employee who becomes ill or is injured while engaged on the work site.

D. The Prime Contractor shall, upon request of the Architect, immediately correct all conditions that constitute a clear and present danger to persons as interpreted by the Architect. If such danger is not so corrected, the Owner or the Architect will employ other persons to do such work and the expense thereof shall be deducted from any monies due or to become due to the Prime Contractor.

E. Clean up of the Prime Contractor's, and/or their subcontractor's, materials and/or debris shall be deemed a safety and health issue.

1.5 ACCIDENTS AND ACCIDENT REPORTS

A. Notify Architect immediately of any accidents involving Prime Contractor, subcontractor or supplier personnel on site.

B. Within 24 hours of the occurrence, the Prime Contractor shall submit a written accident report, to the Architect, fully detailing the occurrence.

1.6 TOOL BOX SAFETY MEETINGS

A. The Prime Contractor shall hold weekly toolbox safety meetings with his/her own workers. Records of these meetings shall be forwarded to the Owner, through the Construction Site Coordinator's office, each week.

1. Failure to comply with this requirement shall result in Applications for Payment not being reviewed and processed.

2. **Tool box talks must be submitted with application for payment**.

1.7 OTHER SAFETY REQUIREMENTS

A. All prime contractors are required to perform the following safety measures on all project sites and construction zones/areas.
1. Hard hats, safety googles/glasses, and safety vests are mandatory and shall be worn at all times by all persons on the project.
2. All construction workers shall wear photo ID at all times and be visible on the person, failure to do so will result to that employee being asked to leave until such ID has been worn visible.
3. All visitors are required to check in with the CM for any reason and not allowed on site without proper PPE.
4. Any workers not wearing PPE will asked to stop working until PPE is appropriate donned. All second offense of said worker, he /she will be removed from site and all district work. All contractors are required to keep the work areas clean and safe from all hazards at all times.
5. Site contractor is to review provided phasing/logistics plan and assume at a minimum quantities of site fencing/protections indicated in those plans be provided in their contract.
6. Some contracts will not be provided a logistics plan to reference due the nature of their work. The contractor is still required to assume the use of construction fencing around all dumpsters and any exterior work area. Any interior work to proceed while school building are occupied require the use of 1 hour rated fire barriers to separate students and staff from active construction. This is to be assumed in the contractor's bid, and is at the CM's discretion to request additional protections as deemed necessary during construction.
7. All fencing shall have construction sign at every 50 feet stating ''CONSTRUCTION AREA; NO UNAUTHORIZED PERSONAL; NO TRESSPASSING. and continuous scrim.
8. All site contractors are required to clean up outside of their chain link and gated fenced in work zone(s) where construction debris may have fallen on a non-work zone area. Sand bags are not considered anchoring.

9. Where driven anchoring of fencing is not feasible due to protection of installed finishes and existing conditions, contractor shall provide YODOCK barriers around construction sites with integral fence panels above.
10. Contractor shall ensure that all chain link construction fence/barriers around the work zone is closed off to any adjacent structure, building, etc. ending the fence perimeter work zone at all times. These areas are the be checked 3 times a day, once before the start of work, mid shift and before the contractor leaves at the end of shift.
11. All site contractors are to have a 24-hour available emergency contact person available to fix and correct areas that have been compromised after hours, weekends and holidays. Upon notification of such incident the contractor is required to deploy workers as necessary within 1-2 hours maximum to be on site to correct such matters reported.
12. All gas-powered equipment shall have the spark plugs removed at the end of each day so that these cannot be started in any way.
13. All LULLS, man lifts, and all equipment shall not have keys left inside and all booms shall be lowered when not in use.
14. All site contractors shall have a dedicated site safety experienced (Manager) person responsible for the site safety with a minimum of 30 hours OSHA training certificate. This person shall be responsible to ensure that the perimeter work zones are free from any fallen construction and trip hazards at the minimum of the 3 field surveys as stated in item 9 above and as noted elsewhere in contract. . Site walk logs are to be submitted daily to the CM including safety status and any items found and corrected.
15. All dumpsters are to be fully surrounded with chain link fence if stored outside other fenced/barricaded work areas.
16. All safety observation reports issued to contractors shall be corrected immediately. If the contractor fails to respond and/or correct the condition(s) included in the safety observation report, that contractor will be subject to termination and charged by the District with all costs related to correcting the reported condition(s) and any other items related thereto.
17. **All contractors are to conform to 155.5 SED Code.**
18. All contractors are to submit their "tool box talks" weekly to the CM.
19. All contractors are to submit daily reports of their activities related to work performed, manpower, equipment onsite and all safety measures put in place that day and any maintenance/monitoring thereof.
20. All contractors are required to provide "egress plans" for both interior and exterior work for locations where work will close off any exits, corridors, pathways, roads, and any access way. These plans are to be provided in advance at least 2 months before work commences in that area, no work shall be started in any manner without approval of such plan. The failure to provide such plan for coordinating and scheduling will result into back charges to the prime(s) involved. These plans

must include all locations and details where scaffolding, fencing and all temporary construction barriers are required.

21. All contractors are to provide their corporate safety manuals to the CM prior to commencement of any work. Under no circumstances can any field work can start without receipt of such manual. This shall be provided in a 3-ring binder in PDF format. Contractors shall maintain a copy on site.
22. All personnel who fail to wear the required PPE while onsite will be warned and directed to stop work until PPE is properly worn. In the event that an employee is warned a second time for failure to comply with PPE requirements, said employee will be removed from all New Rochelle School projects. If the company continues to fail with their employees not abiding by the safety contract requirements, that contractor will be subject to termination for such endangerment of other workers and others.
23. All contractors are required to have a full time flagman(men) as needed at all times escorting construction vehicles into entrances and out of exits to the property/work zone. when . Flagman are required to escort construction vehicles to and from work areas to property lines and public streets. At every gate, the Prime Contractor shall post signage indicating contractor name and contact information including 24-hour emergency telephone number.
24. All contractors storing any materials and equipment on site shall be surrounded with chain link fencing.

END OF SECTION 013150

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SECTION 01 32 33 - PHOTOGRAPHIC 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 the following:

1. Preconstruction photographs.
2. Periodic construction photographs.
3. Final completion construction photographs.
    a. Name of Contractor.
    b. Date photograph was taken.
    c. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.
    d. Unique sequential identifier keyed to accompanying key plan.

1.3 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 and Construction Manager.

C. Preconstruction Photographs: Before commencement of excavation take photographs of Project site and surrounding properties, including existing items to remain during construction, from different vantage points, as directed by Architect and Construction Manager.

1. Flag construction limits before taking construction photographs.
2. Take 20 photographs to show existing conditions adjacent to property before starting the Work.
3. Take 20 photographs of existing buildings either on or adjoining property to accurately record physical conditions at start of construction.
4. Take additional photographs as required to record settlement or cracking of adjacent structures, pavements, and improvements.

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. Architect and Construction Manager-Directed Construction Photographs: From time to time, Architect and Construction Manager will instruct photographer about number and frequency of photographs and general directions on vantage points. Select actual vantage points and take photographs to show the status of construction and progress since last photographs were taken.

F. Time-Lapse Sequence Construction Photographs: Take 20 photographs as indicated, to show status of construction and progress since last photographs were taken.

1. Frequency: Take photographs weekly, with timing each month adjusted to coincide with the cutoff date associated with each Application for Payment.
2. Vantage Points: Following suggestions by Architect and Construction Manager and Contractor, photographer to select vantage points. During each of the following construction phases, take not less than two of the required shots from same vantage point each time to create a time-lapse sequence as follows:

a. Commencement of the Work, through completion of subgrade construction.
b. Above-grade structural framing.
c. Exterior building enclosure.
d. Interior Work, through date of Substantial Completion.

G. Final Completion Construction Photographs: Take 20 color photographs after date of Substantial Completion for submission as project record documents. Architect and Construction Manager will inform photographer of desired vantage points.

1. Do not include date stamp.

END OF SECTION 01 32 33

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SECTION 013300 - ELECTRONIC SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes requirements for the submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.

B. Related Sections:

1. Division 01 Section “Payment Procedures” for submitting Applications for Payment and the schedule of values.

2. Division 01 Section “Construction Progress Documentation” for submitting schedules and reports, including Contractor’s construction schedule.

3. Division 01 Section “Operation and Maintenance Data” for submitting operation and maintenance manuals.

1.3 DEFINITIONS

A. Action Submittals: Written and graphic information and physical samples that require Architect’s responsive action. Action submittals are those submittals indicated in individual Specification Sections as action submittals.

B. Informational Submittals: Written and graphic information and physical samples that do not require Architect’s 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.

1.4 ACTION SUBMITTALS

A. Submittal Schedule: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or modifications to submittals noted by the Architect and additional time for handling and reviewing submittals required by those corrections.

1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.

2. Initial Submittal: Submit concurrently with start-up construction schedule. Include submittals required during the first 60 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.

3. Final Submittal: Submit concurrently with the first complete submittal of Contractor's construction schedule.

    a. Submit revised submittal schedule to reflect changes in current status and timing for submittals.

4. Format: Arrange the following information in a tabular format:

    a. Scheduled date for first submittal.
    b. Specification Section number and title.
    c. Submittal category: Action, informational.
    d. Name of subcontractor.
    e. Description of the Work covered.
    f. Scheduled date for Architect's final release or approval.
    g. Scheduled dates for purchasing.
    h. Scheduled dates for installation.
    i. Activity or event number.

1.5 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

A. Architect's Digital Data Files: Electronic copies of REVIT Drawings 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 REVIT Version 2020.

    c. Contractor shall execute a data licensing agreement that will be supplied by Architect.

    d. The following plot files will by furnished for each appropriate discipline:

        1) Floor plans
        2) Site plans .

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. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.

3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.

4. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.

    a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

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

1. Initial Review: Allow 10 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.

2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.

3. Resubmittal Review: Allow 10 days for review of each resubmittal.

4. Sequential Review: Where sequential review of submittals by Architect's consultants, Owner, or other parties is indicated, allow 15 days for initial review of each submittal.

5. Concurrent Consultant Review: Where the Contract Documents indicate that submittals may be transmitted simultaneously to Architect and to Architect's consultants, allow 15 days for review of each submittal. Submittal will be returned to Architect before being returned to Contractor.

D. Identification and Information: Identify and incorporate information in each electronic submittal file as follows:

1. Assemble complete submittal package into a single indexed file with links enabling navigation to each item.

2. Name file with submittal number or other unique identifier, including revision identifier.

    a. File name shall use project identifier and Specification Section number followed by a decimal point and then a sequential number (e.g., BR-061000.01 or MH-061000.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., BR-061000.01.A or MH-061000.01.A).

3. Provide means for insertion to permanently record Contractor's review and approval markings and action taken by Architect.

4. Include the following information on an inserted cover sheet:

    a. Project name.

b. Date.
c. Name and address of Architect.
d. Name of Contractor.
e. Name of firm or entity that prepared submittal.
f. Name of subcontractor.
g. Name of supplier.
h. Name of manufacturer.
i. Number and title of appropriate Specification Section.
j. Drawing number and detail references, as appropriate.
k. Location(s) where product is to be installed, as appropriate.
l. Related physical samples submitted directly.
m. Other necessary identification.

5. Include the following information as keywords in the electronic file metadata:

a. Project name.
b. Number and title of appropriate Specification Section.
c. Manufacturer name.
d. Product name.

E. Options: Identify options requiring selection by the Architect.

F. Deviations: Identify deviations from the Contract Documents on submittals.

G. Transmittal: Assemble each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Contracting Officer will return submittals, without review, received from sources other than Contractor.

1. Transmittal Form: Provide locations on form for the following information:

a. Project name.
b. Date.
c. Destination (To:).
d. Source (From:).
e. Names of subcontractor, manufacturer, and supplier.
f. Category and type of submittal.
g. Submittal purpose and description.
h. Specification Section number and title.
i. Indication of full or partial submittal.
j. Drawing number and detail references, as appropriate.
k. Transmittal number, numbered consecutively.
l. Submittal and transmittal distribution record.
m. Remarks.
n. Signature of transmitter.

2. On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Architect on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same identification information as related submittal.

H. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
1. Note date and content of previous submittal.
2. Note date and content of revision in label or title block and clearly indicate extent of revision.

3. Resubmit submittals until they are marked with approval notation from Architect's action stamp.

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

J. Use for Construction: Use only final submittals that are marked with approval notation from Architect's action stamp.

PART 2 - PRODUCTS

2.1 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. Submit electronic submittals via email as PDF electronic files.

a. Architect, through Contracting Officer, will return annotated file. Annotate and retain one copy of file as an electronic Project record document file.

2. Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in Division 01 Section "Closeout Procedures."

3. 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.

4. Test and Inspection Reports Submittals: Comply with requirements specified in Division 01 Section "Quality Requirements."

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

1. If information must be specially prepared for submittal because standard published data are not suitable for use, submit as Shop Drawings, not as Product Data.

2. Mark each copy of each submittal to show which products and options are applicable.

3. Include the following information, as applicable:

a. Manufacturer's 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.

4. For equipment, include the following in addition to the above, as applicable:

a. Wiring diagrams showing factory-installed wiring.
b. Printed performance curves.
c. Operational range diagrams.
d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.

5. Submit Product Data before or concurrent with Samples.

6. Submit Product Data in the following format:

a. PDF electronic file.

C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data, unless submittal based upon Architect's digital data drawing files is otherwise permitted.

1. 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.

2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches (215 by 280 mm) but no larger than 30 by 42 inches (750 by 1067 mm).

3. Submit Shop Drawings in the following format:

a. PDF electronic file.

D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.

1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.

2. Identification: Attach label on unexposed side of Samples that includes the following:

a. Generic description of Sample.
b. Product name and name of manufacturer.
c. Sample source.
d. Number and title of applicable Specification Section.

3. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.

    a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
    b. Samples not incorporated into the Work, or otherwise designated as Government's property, are the property of Contractor.

4. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.

    a. Number of Samples: Submit 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 Contracting Officer, will return submittal with options selected.

5. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.

    a. Number of Samples: Submit three sets of Samples. Architect will retain one Sample set; 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.

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

    1. Type of product. Include unique identifier for each product indicated in the Contract Documents.

    2. Manufacturer and product name, and model number if applicable.

    3. Number and name of room or space.

    4. Location within room or space.

    5. Submit product schedule in the following format:

        a. PDF electronic file.

F. Contractor's Construction Schedule: Comply with requirements specified in Division 01 Section "Construction Progress Documentation."

G. Application for Payment: Comply with requirements specified in Division 01 Section “Payment Procedures.”

H. Schedule of Values: Comply with requirements specified in Division 01 Section “Payment Procedures.”

I. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:

1. Name, address, and telephone number of entity performing subcontract or supplying products.

2. Number and title of related Specification Section(s) covered by subcontract.

3. Drawing number and detail references, as appropriate, covered by subcontract.

4. Submit subcontract list in the following format:

a. PDF electronic file.

J. 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.

K. 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 American Welding Society (AWS) forms. Include names of firms and personnel certified.

L. 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.

M. 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.

N. Product Certificates: Submit written statements on manufacturer’s letterhead certifying that product complies with requirements in the Contract Documents.

O. Material Certificates: Submit written statements on manufacturer’s letterhead certifying that material complies with requirements in the Contract Documents.

P. 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.

Q. Product Test Reports: Submit written reports indicating current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.

R. 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.

S. Schedule of Tests and Inspections: Comply with requirements specified in Division 01 Section "Quality Requirements."

T. Field Test Reports: Submit 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.

U. Maintenance Data: Comply with requirements specified in Division 01 Section "Operation and Maintenance Data."

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

A. Action and Informational Submittals: 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 Contracting Officer.

B. Project Closeout and Maintenance/Material Submittals: Refer to requirements in Division 01 Section "Closeout Procedures."

C. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 ARCHITECT'S ACTION

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

B. Action Submittals: Architect 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, as follows:

1. Approved: Where the submittal is marked "Approved," the Work covered by the submittal may proceed provided it complies with the Contract Documents. Final acceptance will depend on that compliance.

2. Approved As Corrected (do not resubmit): Where the submittal is marked "Approved As Corrected" the work covered by the submittal may proceed provided it complies both with Architect's notations and corrections on the submittal and the Contract Documents. Final acceptance will depend on that compliance.

3. Revise and Resubmit (see notes): Where the submittal is marked "Revise and Resubmit" do not proceed with the Work covered by the submittal, including purchasing, fabrication, delivery, or other activity for the product submitted. Revise and prepare a new submittal according to Architect's notations and corrections.

4. Rejected: Where the submittal is marked “Rejected”, do not proceed with the Work covered by the submittal. Prepare a new submittal for a product that complies with the Contract Documents.

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

5. Submit Specified Item: Where the submittal is marked “Submit Specified Item”, do not proceed with the Work covered by the submittal. Prepare a new submittal for a product that complies with the Contract Documents.

D. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Architect.

E. Incomplete submittals are not acceptable, will be considered nonresponsive, and will be returned without review.

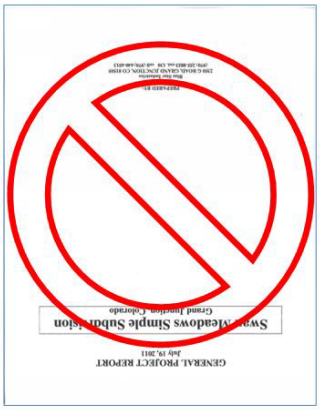
F. Submittals not required by the Contract Documents may not be reviewed and may be discarded.

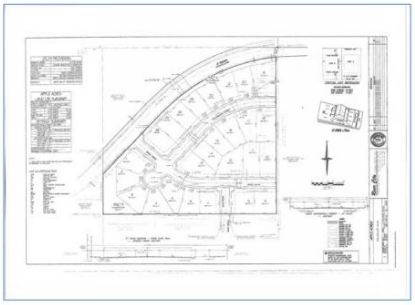
END OF SECTION 013300

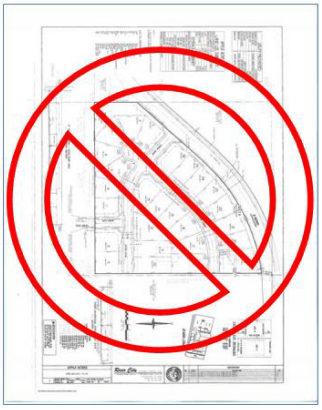
Document Orientation Guide

Correct Orientation:

Incorrect Orientation:







No:_____

SUBMITTAL COVERSHEET
Nanuet UFSD –Phase 2 Projects

Architect:
KSQ Architects
215 W 40th Street,15th Floor
New York, NY 10018

Owner:
Nanuet Union Free School District
101 Church Street
Nanuet, NY 10954

Construction Manager:
Jacobs
One Penn Plaza, 54th floor
New York, NY 10019

Contractor: _____ **Contract:** _____

Address: _____ **Telephone:** _____

_____ **Fax:** _____

School Name: _____

Type of Submittal: **Re-submittal: [ ] No [ ] Yes**

[ ] Shop Drawings **[ ]** Product Data **[ ]** Schedule **[ ]** Sample **[ ]** _____
[ ] Test Report **[ ]** Certificate **[ ]** Color Sample **[ ]** Warranty **[ ]** _____

Submittal Description:

Product Name: _____

Manufacturer: _____

Subcontractor/ Supplier: _____

References:

Spec. Section No.: _____ **Drawing No(s):** _____

Paragraph: _____ **Rm. or Detail No(s):** _____

Architect's/ Engineer's Review Stamp	Contractor Review Statement: These documents have been checked for accuracy and coordinated with job conditions and Contract requirements by this office and have been found to comply with the provisions of the Contract Documents. Name: Date: Company Name:

_____
_____
_____
_____
_____

Remarks:

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SECTION 01 4200 – REFERENCES STANDARDS AND DEFINITIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 DEFINITIONS

A. General: Basic contract definitions are included in the Conditions of the Contract.

B. "Indicated": The term "indicated" refers to graphic representations, notes, or schedules on the Drawings, or other paragraphs or Schedules in the Specifications, and similar requirements in the Contract Documents. Terms such as "shown," "noted," "scheduled," and "specified" are used to help the reader locate the reference. Location is not limited.

C. "Directed": Terms such as "directed," "requested," "authorized," "selected," "approved," "required," and "permitted" mean directed by the Architect, requested by the Architect, and similar phrases.

D. "Approved": The term "approved," when used in conjunction with the Architect's action on the Contractor's submittals, applications, and requests, is limited to the Architect's duties and responsibilities as stated in the Conditions of the Contract.

E. "Regulations": The term "regulations" includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work.

F. "Furnish": The term "furnish" means supply and deliver to the Project Site, ready for unloading, unpacking, assembly, installation, and similar operations.

G. "Install": The term "install" describes operations at the Project Site including the actual unloading, unpacking, assembly, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.

H. "Provide": The term "provide" means to furnish and install, complete and ready for the intended use.

I. "Installer": An installer is the Contractor or another entity engaged by the Contractor, either as an employee, subcontractor, or contractor of lower tier, to perform a particular construction activity, including installation, erection, application, or similar operations. Installers are required to be experienced in the operations they are engaged to perform.

1. The term "experienced," when used with the term "installer," means having a minimum of 5 previous projects similar in size and scope to this Project, being familiar with the special requirements indicated, and having complied with requirements of authorities having jurisdiction.

2. Trades: Using terms such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to tradespersons of the corresponding generic name.

3. Assigning Specialists: Certain Sections of the Specifications require that specific construction activities shall be performed by specialists who are recognized exp

erts in those operations. The specialists must be engaged for those activities, and their assignments are requirements over which the Contractor has no option. However, the ultimate responsibility for fulfilling contract requirements remains with the Contractor.

a. This requirement shall not be interpreted to conflict with enforcing building codes and similar regulations governing the Work. It is also not intended to interfere with local trade-union jurisdictional settlements and similar conventions.

J. "Project Site" is the space available to the Contractor for performing construction activities, either exclusively or in conjunction, with others performing other work as part of the Project. The extent of the Project Site is shown on the Drawings and may or may not be identical with the description of the land on which the Project is to be built.

K. "Testing Agencies": A testing agency is an independent entity engaged to perform specific inspections or tests, either at the Project Site or elsewhere, and to report on and, if required, to interpret results of those inspections or tests.

1.3 SPECIFICATION FORMAT AND CONTENT EXPLANATION

A. Specification Format: These Specifications are organized into Divisions and Sections based on CSI's 33-Division format and MasterFormat's numbering system.

B. Specification Content: This Specification uses certain conventions regarding the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations or circumstances. These conventions are explained as follows:

1. Abbreviated Language: Language used in Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be interpolated as the sense requires. Singular words will be interpreted as plural and plural words interpreted as singular where applicable as the context of the Contract Documents indicates.
2. Streamlined Language: The Specifications generally use the imperative mood and streamlined language. Requirements expressed in the imperative mood are to be performed by the Contractor. At certain locations in the Text, subjective language is used for clarity to describe responsibilities that must be fulfilled indirectly by the Contractor or by others when so noted.

a. The words "shall be" are implied where a colon (:) is used within a sentence or phrase.

1.4 INDUSTRY STANDARDS

A. Applicability of Standards: Except where the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

B. Publication Dates: Comply with the standards in effect as of the date of the Contract Documents.

C. Conflicting Requirements: Where 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 to the Architect bef

ore proceeding for a decision on requirements that are different but apparently equal, and where it is uncertain which requirement is the most stringent.

1. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum acceptable. 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 the requirements. Refer uncertainties to the Architect for a decision before proceeding.

D. Copies of Standards: Each entity engaged in construction on the Project is required to 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, the Contractor shall obtain copies directly from the publication source.

E. Abbreviations and Names: Trade association names and titles of general standards are frequently abbreviated. Where such acronyms or abbreviations are used in the Specifications or other Contract Documents, they mean the recognized name of the trade association, standards-generating organization, authorities having jurisdiction, or other entity applicable to the context of the text provision. Refer to Gale Research Co.'s "Encyclopedia of Associations," available in most libraries.

F. Abbreviations and Names: Trade association names and titles of general standards are frequently abbreviated. The following acronyms or abbreviations, as referenced in the Contract Documents, are defined to mean the associated names. Names and addresses are subject to change and are believed, but are not assured, to be accurate and up-to-date as of the date of the Contract Documents.

AA	Aluminum Association 900 19th St., NW, Suite 300 Washington, DC 20006	(202) 862-5104
AABC	Associated Air Balance Council 1518 K St., NW Washington, DC 20005	(202) 737-0202
AAMA	American Architectural Manufacturers Assoc. 1540 E. Dundee Road, Suite 310 Palatine, IL 60067	(708) 202-1350
AAN	American Association of Nurserymen 1250 Eye St., NW, Suite 500 Washington, DC 20005	(202) 789-2900
AASHTO	American Association of State Highway and Transportation Officials 444 North Capitol St., Suite 24 Washington, DC 20001	(202) 624-5800
AATCC	American Association of Textile Chemists and Colorists P.O. Box 12215 Research Triangle Park, NC 27709-2215	(919) 549-8141

ABMA	American Bearing Manufacturers Assoc. 1101 Connecticut Ave., NW, Suite 700 Washington, DC 20036	(202) 429-5155
ACI	American Concrete Institute P.O. Box 19150 Detroit, MI 48219	(313) 532-2600
ACIL	American Council of Independent Laboratories 1629 K St., NW Washington, DC 20006	(202) 887-5872
ACPA	American Concrete Pipe Assoc. 8300 Boone Blvd., Suite 400 Vienna, VA 22182	(703) 821-1990
ADC	Air Diffusion Council One Illinois Center, Suite 200 111 East Wacker Dr. Chicago, IL 60601-4298	(312) 616-0800
AFBMA	Anti-Friction Bearing Manufacturers Assoc. (Now ABMA)	
AFPA	American Forest and Paper Assoc. (American Wood Council of the) 2nd Floor, 1250 Connecticut Ave., NW Washington, DC 20036	(202) 463-2455
AGA	American Gas Assoc. 1515 Wilson Blvd. Arlington, VA 22209	(703) 841-8400
AHA	American Hardboard Assoc. 1210 W. Northwest Highway Palatine, IL 60067	(708) 934-8800
AHAM	Association of Home Appliance Manufacturers 20 N. Wacker Dr., Suite 1500 Chicago, IL 60606	(312) 984-5800
AI	Asphalt Institute Research Park Dr. P.O. Box 14052 Lexington, KY 40512-4052	(606) 288-4960
AIA	The American Institute of Architects 1735 New York Ave., NW Washington, DC 20006	(202) 626-7300
AIA	American Insurance Assoc. 1130 Connecticut Ave., NW, Suite 1000 Washington, DC 20036	(202) 828-7100

AIHA	American Industrial Hygiene Assoc. 2700 Prosperit Ave., Suite 250 Fairfax, VA 22031	(703) 849-8888
AISC	American Institute of Steel Construction One East Wacker Dr., Suite 3100 Chicago, IL 60601-2001	(312) 670-2400
AISI	American Iron and Steel Institute 1101 17th St., NW Washington, DC 20036-4700	(202) 452-7100
AITC	American Institute of Timber Construction 7012 S. Revere Parkway, #140 Englewood, CO 80112	(303) 792-9559
ALI	Associated Laboratories, Inc. c/o HOH Chemicals 500 S. Vermont St. Palatine, IL 60067	(708) 358-7400
ALSC	American Lumber Standards Committee P.O. Box 210 Germantown, MD 20875	(301) 972-1700
AMCA	Air Movement and Control Assoc. 30 W. University Dr. Arlington Heights, IL 60004-1893	(708) 394-0150
ANSI	American National Standards Institute 11 West 42nd St., 13th Floor New York, NY 10036	(212) 642-4900
AOAC	AOAC International 2200 Wilson Blvd., Suite 400 Arlington, VA 22201-3301	(703) 522-3032
AOSA	Association of Official Seed Analysts California State Seed Laboratory 1220 N St. Sacramento, CA 95814	(916) 445-4521
APA	American Plywood Assoc. P.O. Box 11700 Tacoma, WA 98411	(206) 565-6600
API	American Petroleum Institute 1220 L St., NW Washington, DC 20005	(202) 682-8000
ARI	Air-Conditioning and Refrigeration Institute 4301 Fairfax Dr., Suite 425 Arlington, VA 22203	(703) 524-8800

ARMA	Asphalt Roofing Manufacturers Assoc. 6000 Executive Dr., Suite 201 Rockville, MD 20852-3803	(301) 231-9050
ASA	Acoustical Society of America 500 Sunnyside Blvd. Woodbury, NY 11797	(516) 576-2360
ASC	Adhesive and Sealant Council 1627 K St., NW, Suite 1000 Washington, DC 20006-1707	(202) 452-1500
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers 1791 Tullie Circle, NE Atlanta, GA 30329	(404) 636-8400
ASME	American Society of Mechanical Engineers 345 East 47th St. New York, NY 10017	(212) 705-7722
ASPA	American Sod Producers Assoc. 1855-A Hicks Rd. Rolling Meadows, IL 60008	(708) 705-9898
ASPE	American Society of Plumbing Engineers 3617 Thousand Oaks Blvd., Suite 210 Westlake, CA 91362	(805) 495-7120
ASSE	American Society of Sanitary Engineering P.O. Box 40362 Bay Village, OH 44140	(216) 835-3040
ASTM	American Society for Testing and Materials 1916 Race St. Philadelphia, PA 19103-1187	(215) 299-5400
ATIS	Alliance for Telecommunications Industry Solutions 1200 G St., NW, Suite 500 Washington, DC 20005	(202) 628-6380
AWCMA	American Window Covering Manufacturers Assoc. (Now WCMA)	
AWI	Architectural Woodwork Institute P.O. Box 1550 13924 Braddock Rd., No. 100 Centerville, VA 22020	(703) 222-1100
AWPA	American Wood Preservers' Assoc. P.O. Box 286 Woodstock, MD 21163-0286	(410) 465-3169
AWPB	American Wood Preservers' Bureau (This organization is now defunct.)	

AWS	American Welding Society 550 LeJeune Rd., NW Miami, FL 33126	(305) 443-9353
AWWA	American Water Works Assoc. 6666 W. Quincy Ave. Denver, CO 80235	(303) 794-7711
BANC	Brick Association of North Carolina P.O. Box 13290 Greensboro, NC 27415-3290	(910) 273-5566
BHMA	Builders' Hardware Manufacturers Assoc. 355 Lexington Ave., 17th Floor New York, NY 10017	(212) 661-4261
BIA	Brick Institute of America 11490 Commerce Park Dr. Reston, VA 22091	(703) 620-0010
BIFMA	The Business and Institutional Furniture Manufacturer's Association 2680 Horizon Dr., SE, Suite A1 Grand Rapids, MI 49546-7500	(616) 285-3963
CAGI	Compressed Air and Gas Institute c/o Thomas Associates, Inc. 1300 Sumner Ave. Cleveland, OH 44115-2851	(216) 241-7333
CAUS	Color Association of the United States 409 W. 44th St. New York, NY 10036	(212) 582-6884
CBHF	State of California, Dept. of Consumer Affairs Bureau of Home Furnishings and Thermal Insulation 3485 Orange Grove Ave. North Highland, CA 95660-5595	(800) 952-5210
CBM	Certified Ballast Manufacturers Assoc. 1422 Euclid Ave., Suite 402 Cleveland, OH 44115-2851	(216) 241-0711
CCC	Carpet Cushion Council P.O. Box 546 Riverside, CT 06878	(203) 637-1312
CDA	Copper Development Association Inc. 260 Madison Ave., 16th Floor New York, NY 10016	(212) 251-7200
CFFA	Chemical Fabrics & Film Association, Inc. c/o Thomas Associates, Inc. 1300 Sumner Ave.	

	Cleveland, OH 44115-2851	(216) 241-7333
CGA	Compressed Gas Assoc. 1725 Jefferson Davis Highway, Suite 1004 Arlington, VA 22202-4100	(703) 412-0900
CISCA	Ceiling and Interior Systems Construction Assoc. 579 W. North Ave., Suite 301 Elmhurst, IL 60126	(708) 833-1919
CISPI	Cast Iron Soil Pipe Institute 5959 Shallowford Rd., Suite 419 Chattanooga, TN 37421	(615) 892-0137
CRI	Carpet and Rug Institute P.O. Box 2048 Dalton, GA 30722	(706) 278-3176
CRSI	Concrete Reinforcing Steel Institute 933 N. Plum Grove Rd. Schaumburg, IL 60173	(708) 517-1200
CTI	Ceramic Tile Institute of America 12061 West Jefferson Blvd. Culver City, CA 90230	(310) 574-7800
DHI	Door and Hardware Institute 14170 Newbrook Dr. Chantilly, VA 22021-2223	(703) 222-2010
DIPRA	Ductile Iron Pipe Research Assoc. 245 Riverchase Parkway East, Suite O Birmingham, AL 35244	(205) 988-9870
DLPA	Decorative Laminate Products Assoc. 13924 Braddock Rd. Centreville, VA 22020	(800) 684-3572
ECSA	Exchange Carriers Standards Assoc. (Now ATIS)	
EIA	Electronic Industries Assoc. 2001 Pennsylvania Ave., NW Washington, DC 20006-1813	(202) 457-4900
EIMA	EIFS Industry Manufacturers Assoc. 2759 State Road 580, Suite 112 Clearwater, FL 34621	(813) 726-6477
EJMA	Expansion Joint Manufacturers Assoc. 25 N. Broadway Tarrytown, NY 10591	(914) 332-0040
ETL	ETL Testing Laboratories, Inc. P.O. Box 2040 3933 Route 11, Industrial Park	

	Cortland, NY 13045	(607) 753-6711
FCI	Fluid Controls Institute P.O. Box 9036 Morristown, NJ 07960	(201) 829-0990
FCIB	Floor Covering Installation Board 310 Holiday Ave. Dalton, GA 30720	(706) 226-5488
FGMA	Flat Glass Marketing Assoc. White Lakes Professional Bldg. 3310 S.W. Harrison St. Topeka, KS 66611-2279	(913) 266-7013
FM	Factory Mutual Systems 1151 Boston-Providence Turnpike P.O. Box 9102 Norwood, MA 02062	(617) 762-4300
FTI	Facing Tile Institute P.O. Box 8880 Canton, OH 44711	(216) 488-1211
GA	Gypsum Association 810 First St., NE, Suite 510 Washington, DC 20002	(202) 289-5440
HEI	Heat Exchange Institute c/o Thomas Associates, Inc. 1300 Sumner Ave. Cleveland, OH 44115-2851	(216) 241-7333
HI	Hydronics Institute P.O. Box 218 35 Russo Place Berkeley Heights, NJ 07922	(908) 464-8200
HI	Hydraulic Institute 9 Sylvan Way Parsippany, NJ 07054-3802	(201) 267-9700
HMA	Hardwood Manufacturers Assoc. 400 Penn Center Blvd. Pittsburgh, PA 15235	(412) 829-0770
HPVA	Hardwood Plywood and Veneer Assoc. 1825 Michael Farraday Dr. P.O. Box 2789 Reston, VA 22090	(703) 435-2900
IBD	Institute of Business Designers 341 Merchandise Mart Chicago, IL 60654	(312) 467-1950

ICEA	Insulated Cable Engineers Association, Inc. P.O. Box 440 South Yarmouth, MA 02664	(508) 394-4424
IEC	International Electrotechnical Commission (Available from ANSI) 1430 Broadway New York, NY 10018	(212) 354-3300
IEEE	Institute of Electrical and Electronic Engineers 345 E. 47th St. New York, NY 10017	(212) 705-7900
IESNA	Illuminating Engineering Society of North America 345 E. 47th St. New York, NY 10017	(212) 705-7913
IGCC	Insulating Glass Certification Council c/o ETL Testing Laboratories, Inc. P.O. Box 2040 Route 11, Industrial Park Cortland, NY 13045	(607) 753-6711
ILI	Indiana Limestone Institute of America Stone City Bank Building, Suite 400 Bedford, IN 47421	(812) 275-4426
IMSA	International Municipal Signal Assoc. 165 E. Union St. Newark, NY 14513	(315) 331-2182
IRI	Industrial Risk Insurers P.O. Box 5010 85 Woodland St. Hartford, CT 06102-5010	(203) 520-7300
ISA	Instrument Society of America P.O. Box 12277 67 Alexander Dr. Research Triangle Park, NC 27709	(919) 549-8411
KCMA	Kitchen Cabinet Manufacturers Assoc. 1899 Preston White Dr. Reston, VA 22091-4326	(703) 264-1690
LIA	Lead Industries Association, Inc. 295 Madison Ave. New York, NY 10017	(212) 578-4750
LPI	Lightning Protection Institute 3365 N. Arlington Heights Rd., Suite J Arlington Heights, IL 60004	(800) 488-6864
MBMA	Metal Building Manufacturer's Assoc.	

	c/o Thomas Associates, Inc. 1300 Sumner Ave. Cleveland, OH 44115-2851	(216) 241-7333
MCAA	Mechanical Contractors Association of America 1385 Piccard Dr. Rockville, MD 20850-4329	(301) 869-5800
MFMA	Maple Flooring Manufacturers Assoc. 60 Revere Dr., Suite 500 Northbrook, IL 60062	(708) 480-9138
MIA	Marble Institute of America 33505 State St. Farmington, MI 48335	(810) 476-5558
ML/SFA	Metal Lath/Steel Framing Assoc. (A Division of the National Association of Architectural Metal Manufacturers) 600 S. Federal St., Suite 400 Chicago, IL 60605	(312) 922-6222
MSS	Manufacturers Standardization Society of the Valve and Fittings Industry 127 Park St., NE Vienna, VA 22180	(703) 281-6613
NAA	National Arborist Assoc. The Meeting Place Mall Route 101, P.O. Box 1094 Amherst, NH 03031-1094	(603) 673-3311
NAAMM	National Association of Architectural Metal Manufacturers 600 S. Federal St., Suite 400 Chicago, IL 60605	(312) 922-6222
NAIMA	North American Insulation Manufacturers Assoc. 44 Canal Center Plaza, Suite 310 Alexandria, VA 22314	(703) 684-0084
NAPA	National Asphalt Pavement Assoc. NAPA Building 5100 Forbes Blvd. Lanham, MD 20706-4413	(301) 731-4748
NAPF	National Association of Plastic Fabricators (Now DLPA)	
NBGQA	National Building Granite Quarries Assoc. P.O. Box 482 Barre, VT 05641	(802) 476-3115

NBHA	National Builders Hardware Assoc. (Now DHI)	
NCMA	National Concrete Masonry Assoc. 2302 Horse Pen Rd. Herndon, VA 22071-3406	(703) 713-1900
NCPI	National Clay Pipe Institute P.O. Box 759 253-80 Center St. Lake Geneva, WI 53147	(414) 248-9094
NCRPM	National Council on Radiation Protection and Measurements 7910 Woodmont Ave., Suite 800 Bethesda, MD 20814	(301) 657-2652
NCSPA	National Corrugated Steel Pipe Association 1255 23rd St., NW, Suite 850 Washington, DC 20037	(202) 452-1700
NEC	National Electrical Code (from NFPA)	
NECA	National Electrical Contractors Assoc. 3 Bethesda Metro Center, Suite 1100 Bethesda, MD 20814	(301) 657-3110
NEII	National Elevator Industry, Inc. 185 Bridge Plaza, North Fort Lee, NJ 07024	(201) 944-3211
NEMA	National Electrical Manufacturers Assoc. 2101 L St., NW, Suite 300 Washington, DC 20037	(202) 457-8400
NETA	International Electrical Testing Assoc. P.O. Box 687 Morrison, CO 80465	(303) 697-8441
NFPA	National Fire Protection Assoc. One Batterymarch Park P.O. Box 9101 Quincy, MA 02269-9101	(617) 770-3000 (800) 344-3555
NFPA	National Forest Products Assoc. (Now AFPA)	
NHLA	National Hardwood Lumber Assoc. P.O. Box 34518 Memphis, TN 38184-0518	(901) 377-1818
NKCA	National Kitchen Cabinet Assoc. (Now KCMA)	
NLGA	National Lumber Grades Authority	

	4400 Dominion St., Suite 103 Burnaby, BC V5G 4G3	(604) 451-7323
NOFMA	National Oak Flooring Manufacturers Assoc. P.O. Box 3009 Memphis, TN 38173-0009	(901) 526-5016
NPA	National Particleboard Assoc. 18928 Premiere Ct. Gaithersburg, MD 20879	(301) 670-0604
NPCA	National Paint and Coatings Assoc. 1500 Rhode Island Ave., NW Washington, DC 20005	(202) 462-6272
NRCA	National Roofing Contractors Assoc. 10255 W. Higgins Rd., Suite 600 Rosemont, IL 60018-5607	(708) 299-9070
NSF	National Sanitation Foundation 3475 Plymouth Rd. P.O. Box 130140 Ann Arbor, MI 48113-0140	(313) 769-8010
NSSEA	National School Supply and Equipment Assoc. 8300 Colesville Rd., No. 250 Silver Spring, MD 20910	(301) 495-0240
NTMA	National Terrazzo and Mosaic Assoc. 3166 Des Plaines Ave., Suite 132 Des Plaines, IL 60018	(708) 635-7744
NWMA	National Woodwork Manufacturers Assoc. (Now NWWDA)	
NWWDA	National Wood Window and Door Assoc. 1400 E. Touhy Ave., #G54 Des Plaines, IL 60018	(708) 299-5200 (800) 223-2301
PATMI	Power Actuated Tool Manufacturers' Institute, Inc. 1000 Fairgrounds Rd., Suite 200 St. Charles, MO 63301	(314) 947-6610
PCA	Portland Cement Assoc. 5420 Old Orchard Rd. Skokie, IL 60077	(708) 966-6200
PCI	Precast/Prestressed Concrete Institute 175 W. Jackson Blvd. Chicago, IL 60604	(312) 786-0300
PDI	Plumbing and Drainage Institute c/o Sol Baker 1106 W. 77th St., South Dr.	

	Indianapolis, IN 46260	(317) 251-6970
PEI	Porcelain Enamel Institute 102 Woodmont Blvd., Suite 360 Nashville, TN 38205	(615) 385-0758
RFCI	Resilient Floor Covering Institute 966 Hungerford Dr., Suite 12-B Rockville, MD 20805	(301) 340-8580
RIS	Redwood Inspection Service 405 Enfrente Dr., Suite 200 Novato, CA 94949	(415) 382-0662
RMA	Rubber Manufacturers Assoc. 1400 K St., NW Washington, DC 20005	(202) 682-4800
SDI	Steel Deck Institute P.O. Box 9506 Canton, OH 44711	(216) 493-7886
SDI	Steel Door Institute 30200 Detroit Rd. Cleveland, OH 44145	(216) 889-0010
SGCC	Safety Glazing Certification Council c/o ETL Testing Laboratories Route 11, Industrial Park Cortland, NY 13045	(607) 753-6711
SHLMA	Southern Hardwood Lumber Manufacturers Assoc. (Now HMA)	
SIGMA	Sealed Insulating Glass Manufacturers Assoc. 401 N. Michigan Ave. Chicago, IL 60611	(312) 644-6610
SJI	Steel Joist Institute 1205 48th Avenue North, Suite A Myrtle Beach, SC 29577	(803) 449-0487
SMA	Screen Manufacturers Assoc. 3950 Lake Shore Dr., Suite 502-A Chicago, IL 60613-3431	(312) 525-2644
SMACNA	Sheet Metal and Air Conditioning Contractors National Assoc. 4201 Lafayette Center Dr. Chantilly, VA 22021	(703) 803-2980
SPIB	Southern Pine Inspection Bureau	

	4709 Scenic Highway Pensacola, FL 32504	(904) 434-2611
SPRI	Single Ply Roofing Institute 20 Walnut St. Wellesley Hills, MA 02181	(617) 237-7879
SSPC	Steel Structures Painting Council 4516 Henry St. Pittsburgh, PA 15213	(412) 687-1113
SSPMA	Sump and Sewage Pump Manufacturers Assoc. P.O. Box 647 Northbrook, IL 60065-0647	(708) 559-9233
STI	Steel Tank Institute 570 Oakwood Rd. Lake Zurich, IL 60047	(708) 438-8265
SWI	Steel Window Institute c/o Thomas Associates, Inc. 1300 Sumner Ave. Cleveland, OH 44115-2851	(216) 241-7333
SWPA	Submersible Wastewater Pump Assoc. 600 S. Federal St., Suite 400 Chicago, IL 60605	(312) 922-6222
TCA	Tile Council of America P.O. Box 326 Princeton, NJ 08542-0326	(609) 921-7050
TIMA	Thermal Insulation Manufacturers Assoc. (This Organization is now defunct. See NAIMA)	
TPI	Truss Plate Institute 583 D'Onofrio Dr., Suite 200 Madison, WI 53719	(608) 833-5900
UL	Underwriters Laboratories 333 Pfingsten Rd. Northbrook, IL 60062	(708) 272-8800
UNI	Uni-Bel PVC Pipe Assoc. 2655 Villa Creek Dr., Suite 155 Dallas, TX 75234	(214) 243-3902
USP	U.S. Pharmacopoeial Convention 12601 Twinbrook Parkway Rockville, MD 20852	(301) 881-0666

WA	Wallcoverings Assoc. 401 N. Michigan Ave. Chicago, IL 60611-4267	(312) 644-6618
WCLIB	West Coast Lumber Inspection Bureau P.O. Box 23145 Portland, OR 97281	(503) 639-0651
WCMA	Window Covering Manufacturers Assoc. 355 Lexington Ave., 17th Floor New York, NY 10017	(212) 661-4261
WIC	Woodwork Institute of California P.O. Box 11428 Fresno, CA 93773-1428	(209) 233-9035
WLPDIA	Western Lath, Plaster, Drywall Industries Assoc. (Formerly California Lath & Plaster Assoc.) 8635 Navajo Rd. San Diego, CA 92119	(619) 229-8307
WRI	Wire Reinforcement Institute 1101 Connecticut Ave. NW, Suite 700 Washington, DC 20036-4303	(202) 429-5125
WSC	Water Systems Council 600 S. Federal St., Suite 400 Chicago, IL 60605	(312) 922-6222
WSFI	Wood and Synthetic Flooring Institute 4415 W. Harrison St., Suite 242-C Hillside, IL 60162	(708) 449-2933
WWPA	Western Wood Products Assoc. Yeon Building 522 SW 5th Ave. Portland, OR 97204-2122	(503) 224-3930
WWPA	Woven Wire Products Assoc. 2515 N. Nordica Ave. Chicago, IL 60635	(312) 637-1359

G. Federal Government Agencies: Names and titles of federal government standard- or Specification-producing agencies are often abbreviated. The following acronyms or abbreviations referenced in the Contract Documents indicate names of standard- or Specification-producing agencies of the federal government. Names and addresses are subject to change and are believed, but are not assured, to be accurate and up-to-date as of the date of the Contract Documents.

CE	Corps of Engineers (U.S. Department of the Army) Chief of Engineers - Referral Washington, DC 20314	(202) 272-0660
CFR	Code of Federal Regulations	

	(Available from the Government Printing Office) N. Capitol St. between G and H St., NW Washington, DC 20402 (Material is usually first published in the "Federal Register")	(202) 783-3238
CPSC	Consumer Product Safety Commission 5401 Westbard Ave. Bethesda, MD 20207	(800) 638-2772
CS	Commercial Standard (U.S. Department of Commerce) Government Printing Office Washington, DC 20402	(202) 783-3238
DOC	Department of Commerce 14th St. and Constitution Ave., NW Washington, DC 20230	(202) 482-2000
DOT	Department of Transportation 400 Seventh St., SW Washington, DC 20590	(202) 366-4000
EPA	Environmental Protection Agency 401 M St., SW Washington, DC 20460	(202) 382-2090
FAA	Federal Aviation Administration (U.S. Department of Transportation) 800 Independence Ave., SW Washington, DC 20590	(202) 366-4000
FCC	Federal Communications Commission 1919 M St., NW Washington, DC 20554	(202) 632-7000
FDA	Food and Drug Administration 5600 Fishers Lane Rockville, MD 20857	(301) 443-1544
FHA	Federal Housing Administration (U.S. Department of Housing and Urban Development) 451 Seventh St., SW Washington, DC 20201	(202) 708-1422
FS	Federal Specification (from GSA) Specifications Unit (WFSIS) 7th and D St., SW Washington, DC 20407	(202) 708-9205
GSA	General Services Administration F St. and 18th St., NW Washington, DC 20405	(202) 708-5082

MIL	Military Standardization Documents (U.S. Department of Defense) Naval Publications and Forms Center 5801 Tabor Ave. Philadelphia, PA 19120	
NIST	National Institute of Standards and Technology (U.S. Department of Commerce) Gaithersburg, MD 20899	(301) 975-2000
OSHA	Occupational Safety and Health Administration (U.S. Department of Labor) 200 Constitution Ave., NW Washington, DC 20210	(202) 219-6091
PS	Product Standard of NBS (U.S. Department of Commerce) Government Printing Office Washington, DC 20402	(202) 783-3238
REA	Rural Electrification Administration (U.S. Department of Agriculture) 14th St. and Independence Ave., SW Washington, DC 20250	(202) 447-2791
USDA	U.S. Department of Agriculture Independence Ave. between 12th St. and 14th St., SW Washington, DC 20250	(202) 720-2791
USPS	U.S. Postal Service 475 L'Enfant Plaza, SW Washington, DC 20260-0010	(202) 268-2000

1.5 GOVERNING REGULATIONS AND AUTHORITIES

A. Copies of Regulations: Obtain copies of the following regulations and retain at the Project Site to be available for reference by parties who have a reasonable need.

1.6 SUBMITTALS

A. Permits, Licenses, and Certificates: For the 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 in conjunction with compliance with standards and regulations bearing upon performance of the Work.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

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SECTION 014500 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

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

B. Quality-control services include inspections, tests, and related actions, including reports performed by Contractor, by independent agencies, and by governing authorities. They do not include contract enforcement activities performed by Architect.

C. Inspection and testing services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with Contract Document requirements.

D. Requirements of this Section relate to customized fabrication and installation procedures, not production of standard products.

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

E. Related Sections: The following Sections contain requirements that relate to this Section:

1. Division 1 Section "Cutting and Patching" specifies requirements for repair and restoration of construction disturbed by inspection and testing activities.
2. Division 1 Section "Submittals" specifies requirements for development of a schedule of required tests and inspections.

F. Referenced Standards: If compliance with two or more standards is specified and the standards establish different or conflicting requirements, comply with the most stringent requirement. Refer uncertainties to Architect for a decision.

G. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum. The actual installation may exceed the minimum within reasonable limits. Indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision.

H. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, notices, receipts for fee payments, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

I. Testing Agency Qualifications: An independent agency with the experience and capability to conduct testing and inspecting indicated; and where required by authorities having jurisdiction, that is acceptable to authorities.

J. 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.

K. Testing Agency Responsibilities: Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.

1. Promptly notify Architect and Contractor of irregularities or deficiencies in the Work observed during performance of its services.
2. Do not release, revoke, alter, or increase requirements of the Contract Documents or approve or accept any portion of the Work.
3. Do not perform any duties of Contractor.

L. Associated Services: Cooperate with testing agencies and provide reasonable auxiliary services as requested. 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. Security and protection for samples and for testing and inspecting equipment.

M. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.

1. Schedule times for tests, inspections, obtaining samples, and similar activities.

1.3 RESPONSBILITIES

A. Contractor Responsibilities: Unless otherwise indicated as the responsibility of another identified entity, Contractor shall provide inspections, tests, and other quality-control services specified elsewhere in the Contract Documents and required by authorities having jurisdiction. Costs for these services are included in the Contract Sum.

1. Where individual Sections specifically indicate that certain inspections, tests, and other quality-control services are the Contractor’s responsibility, the Contractor shall employ and pay a qualified independent testing agency to perform quality-control services. Costs for these services are included in the Contract Sum.
2. Where individual Sections specifically indicate that certain inspections, tests, and other quality-control services are the Owner’s responsibility, the Owner will employ and pay a qualified independent testing agency to perform those services.
3. Where individual Sections specifically indicate that certain inspections, tests, and other quality-control services are the Owner’s responsibility, the Owner will engage the services of a qualified independent testing agency to perform those services. Payment for these services will be made from the Inspection and Testing Allowance, as authorized by Change Orders.

a. Where the Owner has engaged a testing agency for testing and inspecting part of the Work, and the Contractor is also required to engage an entity for the same or related element, the Contractor shall not employ the entity engaged by the Owner, unless agreed to in writing by the Owner.

B. Retesting: The Contractor is responsible for retesting where results of inspections, tests, or other quality-control services prove unsatisfactory and indicate noncompliance with Contract Document requirements, regardless of whether the original test was Contractor's responsibility.

1. The cost of retesting construction, revised or replaced by the Contractor, is the Contractor's responsibility where required tests performed on original construction indicated noncompliance with Contract Document requirements.

C. Associated Services: Cooperate with agencies performing required inspections, tests, and similar services, and provide reasonable auxiliary services as requested. Notify the agency sufficiently in advance of operations to permit assignment of personnel. Auxiliary services required include, but are not limited to, the following.

1. Provide access to the Work.
2. Furnish incidental labor and facilities necessary to facilitate inspections and tests.
3. Take adequate quantities of representative samples of materials that require testing or assist the agency in taking samples.
4. Provide facilities for storage and curing of test samples.
5. Deliver samples to testing laboratories.
6. Provide the agency with a preliminary design mix proposed for use for materials mixes that require control by the testing agency.
7. Provide security and protection of samples and test equipment at the Project Site.

D. Duties of the testing Agency: The independent agency engaged to perform inspections, sampling, and testing of materials and construction specified in individual Sections shall cooperate with the Architect, and the Contractor in performance of the agency's duties. The testing agency shall provide qualified personnel to perform required inspections and tests.

1. The agency shall notify the Architect, and the Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
2. The agency is not authorized to release, revoke, alter or enlarge requirements of the Contract Documents or approve or accept any portion of the Work.
3. The agency is not authorized to release, revoke, alter or enlarge requirements of the Contract Documents or approve or accept any portion of the Work.

E. Coordination: Coordinate the sequence of activities to accommodate required services with a minimum of delay.

1. Coordinate activities to avoid the necessity of removing and replacing construction to accommodate inspections and tests.
2. The Architect is responsible for scheduling times for inspections tests, taking samples, and similar activities.

1.4 SUBMITTALS

A. Unless the Contractor is responsible for this service, the independent testing agency shall submit a certified written report, induplicate, of each inspection, test, or similar service through the Contractor.

1. Submit additional copies of each written report directly to the governing authority, when the authority so directs.
2. Report Data: Written reports of each inspection, test, or similar service include, but are not limited to, the following:

    a. Date of issue.
    b. Project title and number.
    c. Name, address, and telephone number of testing agency.
    d. Dates and locations of samples and tests or inspections.
    e. Names of individuals making the inspection or test.
    f. Designation of the Work and test method.
    g. Identification of product and Specification Section.
    h. Complete inspection or test data.
    i. Test results and an interpretations of test results.
    j. Ambient conditions at the time of sample taking and testing.
    k. Comments or professional opinion on whether inspected or tested Work complies with Contract document requirements.
    l. Name and signature of laboratory inspector.
    m. Recommendations on retesting.

1.5 QUALITY ASSURANCE

A. Qualifications for Service Agencies: Engage inspection and testing service agencies, including independent testing laboratories, that are pre-qualified as complying with the American Council of Independent Laboratories “Recommended Requirements for Independent Laboratory Qualification” and that specialize in the types of inspections and test to be performed.

1. Each independent inspection and testing agency engaged on the Project shall be authorized by authorities having jurisdiction to operate in the state where the project is located.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 REPAIR AND PROTECTION

A. General: Upon completion of inspection, testing, sample taking and similar services, repair damaged construction and restore substrates and finishes. Comply with Contract Document requirements for Division 1 Section “Cutting and Patching.”

B. Protect construction exposed by or for quality-control service activities, and protect repaired construction.

C. Repair and protection is Contractor’s responsibility, regardless of the assignment of responsibility for inspection, testing, or similar services.

END OF SECTION 014500

SECTION 01 50 00 – 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. This Section includes requirements for temporary utilities, support facilities, and security and protection facilities.

B. Related Sections include the following:

1. Division 01 Section "Summary of Work" for limitations on utility interruptions and other work restrictions.
2. Division 01 Section "Submittal Procedures" for procedures for submitting copies of implementation and termination schedule and utility reports.
3. Division 01 Section "Execution" for progress cleaning requirements.

1.3 DEFINITIONS

A. Permanent Enclosure: As determined by Architect, exterior walls are insulated and weathertight; and all openings are closed with permanent construction or substantial temporary closures.

1.4 USE CHARGES

A. General: Cost or use charges for temporary facilities shall be included in the Contract Sum. 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. Water Service: 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.

C. Electric Power: Owner shall supply single-phase electric power from existing building distribution systems for use by all Prime Contracts, for each Phased building area.

1. EC shall install temporary facilities as outlined in their Scope of Work and related Division 01.
2. Owner shall not be responsible for supplying temporary three-phase power.
3. Staging Area Power: The Owner shall be responsible for all power use charges associated with this facility; the Prime Contract shall enforce power conservation measures with their facilities and those of their sub-contractors.

D. Telephone/Internet: Each Prime Contract shall be responsible for use charges associated with their respective telephone and internet access requirements.

1.5 SUBMITTALS

A. Site Plan: Show temporary facilities, egress plans, utility hookups, staging areas, and parking areas for construction personnel.

All contractors are required to provide "egress plans" for both interior and exterior work for locations where work will close off any exits, corridors, pathways, roads, and any access way. These plans are to be provided in advance at least 2 months before work commences in that area, no work shall be started in any manner without approval of such plan. The failure to provide such plan for coordinating and scheduling will result into back charges to the prime(s) involved. These plans must include all locations and details where scaffolding, fencing and all temporary construction barriers are required.

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.

1.7 PROJECT CONDITIONS

A. A. Temporary Use of Permanent Facilities: Prime Contract, as installer of each permanent service shall assume responsibility for its operation, maintenance, and protection during use as a construction facility prior to the Owner's acceptance, regardless of previously assigned temporary facilities and controls responsibility.

B. Owner's Facilities: Contractors are <u>not</u> allowed to use the Owner's facilities (toilets, telephone, food service, etc.) for their own benefit. Prime Contract Superintendents shall enforce this policy with their respective work forces.

1. Parking will be restricted to an area determined by the Owner. Owner reserves the right to remove from their property, unauthorized vehicles occupying unauthorized areas, at respective Contractors' expense.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Chain-Link Fencing: Minimum 2 inch, 0.148 inch thick, galvanized steel, chain-link fabric fencing; minimum 6 feet high with galvanized steel pipe posts; minimum 2-3/8 inch OD line posts and 2-7/8 inch OD corner and pull posts.

1. Provide gate openings to accommodate vehicle delivery traffic or as noted. Install gateposts in sizes required for support gates.

2. All temp fencing is to receive privacy screening.

B. Yodock barriers may be provided by the contractor as substitution to fence with driven post. If site conditions or pace of work do not allow for typical fence with driven post, then the contractor is responsible to provide Yodock barriers. This is at the sole discretion of the construction manager.

C. Gypsum Board: Minimum 5/8 inch thick by 48 inches wide by maximum available lengths; regular-type panels with tapered edges. Comply with ASTM C 36/C 36M.

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.

2.2 TEMPORARY FACILITIES

A. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.

1. Store combustible materials apart from building.

B. Porta-jons.: Contractors are not permitted to use the owners toilets facilities unless given permission by the construction manager. The contractor will be required to provide temporary toilet facilities as required for its workforce. Location to be determined by the construction manager.

2.3 EQUIPMENT

A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures. Comply with applicable codes for quantities required. Comply with NFPA for recommended classes for exposure; extinguishers shall be inspected and appropriately tagged prior to being brought on site. Provide stands, painted bright orange, sturdy enough to carry the extinguisher, and built as not to create a tipping hazard.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Locate facilities where directed by site coordinator and 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 and when directed by the Construction Site Coordinator at no additional cost to the owner.

1. Locate facilities to limit site disturbance as specified in Division 01 Section "Summary of Work."

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. Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.

1. Connect temporary sewers to municipal system as directed by authorities having jurisdiction.

C. Water Service: Use of Owner's existing water service facilities will be permitted, as long as facilities are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.

1. Where installations below an outlet might be damaged by spillage or leakage, provide a drip pan of suitable size to minimize water damage. Drain accumulated water promptly from pans.

D. Heating: Provide temporary heating required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.

E. 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.

F. Electric Power Service: Use of Owner's existing single phase electric power service will be permitted, as long as equipment is maintained in a condition acceptable to Owner.

1. See Section 011000 for additional requirements.

G. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.

1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.
2. See Section 011000 for additional requirements.

3.3 SUPPORT FACILITIES INSTALLATION

A. General: Comply with the following:

1. Provide incombustible construction for offices, shops, and sheds located within construction area or within 30 feet of building lines. Comply with NFPA 241.
2. Maintain support facilities until near Substantial Completion. Remove before 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. Parking: Parking will be restricted to an area determined by the Owner. Owner reserves the right to remove from their property, unauthorized vehicles occupying unauthorized areas, at respective Contractors' expense.

D. Project Identification and Temporary Signs: Provide Project identification and other signs. Install signs where indicated to inform public and individuals seeking entrance to Project. Unauthorized signs are not permitted.

1. Provide temporary, directional signs for construction personnel and visitors.
2. Maintain and touchup signs so they are legible at all times.

E. Waste Disposal Facilities: Comply with requirements specified in Division 01 Section "Construction Waste Management and Disposal" and Section 011200, "Summary of Work."

F. 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 01 Section "Execution" for progress cleaning requirements.

G. 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.

H. Existing Stair Usage: Use of Owner's existing stairs will be permitted, as long as stairs are protected, cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore stairs to no less than 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. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that 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 "Multiple Contract Summary."

2. Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.

B. Pest Control: Engage pest-control service to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests and to perform extermination and control procedures at regular intervals so Project will be free of pests and their residues at Substantial Completion. Obtain extended warranty for Owner. Perform control operations lawfully, using environmentally safe materials.

C. Security Enclosure and Lockup: Install substantial temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security.

1. Refer to Section 011200, "Multiple Contract Summary" for additional information.
2. All site contractors are to have a 24hr available emergency contact person available to fix and correct areas that have been compromised after hours, weekends and holidays. Upon notification of such incident, the contractor is required to deploy workers as necessary within 1-2 hours maximum to be on site to correct such matter reported. Emergency personnel contact information shall be submitted within 2 weeks of Notice to Proceed.

3.

D. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
1. Yodock barriers are to be furnished and installed around all site construction zones with chain link fencing panels, posts and signage. All entries to sites are to have lockable gates.
2. Contractor shall ensure that all chain link safety fencings around the work zone are closed off to any adjacent structure, building, etc. at all times.
3. All contractors storing any materials and/or equipment on site shall be fenced in with secured chain link fencing.

E. 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.

1. Where heating or cooling is required and permanent enclosure is not complete, insulate temporary enclosures.

F. 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 plywood on construction operations side.
2. Construct dustproof partitions with 2 layers of 3 mil polyethylene sheet on each side. Cover floor with 2 layers of 3 mil polyethylene sheet, extending sheets 18 inches up the sidewalls. Overlap and tape full length of joints. Cover floor with fire-retardant plywood.
    a. Construct vestibule and airlock at each entrance through temporary partition with not less than 48 inches between doors. Maintain water-dampened foot mats in vestibule.
3. Insulate partitions to provide noise protection to occupied areas.
4. Seal joints and perimeter. Equip partitions with dustproof doors with exit device, closer and security locks.
5. Protect air-handling equipment.
6. Weather strip openings.
7. Provide walk-off mats at each entrance through temporary partition.

G. 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.

1. Prohibit smoking within 50 feet of all school property.
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. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.

D. 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 01 Section "Closeout Procedures."

END OF SECTION 015000

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SECTION 01 60 00 – PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes administrative and procedural requirements governing the Contractor's selection of products for use in the Project.
   1. Single Prime Contract: Provisions of this Section apply to the construction activities of each prime contractor.

B. Related Sections: The following Sections contain requirements that relate to this Section:
   1. Division 1 Section "Electronic Submittal Procedures" specifies requirements for submittal of the Contractor's Construction Schedule and the Submittal Schedule.
   2. Division 1 Section "Substitution Procedures" specifies administrative procedures for handling requests for substitutions made after award of the Contract.

1.3 DEFINITIONS

A. Definitions used in this Article are not intended to change the meaning of other terms used in the Contract Documents, such as "specialties," "systems," "structure," "finishes," "accessories," and similar terms. Such terms are self-explanatory and have well-recognized meanings in the construction industry.
   1. "Products" are items purchased for incorporation in the Work, whether purchased for the Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
      a. "Named Products" are items identified by the manufacturer's product name, including make or model number or other designation, shown or listed in the manufacturer's published product literature, that is current as of the date of the Contract Documents.
   2. "Materials" are products substantially shaped, cut, worked, mixed, finished, refined or otherwise fabricated, processed, or installed to form a part of the Work.
   3. "Equipment" is a product with operational parts, whether motorized or manually operated, that requires service connections, such as wiring or piping.

1.4 QUALITY ASSURANCE

A. Source Limitations: To the fullest extent possible, provide products of the same kind from a single source.

1. When specified products are available only from sources that do not, or cannot, produce a quantity adequate to complete project requirements in a timely manner, consult with the Architect to determine the most important product qualities before proceeding. Qualities may include attributes, such as visual appearance, strength, durability, or compatibility. When a determination has been made, select products from sources producing products that possess these qualities, to the fullest extent possible.

B. Compatibility of Options: When the Contractor is given the option of selecting between 2 or more products for use on the Project, the product selected shall be compatible with products previously selected, even if previously selected products were also options.
   1. Each prime contractor is responsible for providing products and construction methods that are compatible with products and construction methods of other prime or separate contractors.
   2. If a dispute arises between prime contractors over concurrently selectable, but incompatible products, the Architect will determine which products shall be retained and which are incompatible and must be replaced.

C. Nameplates: Except for required labels and operating data, do not attach or imprint manufacturer's or producer's nameplates or trademarks on exposed surfaces of products that will be exposed to view in occupied spaces or on the exterior.
   1. Labels: Locate required product labels and stamps on concealed surfaces or, where required for observation after installation, on accessible surfaces that are not conspicuous.
   2. Equipment Nameplates: Provide a permanent nameplate on each item of service-connected or power-operated equipment. Locate on an easily accessible surface that is inconspicuous in occupied spaces. The nameplate shall contain the following information and other essential operating data:
      a. Name of product and manufacturer.
      b. Model and serial number.
      c. Capacity.
      d. Speed.
      e. Ratings.

1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products according to the manufacturer's recommendations, using means and methods that will prevent damage, deterioration, and loss, including theft.
   1. Schedule delivery to minimize long-term storage at the site and to prevent overcrowding of construction spaces.
   2. Coordinate delivery with installation time to assure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
   3. Deliver products to the site in an undamaged condition in the manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
   4. Inspect products upon delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.
   5. Store products at the site in a manner that will facilitate inspection and measurement of quantity or counting of units.
   6. Store heavy materials away from the Project structure in a manner that will not endanger the supporting construction.
   7. Store products subject to damage by the elements above ground, under cover in a weathertight enclosure, with ventilation adequate to prevent condensation. Maintain temperature and humidity within range required by manufacturer's instructions.

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION

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

B. Product Selection Procedures: The Contract Documents and governing regulations govern product selection. Procedures governing product selection include the following:
   1. Nonproprietary Specifications: When Specifications list products or manufacturers that are available and may be incorporated in the Work, but do not restrict the Contractor to use of these products only, the Contractor may propose any available product that complies with Contract requirements. Comply with Contract Document provisions concerning "substitutions" to obtain approval for use of an unnamed product.
   2. Descriptive Specification Requirements: Where Specifications describe a product or assembly, listing exact characteristics required, with or without use of a brand or trade name, provide a product or assembly that provides the characteristics and otherwise complies with Contract requirements.
   3. Performance Specification Requirements: Where Specifications require compliance with performance requirements, provide products that comply with these requirements and are recommended by the manufacturer for the application indicated.
   4. Manufacturer's recommendations may be contained in published product literature or by the manufacturer's certification of performance.
   5. Compliance with Standards, Codes, and Regulations: Where Specifications only require compliance with an imposed code, standard, or regulation, select a product that complies with the standards, codes, or regulations specified.
   6. Visual Matching: Where Specifications require matching an established Sample, the Architect's decision will be final on whether a proposed product matches satisfactorily.
   7. Where no product available within the specified category matches satisfactorily and complies with other specified requirements, comply with provisions of the Contract Documents concerning "substitutions" for selection of a matching product in another product category.
   8. Visual Selection: Where specified product requirements include the phrase "... as selected from manufacturer's standard colors, patterns, textures ..." or a similar phrase, select a product and manufacturer that complies with other specified requirements. The Architect will select the color, pattern, and texture from the product line selected.
   9. Allowances: Refer to individual Specification Sections and "Allowance" provisions in Division 1 for allowances that control product selection and for procedures required for processing such selections.

PART 3 - EXECUTION

3.1 INSTALLATION OF PRODUCTS

A. Comply with manufacturer's instructions and recommendations for installation of products in the applications indicated. Anchor each product securely in place, accurately located and aligned with other Work.

1. Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

END OF SECTION 01 60 00

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SECTION 017329 - CUTTING AND PATCHING

PART 1 - GENERAL

1.1 SUMMARY

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

B. Definition: "Cutting and patching" includes cutting into existing construction to provide for the installation or performance of other work and subsequent fitting and patching required to restore surfaces to their original condition, and does not apply to new construction procedures, except when new construction is already completed and must be cut and patched due to incorrect sequencing of work and/or improper coordination.

C. Multiple Prime Contracts: Provisions of this Section apply to the construction activities of each prime Contractor.

D. Related Sections: The following Sections contain requirements that relate to this Section:
   1. Division 1 Section "Coordination" for procedures for coordinating cutting and patching with other construction activities.
   2. Refer to other Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work.
      a. Requirements of this Section apply to mechanical and electrical installations. Refer to Division 15 and 16 Sections for other requirements and limitations applicable to cutting and patching mechanical and electrical installations.

1.2 RESPONSIBILITIES

A. General: Each Prime Contractor is responsible to perform cutting and patching for their portion of the Work. Patching work shall restore surfaces to original condition including paint, ceramic, tile, masonry, EIFS, VCT flooring, terrazzo flooring, gypsum wallboard ceilings and walls, etc. The requirements of this section apply to all Prime Contractors, even though certain items of work may be applicable to a specific Prime Contractor.

B. Cutting and patching of completed new construction required due to out of sequence construction and/or improper coordination is the responsibility of the prime Contractor responsible for the out of sequence construction or improper coordination. Cutting and patching of new construction for these purposes shall be accomplished by the Contractor for General Work and shall be paid for by the prime Contractor responsible. The Architect shall be the sole judge of the responsibility for such cutting and patching, and shall prepare change orders to delete monies from the Contract of the responsible prime Contractor and credit those monies to the Contractor for General Work.
   1. Contractor for General Work shall cooperate with Architect and other Contractors to accomplish this cutting and patching with minimal disruption to construction and at reasonable costs.

1.3 SUBMITTALS:

A. Cutting and Patching Proposal: Submit a plan describing procedures well in advance of the time cutting and patching will be performed if the Owner requires approval of these procedures before proceeding. Request approval to proceed. Include the following information, as applicable, in the proposal:

1. Describe the extent of cutting and patching required. Show how it will be performed and indicate why it cannot be avoided.

2. Describe anticipated results in terms of changes to existing construction. Include changes to structural elements and operating components as well as changes in the building's appearance and other significant visual elements.

3. List products to be used and firms or entities that will perform Work.

4. Indicate dates when cutting and patching will be performed.

5. Utilities: List utilities that cutting and patching procedures will disturb or affect. List utilities that will be relocated and those that will be temporarily out-of-service. Indicate how long service will be disrupted.

6. Where cutting and patching involves adding reinforcement to structural elements, submit details and engineering calculations showing integration of reinforcement with the original structure.

7. Approval by the Architect to proceed with cutting and patching does not waive the Architect's right to later require complete removal and replacement of unsatisfactory work.

1.4 QUALITY ASSURANCE:

A. Requirements for Structural Work: Do not cut and patch structural elements in a manner that would change their load-carrying capacity or load-deflection ratio.

1. Obtain approval of the cutting and patching proposal before cutting and patching the following structural elements:
   a. Foundation construction.
   b. Bearing and retaining walls.
   c. Structural concrete.
   d. Structural steel.
   e. Lintels.
   f. Timber and primary wood framing.
   g. Structural decking.
   h. Stair systems.
   i. Miscellaneous structural metals.
   j. Exterior curtain-wall construction.
   k. Equipment supports.
   l. Piping, ductwork, vessels, and equipment.
   m. Structural systems of special construction in Division 13 Sections.

B. Operational Limitations: Do not cut and patch operating elements or related components in a manner that would result in reducing their capacity to perform as intended. Do not cut and patch operating elements or related components in a manner that would result in increased maintenance or decreased operational life or safety.

1. Obtain approval of the cutting and patching proposal before cutting and patching the following operating elements or safety related systems:
   a. Primary operational systems and equipment.
   b. Air or smoke barriers.

c. Water, moisture, or vapor barriers.
d. Membranes and flashings.
e. Fire protection systems.
f. Noise and vibration control elements and systems.
g. Control systems.
h. Communication systems.
i. Conveying systems.
j. Electrical wiring systems.
k. Operating systems of special construction.

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

1. If possible retain the original Installer or fabricator to cut and patch the exposed Work listed below. If it is impossible to engage the original Installer or fabricator, engage another recognized experienced and specialized firm.
   a. Processed concrete finishes.
   b. Stonework and stone masonry.
   c. Ornamental metal.
   d. Matched-veneer woodwork.
   e. Preformed metal panels.
   f. Firestopping.
   g. Window wall system.
   h. Stucco and ornamental plaster.
   i. Acoustical ceilings.
   j. Terrazzo.
   k. Finished wood flooring.
   l. Fluid-applied flooring.
   m. Carpeting.
   n. Aggregate wall coating.
   o. Wall covering.
   p. Swimming pool finishes

1.5 WARRANTY:

A. Existing Warranties: Replace, patch, and repair material and surfaces cut or damaged by methods and with materials in such a manner as not to void any warranties required or existing.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL:

A. Use materials identical to existing materials. For exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible if identical materials are unavailable or cannot be used. Use materials whose installed performance will equal or surpass that of existing materials.

PART 3 - EXECUTION

3.1 INSPECTION:

A. Examine surfaces to be cut and patched and conditions under which cutting and patching is to be performed before cutting. If unsafe or unsatisfactory conditions are encountered, take corrective action before proceeding.

1. Before proceeding, meet at the 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.

3.2 PREPARATION:

A. Temporary Support: Provide temporary support of work to be cut, including shoring, lumber, plywood, etc.

B. Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of the Project that might be exposed during cutting and patching operations.

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

D. Avoid cutting existing pipe, conduit, or ductwork serving the building but scheduled to be removed or relocated until provisions have been made to bypass them.

3.3 PERFORMANCE:

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

1. Cut existing construction to provide for installation of other components or performance of other construction activities and the subsequent fitting and patching required to restore surfaces to their original condition.

B. Cutting: Cut existing construction using methods least likely to damage elements retained or adjoining construction. Where possible, review proposed procedures with the original Installer; comply with the original Installer's recommendations.

1. In general, where cutting, use hand or small power tools designed for sawing or 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. To avoid marring existing finished surfaces, cut or drill from the exposed or finished side into concealed surfaces.

3. Cut through concrete and masonry using a cutting machine, such as a Carborundum saw or a diamond-core drill. (Do not overcut.)

4. Comply with requirements of applicable Division 2 Sections where cutting and patching requires excavating and backfilling.

5. Where services are required to be removed, relocated, or abandoned, by-pass utility services, such as pipe or conduit, before cutting. Cut-off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal the remaining portion of pipe or

conduit to prevent entrance of moisture or other foreign matter after by-passing and cutting.

6. Existing electric and plumbing lines are located beneath floor areas. Contractor will trace out these items and proceed with caution so that existing utilities are not damaged by cutting / demolition.

C. Patching: Patch with durable seams that are as invisible as possible. Comply with specified tolerances.

1. Where feasible, inspect and test patched areas to demonstrate integrity of the installation.

2. 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. Where removing walls or partitions extends one finished area into another, patch and repair floor and wall surfaces in the new space. 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.
   a. Where patching occurs in a smooth painted surface, extend final paint coat over entire unbroken surface containing the patch after the area has received primer and second coat.

4. Patch, repair, or re-hang existing ceilings as necessary to provide an even-plane surface of uniform appearance.

3.4 CLEANING:

A. Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar items. Thoroughly clean piping, conduit, and similar features before applying paint or other finishing materials. Restore damaged pipe covering to its original condition.

END OF SECTION 017329

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SECTION 017423 – CLEANING UP

PART 1 - GENERAL

1.1 Description of Work:

A. The work of this section relates to the following:

1. Maintain premises and public properties and roadways free from accumulations of waste, debris, dirt, mud and rubbish caused by operations.
2. At completion of work, remove waste materials, rubbish tools, equipment, machinery and surplus materials, and clean all sight exposed surfaces; leave project clean and ready for occupancy.
3. Remove all overspray caused by construction operations from adjacent construction, surfaces and vehicles.

B. Related Requirements Specified Elsewhere

1. Summary of work: Section 01 10 00
2. Cutting and Patching: Section 01 73 29
3. Cleaning for Specific Products or Work: the respective sections of the specifications:

1.2 Safety Requirements

A. Standards: Maintain project in accord with safety and insurance standards.

B. Hazard Control

1. Store volatile waste in covered metal containers and remove from premises daily.
2. Prevent accumulations of waste which create hazardous conditions.
3. Provide adequate ventilation during use of volatile or noxious substances.

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

1. Do not burn or bury rubbish and waste materials on project site.
2. Do not dispose of volatile waste such as mineral spirits, oil, or paint thinner in storm or sanitary drains.
3. Do not dispose of waste into streams or waterways.

PART 2 - PRODUCTS

2.1 Materials: Use only cleaning materials recommended by manufacturer of surface to be cleaned.

PART 3 - EXECUTION

3.1 During Construction Each Contract Shall:

A. Execute daily cleaning to ensure that building, grounds, and public properties and roadways are maintained free from accumulations of waste materials, rubbish, dirt and mud.

B. Wet down dry materials and rubbish to lay dust and prevent blowing dust. Erect dustproof barriers to keep dust from drifting through the building.

C. Each day, all contractors shall affect the following:

1. Areas of intense activity, such as cutting and sawing must be swept clean and reorganized at the end of each day.
2. Areas of moderate activity such as installation of plumbing, ductwork, electrical work must be returned to good order at the end of each day.
3. Debris below scaffolds (and shoring/re-shoring) must at all time, be kept sufficiently consolidated to keep walkways free of tripping hazards. These work areas must also be swept clean immediately upon removal of scaffolds.
4. All swept up debris, waste materials, and packing must be removed and placed in the dumpster by noon of the following workday.
5. All sorted material must be kept in good order.
6. As portions of the work are completed, all used and excess materials must be removed promptly.
7. Daily Clean-up and good housekeeping is the responsibility of each contractor individually and will be monitored by the Construction Manager.
8. Contractors shall promptly comply with requests to organize scatted materials.

D. Each contractor is responsible for furnishing all dumpsters or other such containers as required for collection, storage and legal disposal of all debris and rubbish resultant from the construction operation. The Construction Manager shall locate, maintain and move such containers as necessary and legally dispose of waste as containers are filled. Separate and recycle as required authorities and regulations.

E. Vacuum clean interior building areas when ready to receive finish painting, and continue vacuum cleaning on an as needed basis until building is ready for Substantial Completion or occupancy.

F. Handle materials in a controlled manner with as few handlings as possible; do not drop or throw materials from heights.

G. Schedule cleaning operations so that dust and other containment resulting from cleaning process will not fall on wet, newly painted surfaces.

3.2 FINAL CLEANING

A. Each Contractor Shall:

1. Employ experienced workmen, or professional cleaners, for final cleaning.
2. In preparation for substantial completion or occupancy, conduct final inspection of sight exposed interior and exterior surfaces, and of concealed spaces.
3. Remove grease, dust, dirt, stains, labels, fingerprints, and other foreign materials form sight-exposed interior and exterior finished surfaces; polish surface so designated to shine finish.
4. Maintain cleaning until project, or portion thereof, is occupied by owner.
5. Repair, patch and touch up marred surfaces to specified finish, to match adjacent surfaces.

B. General Work Contractor shall complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or portion of Project:

1. Wash all transparent materials including mirrors and glass in doors and windows (inside and out).
2. Vacuum clean carpeting and epoxy flooring.
3. Wash & wax resilient tile floors.
4. Wash and polish all terrazzo and ceramic tile.
5. Dust/ clean all finished surfaces including casework, window sills, toilet partitions/ accessories, hardware, specialties, etc.
6. Restoration of any lawn areas disturbed by construction operations.

C. Mechanical Work Contractor shall complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or portion of Project:
1. Restoration of any lawn areas disturbed by construction operations.
2. Replace disposable filters on HVAC units. Clean permanent air filters.
3. Clean ducts, blowers and coils if dusty/ soiled during construction process
4. Final clean surfaces of all HVAC equipment including dust, paint, taping compound, mortar droppings, etc. (Unit ventilators, unit heaters, convectors, fintube, diffusers/ grills, etc).

D. Electrical Work Contractor shall complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or portion of Project:

1. Clean light fixtures, lamps, globes & reflectors. Replace burned out bulbs, noisy starters, etc.
2. Clean surfaces of all electrical equipment.

3.3 RECYCLING DEMOLITION AND CONSTRUCTION WASTE, GENERAL

A. General: Recycle paper and beverage containers used by on-site workers.

B. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type.

1. Provide appropriately marked containers or bins for controlling recyclable waste until removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.

2. Remove recyclable waste from Owner's property and transport to recycling receiver or processor.

3.4 RECYCLING DEMOLITION AND CONSTRUCTION WASTE

A. Recycle demolition and construction waste at local recycling centers where reasonable.

3.5 DISPOSAL OF WASTE

A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.

B. Disposal: Remove waste materials from Owner's property and legally dispose of them.

END OF SECTION 017423

SECTION 01 77 00 - EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for contract closeout including, but not limited to, the following:

1. Inspection procedures.
2. Project record document submittal.
3. Operation and maintenance manual submittal.
4. Submittal of warranties.
5. Final cleaning.

B. Closeout requirements for specific construction activities are included in the appropriate Sections.

C. Multiple Prime Contracts: Provisions of this Section apply to the construction activities of each Prime Contractor.

1.3 SUBSTANTIAL COMPLETION

A. Preliminary Procedures: Before requesting inspection for certification of Substantial Completion, complete the following. List exceptions in the request.

1. In the Application for Payment that coincides with, or first follows, the date Substantial Completion is claimed, show 100 percent completion for the portion of the Work claimed as substantially complete.

    a. Include supporting documentation for completion as indicated in these Contract Documents and a statement showing an accounting of changes to the Contract Sum.
    b. If 100 percent completion cannot be shown, include a list of incomplete items, the value of incomplete construction, and reasons the Work is not complete.

2. Advise the Owner of pending insurance changeover requirements.
3. Submit specific warranties, workmanship bonds, maintenance agreements, final certifications, and similar documents.
4. Obtain and submit releases enabling the Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.

5. Submit record drawings, maintenance manuals, final project photographs, damage or settlement surveys, property surveys, and similar final record information.
6. Deliver tools, spare parts, extra stock, and similar items.
7. Make final changeover of permanent locks and transmit keys to the Owner. Advise the Owner's personnel of changeover in security provisions.
8. Complete startup testing of systems and instruction of the Owner's operation and maintenance personnel. Discontinue and remove temporary facilities from the site, along with mockups, construction tools, and similar elements.
9. Complete final cleanup requirements, including touchup painting.
10. Touch up and otherwise repair and restore marred, exposed finishes.

B. Inspection Procedures: On receipt of a request for inspection, the Architect will either proceed with inspection or advise the Contractor of unfilled requirements. The Architect will prepare the Certificate of Substantial Completion following inspection or advise the Contractor of construction that must be completed or corrected before the certificate will be issued.

1. The Architect will repeat inspection when requested and assured that the Work is substantially complete.
2. Results of the completed inspection will form the basis of requirements for final acceptance.

1.4 FINAL ACCEPTANCE

A. Preliminary Procedures: Before requesting final inspection for certification of final acceptance and final payment, complete the following. List exceptions in the request.

1. Submit the final payment request with releases and supporting documentation not previously submitted and accepted. Include insurance certificates for products and completed operations where required.
2. Submit an updated final statement, accounting for final additional changes to the Contract Sum.
3. Submit a certified copy of the Architect's final inspection list of items to be completed or corrected, endorsed and dated by the Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance and shall be endorsed and dated by the Architect.
4. Submit final meter readings for utilities, a measured record of stored fuel, and similar data as of the date of Substantial Completion or when the Owner took possession of and assumed responsibility for corresponding elements of the Work.
5. Submit consent of surety to final payment.
6. Submit a final liquidated damages settlement statement.
7. Submit evidence of final, continuing insurance coverage complying with insurance requirements.

B. Re-inspection Procedure: The Architect will re-inspect the Work upon receipt of notice that the Work, including inspection list items from earlier inspections, has been completed, except for items whose completion is delayed under circumstances acceptable to the Architect.

1. Upon completion of re-inspection, the Architect will prepare a certificate of final acceptance. If the Work is incomplete, the Architect will advise the Contractor of Work that is incomplete or of obligations that have not been fulfilled but are required for final acceptance.
2. If necessary, re-inspection will be repeated, but may be chargeable to the Owner and back-chargeable to the Contractor in conditions within his control.

1.5 RECORD DOCUMENT SUBMITTALS

A. General: Do not use record documents for construction purposes. Protect record documents from deterioration and loss in a secure, fire-resistant location. Provide access to record documents for the Architect's reference during normal working hours.

B. Record Drawings: Maintain a clean, undamaged set of blue or black line white-prints of Contract Drawings and Shop Drawings. Mark the set to show the actual installation where the installation varies substantially from the Work as originally shown. Mark which drawing is most capable of showing conditions fully and accurately. Where Shop Drawings are used, record a cross-reference at the corresponding location on the Contract Drawings. Give particular attention to concealed elements that would be difficult to measure and record at a later date.

1. Mark record sets with red erasable pencil. Use other colors to distinguish between variations in separate categories of the Work.
2. Mark new information that is important to the Owner but was not shown on Contract Drawings or Shop Drawings.
3. Note related change-order numbers where applicable.
4. Organize record drawing sheets into manageable sets. Bind sets with durable-paper cover sheets; print suitable titles, dates, and other identification on the cover of each set.

C. Record Specifications: Maintain one complete copy of the Project Manual, including addenda. Include with the Project Manual one copy of other written construction documents, such as Change Orders and modifications issued in printed form during construction.

1. Mark these documents to show substantial variations in actual Work performed in comparison with the text of the Specifications and modifications.
2. Give particular attention to substitutions and selection of options and information on concealed construction that cannot otherwise be readily discerned later by direct observation.
3. Note related record drawing information and Product Data.
4. Upon completion of the Work, submit record Specifications to the Architect for the Owner's records.

D. Record Product Data: Maintain one copy of each Product Data submittal. Note related Change Orders and markup of record drawings and Specifications.

1. Mark these documents to show significant variations in actual Work performed in comparison with information submitted. Include variations in products delivered to the site and from the manufacturer's installation instructions and recommendations.
2. Give particular attention to concealed products and portions of the Work that cannot otherwise be readily discerned later by direct observation.
3. Upon completion of markup, submit complete set of record Product Data to the Architect for the Owner's records.

E. Record Sample Submitted: Immediately prior to Substantial Completion, the Contractor shall meet with the Architect and the Owner's personnel at the Project Site to determine which Samples are to be transmitted to the Owner for record purposes. Comply with the Owner's instructions regarding delivery to the Owner's Sample storage area.

F. Miscellaneous Record Submittals: Refer to other Specification Sections for requirements of miscellaneous record keeping and submittals in connection with actual performance of the Work. Immediately prior to the date or dates of Substantial Completion, complete miscellaneous records and place in good order. Identify miscellaneous records properly and

bind or file, ready for continued use and reference. Submit to the Architect for the Owner's records.

G. Maintenance Manuals: 3 copies required. Organize operation and maintenance data into suitable sets of manageable size. Bind properly indexed data in individual, heavy-duty, 2-3 inch, 3-ring, vinyl-covered binders, with pocket folders for folded sheet information. Mark appropriate identification on front and spine of each binder. Include the following types of information:

1. Emergency instructions.
2. Spare parts list.
3. Copies of warranties.
4. Wiring diagrams.
5. Recommended "turn-around" cycles.
6. Inspection procedures.
7. Shop Drawings and Product Data.
8. Fixture lamping schedule.

H. Waivers, guarantees, certification letters, AIA documents, etc.: See checklist attachment at the end of this section

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 CLOSEOUT PROCEDURES

A. Operation and Maintenance Instructions: Arrange for each Installer of equipment that requires regular maintenance to meet with the Owner's personnel to provide instruction in proper operation and maintenance. Provide instruction by manufacturer's representatives if installers are not experienced in operation and maintenance procedures. Include a detailed review of the following items:

1. Maintenance manuals.
2. Record documents.
3. Spare parts and materials.
4. Tools.
5. Lubricants.

6. Fuels.

7. Identification systems.

8. Control sequences.

9. Hazards.

10. Cleaning.

11. Warranties and bonds.

12. Maintenance agreements and similar continuing commitments.

B. As part of instruction for operating equipment, demonstrate the following procedures:

1. Startup.

2. Shutdown.

3. Emergency operations.

4. Noise and vibration adjustments.

5. Safety procedures.

6. Economy and efficiency adjustments.

7. Effective energy utilization.

C. Record "As-Built" Drawings

1. Upon completion of the work, and review of the record drawings by the Architect, prepare a final set of record drawings using reproducible mylar or vellum. Submit final set of transparencies to Architect.

2. The cost of furnishing above prints and preparing these record drawings shall be included in the contract price

3.2 FINAL CLEANING

A. General: The General Conditions require general cleaning during construction. Regular site cleaning is included in Division 1 Section “Temporary Facilities and Controls."

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to the condition expected in a normal, commercial building cleaning and maintenance program. Comply with manufacturer's instructions.

1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion.

a. Remove labels that are not permanent labels.

b. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other substances that are noticeable vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials.

c. Clean exposed exterior and interior hard-surfaced finishes to a dust-free condition, free of stains, films, and similar foreign substances. Restore reflective surfaces to their original condition. Leave concrete floors broom clean. Vacuum carpeted surfaces.

d. Wipe surfaces of mechanical and electrical equipment. Remove excess lubrication and other substances. Clean plumbing fixtures to a sanitary condition. Clean light fixtures and lamps.

e. Clean the site, including landscape development areas, of rubbish, litter, and other foreign substances. Sweep paved areas broom clean; remove stains, spills, and other foreign deposits. Rake grounds that are neither paved nor planted to a smooth, even-textured surface.

C. Pest Control: Engage an experienced, licensed exterminator to make a final inspection and rid the Project of rodents, insects, and other pests.

D. Removal of Protection: Remove temporary protection and facilities installed for protection of the Work during construction.

E. Compliance: Comply with regulations of authorities having jurisdiction and safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on the Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from the site and dispose of lawfully.

1. Where extra materials of value remain after completion of associated Work, they become the Owner's property. Dispose of these materials as directed by the Owner.

3.3 DEMONSTRATION AND TRAINING

A. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system. Arrange for three separate days of training, each separated by a minimum of two weeks covering all systems and equipment. Include a detailed review of the following:

1. Include instruction for basis of system design and operational requirements, review of documentation, emergency procedures, operations, adjustments, troubleshooting, maintenance, and repairs.

2. All owner training sessions to be recorded to DVD by the contractor and shall be of sufficient quality to allow the DVD to serve as a training guide for new employees. Contractor will provide 3 copies of each DVD in their closeout submittal.

3.4 CLOSEOUT CHECKLIST

A. See attached checklist for required wage & supplements, lien release, guarantee / warranties, etc.

END OF SECTION 017700

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SECTION 01 77 01 - CHECKLIST FOR PROJECT CLOSEOUT AND PROCESSING OF FINAL PAYMENT

PART 1 - GENERAL

1.1 Final payment will not be processed until all items indicated are received in accordance with Section 01 77 00 - EXECUTION AND CLOSEOUT REQUIREMENTS.

1.2 Close-Out Submittals:

1. [ ] Wage & Supplements Verification Form from prime and subcontractors (copy attached).
2. [ ] Three (3) bound, hard cover, 3-ring binder brochures of Operation and Maintenance. Manuals for all equipment installed on the project:
3. [ ] Typed or printed instructions covering the care and operations of equipment and systems furnished and installed.
4. [ ] Manufacturers instruction books, diagrams, spare parts lists covering all equipment.
5. [ ] Instruction of Owner's Representative in care and maintenance of new equipment.
6. [ ] All approved shop drawings.
7. [ ] Certificates of compliance and inspection. (Where applicable - electric, elevator, etc.)
8. [ ] Spare parts and Maintenance Materials.
9. [ ] Evidence of compliance with requirements of governing authorities (Certificates of Inspection for Electrical).
10. [ ] Certificates of insurance for products and completed operations.
11. [ ] Notarized statement that only non-asbestos materials were installed on this project.
12. [ ] Fully executed certificate of substantial completion: AIA G734.
13. [ ] Contractor's written Two-year warranty and extended warranties (if any required).
14. [ ] Project Record Documents: Section 01 7700.
15. [ ] As-Built Drawings.

1.3 Evidence of Payments and Release of Liens:

1. [ ] Contractor's Affidavit of Payment of Debts and Claims: AIA G706.
2. [ ] Contractor's Affidavit of Release of Liens - AIA G706A with:
3. [ ] Separate written releases of waivers and liens for subcontractors, suppliers, and others with lien rights against the property of owner, together with a list of those parties – AIA G706A.
4. [ ] Contractor's written release or waiver of lien upon payment to the Contractor pursuant to New York State lien law.
5. [ ] Consent of Surety to Final Payment: AIA G707.

END OF SECTION 017701

Nanuet Union Free School District

Contractor Wage and Supplement Certification

I _____ am an officer

of_____ (Prime Contractor)

and I am duly authorized to make this affidavit for the Public Contract for the Nanuet Union Free School District.

That I fully comprehend the terms and provisions of section 220-1 of the Labor Law.

That I have been issued a copy of the schedule of Wages and Supplements, as specified in the project manual.

That I agree to pay the applicable Prevailing Wage and will pay or provide the supplements specified.

_____
Contractor

_____
Signature

_____
Print Name

_____
President

ACKNOWLEDGMENT:

STATE OF NEW YORK
COUNTY OF _____:SS.:

On this _____ day of _____, 20___before me personally came

_____ to me known and known to me to be the person described in and who executed the foregoing instrument and acknowledged that he executed the same.

_____
Notary Public

_____
County

Nanuet Union Free School District

Subcontractor Wage and Supplement Certification

That I am an officer of _____ and am duly authorized to make

this affidavit on behalf of the Subcontract to _____

(Prime Contractor) on Public Contract for the Nanuet Union Free School District.

That I fully comprehend the terms and provisions of section 220-1 of the Labor Law.

That I have been issued a copy of the schedule of Wages and Supplements, as specified in the project manual.

That I agree to pay the applicable Prevailing Wage and will pay or provide the supplements specified.

_____
Subcontractor

_____
Signature

_____
Print Name

_____
President

ACKNOWLEDGMENT:

STATE OF NEW YORK
COUNTY OF _____:SS.:

On this _____ day of _____, 20___before me personally came

_____ to me known and known to me to be the person described in and who executed the foregoing instrument and acknowledged that he executed the same.

_____
Notary Public

_____
County

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SECTION 01 78 23 - 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. This Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:

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

1.3 DEFINITIONS

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

B. Subsystem: A portion of a system with characteristics similar to a system.

1.4 SUBMITTALS

A. Initial Submittal: Submit 2 draft copies of each manual at least 15 days before requesting inspection for Substantial Completion. Include a complete operation and maintenance directory. Architect will return one copy of draft and mark whether general scope and content of manual are acceptable.

B. Final Submittal: Submit four of each manual in final form at least 15 days before final inspection. Architect will return copy with comments within 15 days after final inspection.

1.5 COORDINATION

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

PART 2 - PRODUCTS

2.1 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY

A. Organization: Include a section in the directory for each of the following:

1. List of documents.
2. List of systems.
3. List of equipment.
4. Table of contents.

B. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.

C. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.

D. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.

E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

2.2 MANUALS, GENERAL

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

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

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

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

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

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

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

1. Binders: Heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2 by11 inch paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.
   a. If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system.
   b. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter of contents. Indicate volume number for multiple-volume sets.
2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software diskettes for computerized electronic equipment.
4. Supplementary Text: Prepared on 8-1/2 by 11 inch 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. Water leak.

5. Power failure.
6. Water outage.
7. System, subsystem, or equipment failure.
8. Chemical release or spill.

C. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.

D. Emergency Procedures: Include the following, as applicable:

1. Instructions on stopping.
2. Shutdown instructions for each type of emergency.
3. Operating instructions for conditions outside normal operating limits.
4. Required sequences for electric or electronic systems.
5. Special operating instructions and procedures.

2.4 OPERATION MANUALS

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

1. System, subsystem, and equipment descriptions.
2. Performance and design criteria if Contractor is delegated design responsibility.
3. Operating standards.
4. Operating procedures.
5. Operating logs.
6. Wiring diagrams.
7. Control diagrams.
8. Piped system diagrams.
9. Precautions against improper use.
10. License requirements including inspection and renewal dates.

B. Descriptions: Include the following:

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

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

1. Startup procedures.
2. Equipment or system break-in procedures.

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

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

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

2.5 PRODUCT MAINTENANCE MANUAL

A. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.

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

C. Product Information: Include the following, as applicable:

1. Product name and model number.
2. Manufacturer's name.
3. Color, pattern, and texture.
4. Material and chemical composition.
5. Reordering information for specially manufactured products.

D. Maintenance Procedures: Include manufacturer's written recommendations and the following:

1. Inspection procedures.
2. Types of cleaning agents to be used and methods of cleaning.
3. List of cleaning agents and methods of cleaning detrimental to product.
4. Schedule for routine cleaning and maintenance.
5. Repair instructions.

E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.

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

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

2.6 SYSTEMS AND EQUIPMENT MAINTENANCE MANUAL

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

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

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

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

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

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

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

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

F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts 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.

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 Division 01 Section "Project Record Documents."

G. Comply with Division 01 Section "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

END OF SECTION 017823

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SECTION 017836 - WARRANTIES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes administrative and procedural requirements for warranties required by the Contract Documents, including manufacturer's standard warranties on products and special warranties.
   1. Refer to the General Conditions for terms of the Contractor's period for correction of the Work.
B. Related Sections: The following Sections contain requirements that relate to this Section:
   1. Division 1 Section "Submittals" specifies procedures for submitting warranties.
   2. Division 1 Section "Execution and closeout requirements" specifies contract closeout procedures.
   3. Divisions 2 through 33 Sections for specific requirements for warranties on products and installations specified to be warranted.
   4. Certifications and other commitments and agreements for continuing services to Owner are specified elsewhere in the Contract Documents.
C. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the Work that incorporates the products. Manufacturer's disclaimers and limitations on product warranties do not relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the Contractor.
D. Separate Prime Contracts: Each prime contractor is responsible for warranties related to its own contract.

1.2 DEFINITIONS

A. Standard product warranties are preprinted written warranties published by individual manufacturers for particular products and are specifically endorsed by the manufacturer to the Owner.
B. Special warranties are written warranties required by or incorporated in the Contract Documents, either to extend time limits provided by standard warranties or to provide greater rights for the Owner.

1.3 WARRANTY REQUIREMENTS

A. Related Damages and Losses: When correcting failed or damaged warranted construction, remove and replace construction that has been damaged as a result of such failure or must be removed and replaced to provide access for correction of warranted construction.
B. Reinstatement of Warranty: When Work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.
C. Replacement Cost: Upon determination that Work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with requirements of the Contract Documents. The Contractor is responsible for the cost of replacing or rebuilding defective Work regardless of whether the Owner has benefited from use of the Work through a portion of its anticipated useful service life.
D. Owner's Recourse: Expressed warranties made to the Owner are in addition to implied warranties and shall not limit the duties, obligations, rights, and remedies otherwise available under the law. Expressed warranty periods shall not be interpreted as limitations on the time in which the Owner can enforce such other duties, obligations, rights, or remedies.

1. Rejection of Warranties: The Owner reserves the right to reject warranties and to limit selection to products with warranties not in conflict with requirements of the Contract Documents.

E. Where the Contract Documents require a special warranty, or similar commitment on the Work or part of the Work, the Owner reserves the right to refuse to accept the Work, until the Contractor presents evidence that entities required to countersign such commitments are willing to do so.

1.4 SUBMITTALS

A. Submit written warranties to the Architect prior to the date certified for Substantial Completion. If the Architect's Certificate of Substantial Completion designates a commencement date for warranties other than the date of Substantial Completion for the Work, or a designated portion of the Work, submit written warranties upon request of the Architect.
   1. When a designated portion of the Work is completed and occupied or used by the Owner, by separate agreement with the Contractor during the construction period, submit properly executed warranties to the Architect within 15 days of completion of that designated portion of the Work.

B. When the Contract Documents require the Contractor, or the Contractor and a subcontractor, supplier or manufacturer to execute a special warranty, prepare a written document that contains appropriate terms and identification, ready for execution by the required parties. Submit a draft to the Owner, through the Architect, for approval prior to final execution.
   1. Refer to Divisions 2 through 16 Sections for specific content requirements and particular requirements for submitting special warranties.

C. Form of Submittal: At Final Completion compile 2 copies of each required warranty properly executed by the Contractor, or by the Contractor, subcontractor, supplier, or manufacturer. Organize the warranty documents into an orderly sequence based on the table of contents of the Project Manual.

D. Bind warranties and bonds in heavy-duty, commercial-quality, durable 3-ring, vinyl-covered loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch(115-by-280-mm) paper.
   1. Provide heavy paper dividers with celluloid covered tabs for each separate warranty. Mark the 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 the Installer.
   2. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project title or name, and name of the Contractor.
   3. When warranted construction requires operation and maintenance manuals, provide additional copies of each required warranty, as necessary, for inclusion in each required manual.

PART 2 - PRODUCTS (Not used)

PART 3 - EXECUTION (Not used)

END OF SECTION 017836

Request for Shutdown

PROJECT	Nanuet Union Free School District – Phase 2 Projects	**DATE**
		CONTRACT NO.
KSQ PROJ. # 2111005.00		**CONTRACT FOR**

CONTRACTOR REQUEST		
Contractor Name:		
Foreman:		Emergency Phone:
Type (electrical, etc.):		
Area Affected (room, building, etc.):		
Reason for Shutdown:		
1) Date Requested	From Time:	To Time:
2) Date Requested	From Time:	To Time:
3) Date Requested	From Time:	To Time:
4) Date Requested	From Time:	To Time:
Send to: Jacobs, ATTN:		

OWNER'S REMARKS

Owner's Remarks:

Owner's Signature of Approval: _____ Date: _____

PLEASE NOTIFY ALL AFFECTED!

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Daily Report Cover

PROJECT Nanuet Union Free School District –Phase 2 Projects	**DATE**
	CONTRACT NO.
KSQ PROJ. # 2111005.00	**CONTRACT FOR**

	7:00 AM	Noon	3:30 PM
Temperature			
Weather			

PERSONNEL (list by trade or attach daily time sheet)

SUBCONTRACTORS / PERSONNEL

EQUIPMENT

Send to: Jacobs

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Two Week Look-Ahead Schedule

PROJECT Nanuet Union Free School District – Phase 2 Projects	**DATE** **CONTRACT #**
KSQ PROJ. # 2111005.00	**WORK AREA**

MONTH/YEAR _____

DATES											COMMENTS/NOTES

Send to: Jacobs

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Submittal Schedule

PROJECT: NANUET UNION FREE SCHOOL DISTRICT PHASE 2 PROJECTS

KSQ PROJ. # 2111005.00

SECTION	SUBMITTAL TYPE												DATE SUBMIT	DATE RETURN	ACTION	COMMENT
	Product Data	Shop Drawings	Samples	Certificates	Qualification Data	Test Reports	Pre-Install conference	Maintenance Data	Warranty	Inspection Report	O&M Data	Demo & Training				

SECTION 02 31 32 – GEOTECHNICAL DATA

PART 1 - GENERAL

1.1 GEOTECHNICAL DATA

A. This Document with its referenced attachments is part of the Procurement and Contracting Requirements for Project. They provide Owner's information for Bidders' convenience and are intended to supplement rather than serve in lieu of Bidders' own investigations. They are made available for Bidders' convenience and information but are not a warranty of existing conditions. This Document and its attachments are not part of the Contract Documents.

1. Geotechnical Recommendations for the Proposed High School Additions for Nanuet Schools Nanuet, New York, prepared by Daniel G. Loucks, P.E. Geotechnical Engineering, dated March 3, 2022.

2. Geotechnical Investigation and Recommendations for the Barr Middle School foundation drainage, prepared by The Chazen Companies, dated May 4, 2021.

PART 2 – MATERIALS (Not Used)

PART 3 – EXECUTION (Not Used)

END OF SECTION 02 31 32

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DANIEL G. LOUCKS, P.E.

GEOTECHNICAL ENGINEERING

3 March 2022

Mario Spagnuolo
Nanuet Union Free School District

Re: Geotechnical Recommendations for the Proposed High School Additions for Nanuet Schools
Nanuet, New York
File No. 4060

I have included recommendations for the allowable soil bearing pressures for designing the foundations for the project. These recommendations are based on the test pit information and my own experience.

The scope of my services is limited to observing the excavation of the test pits at the site and providing recommendations for the allowable soil bearing pressure for designing foundations for the proposed building. Recommendations for earthwork for the site have not been included. I also provided test pit logs for the proposed playgrounds at the elementary school.

The recommendations contained in this letter report are based on the information that was provided up to the date the letter report was completed. Any changes in the design of the project or changes to the recommendations provided in this letter report should be brought to my attention to determine if there needs to be any revision of the geotechnical recommendations. I am not responsible for any changes in the recommendations provided in this letter report unless I have provided written approval of the changes.

It is my understanding that the proposed additions will include an elevator and a new entrance. The elevator will extend two stories and the entrance will be single story with a slab on grade design. The loading will be less than 2 kips per foot. The settlement tolerances are slightly less than normal because the high school structures will be additions. I understand that the playground equipment will be lightly loaded and designed to be supported on piers. The footings and floor slab recommendations contained in the report consider up to 3/4 inch of total settlement and 1/2 inch of differential settlement within 20 feet acceptable.

The test pit investigation included the excavation of four (4) test pits at the sites. The test pit for the elevator encountered 9 feet of old sand with gravel fill adjacent to the existing foundation wall and footing. The edge of the footing extended approximately 12 inches out from the foundation wall. The test pit was not extended deeper due to the limitations of the equipment.

The test pit for the addition extended through old fill soils to a depth of approximately 5.5 feet where virgin sand with some gravel and a trace to some clayey silt was encountered. The top of the footing was encountered at 4.5 feet below the existing ground surface and it extended approximately 4 inches from the foundation wall.

14 AMBER WAY, BALLSTON SPA, NY 12020 ■ 518-369-9453 ■ E-MAIL: DGLGEOENG@GMAIL.COM

It is my understanding that the proposed elevator and entrance addition have been designed to be supported by spread footing foundations. All footings should rest on firm virgin, inorganic, soils or on controlled fill which, in turn, rests on these virgin materials. Footings can be designed for a maximum, net, allowable soil bearing pressure of 2500 psf.

As noted, there is approximately 9 feet of uncontrolled fill at the elevator location and a pipe that extends into the proposed location. I understand that the foundation wall will extend around the pipe. I recommend that a minimum off a 1 inch gap be placed, in the foundation wall, over the pipe to allow for settlements in the foundation for the elevator. The uncontrolled fill under the elevator foundation should be removed and replaced with controlled fill that extends a minimum of 5 feet past the edge of the footing.

Another foundation approach for the proposed elevator would be to support the elevator on helical piles that extend into the virgin soils and then support the bearing walls for the elevator on the helical piles. This approach would reduce the amount of over excavation required to properly support the foundation on controlled fill that in turn rests on virgin soils.

Footing subgrades should be tamped to compact any soils disturbed during the excavation process. The footing subgrade should be observed by me or a qualified engineer to verify that the subgrade conditions are similar to the soils described in the soil test pit logs and are adequate for the recommended allowable soil bearing pressure and that all the uncontrolled fill has been removed. If the footing subgrade soils become disturbed or saturated and soft all soft soils should be removed and replaced with controlled fill and I should be contacted.

A minimum footing width of 1.75 feet is recommended for load-bearing strip footings. Isolated footings should be at least 2.0 feet wide. Exterior footings or footings in unheated areas should have a minimum of 4.0 feet of embedment for protection from frost action. All fill placed within the proposed building should be placed in lifts as controlled fill.

I understand that for the playground areas that the equipment is designed to be supported on pier foundations. These piers should extend a minimum of 4 feet below grade for frost protection and should be a minimum of 1 foot in diameter. All piers should rest on firm undisturbed virgin soils. Pier can be designed to a maximum net allowable soil bearing pressure or 1500 psf.

If you have any questions, please call.

Yours truly,

Daniel G. Loucks
N.Y.P.E. 068389

Enc: Test Pit Logs

Test Pit Logs
Nanuet School District
Nanuet, NY
24 February 2022

Test Pit # 1 High School Elevator
0.0 – 9.0 ft Brown Sand, some Gravel, trace to some Clayey Silt (SM) FILL
No Water Observed
Top of 12 inch wide footing at 9.0 ft

Test Pit # 2 High School Entrance
0.0 – 0.5 ft Dark Brown Clayey Silt, some Sand (ML)Topsoil FILL
0.5 – 1.5 ft Brick, Mortar, Sand FILL
1.5 – 5.0 ft Brown Sand, trace to some Clayey Silt, Gravel (SM) FILL
5.0 – 5.5 ft Brown Sand, some Gravel, trace to some Clayey Silt (SM)
No Water Observed
Top of 4 inch wide footing at 4.5 ft

Test Pit # 3 Elementary School Front Playground
0.0 – 2.5 ft Brown Sand, some Gravel, trace to some Silt (SM) FILL
2.5 – 3.0 ft Dark Brown Sand, trace to some Clayey Silt (SM) Topsoil
3.0 – 4.0 ft Brown Sand, some Clayey Silt, trace to some Gravel (SM)
No Water Observed

Test Pit # 4 Elementary School Side Playground
0.0 – 1.5 ft Wood Chips FILL
1.5 – 1.5 ft Geotextile
1.5 – 1.8 ft Pea Stone (GP)
1.8 – 2.1 ft Asphalt Pavement
2.1 – 4.0 ft Brown Sand, some Gravel, trace to some Clayey Silt (SM)
No Water Observed

THE Chazen COMPANIES®
Proud to be Employee Owned

MEMORANDUM

To: Andy Rymph

From: Joshua Blake, Matt Korn

Date: May 4, 2021

Re: Middle School Boring Findings

Job #: 31963.04

Investigation

As we understand, water seepage at multiple levels in the basement of the Nanuet Middle School has been observed recently. In an attempt to identify the source of the groundwater, three (3) test borings, identified B1 through B3, were performed on the west side of the Nanuet Middle School through the asphalt basketball court (refer to the attached figure). Test borings were performed approximately 4-feet off the exterior wall and were advanced to 10-feet below existing site grade.

The subsurface soils were visually observed as Clayey Sand (SC), Poorly Graded Sand (SP), and Silty Sand (SM), which are similar to the soils encountered at the Jerry Leo Memorial Feld Area and Lower Field Area.

Groundwater was observed in test borings B1 and B3 at depths of 3 feet and 1.5 feet respectively. The groundwater was perched and did not continue past 5-feet below ground surface. In one of the test borings the groundwater appeared to be ponding on a layer of dense Clayey Sand (SC), which appears to be limiting the downward movement.

Recommendation

Based on the observed subsurface conditions, as an economical solution to minimize seepage occurring at the higher level in the basement walls, we recommend the installation of a foundation drainpipe at a depth of 5-feet. The pipe should be pitched to promotive free drainage by gravity to an approved daylight point or structure. The foundation drain should be founded within a drainage zone consisting of uniformly graded washed gravel (nominal ¾-inch stone) wrapped in fabric. It is further recommended that the exposed exterior wall be waterproofed from the bottom of the drainage zone to a within 6-inches of the finished asphalt surface.

Limitations

Due to the limits of the exploratory (i.e. 2.5-inch diameter hole created while advancing a split spoon sampler) and distance from the foundation wall, the proposed solution may not address the seepage observed near the basement floor level. For conclusions to be drawn as to the definite source of seepage into the basement, excavation would be required at numerous locations along the wall, to the top of the footing. Due to the depth of the basement, shoring would be necessary, or a significant area of the asphalt court removed to provide a stable excavation.

Summary

The recommended measures for foundation drainage would provide the district a reasonably cost-effective solution for mitigating a source of groundwater that is likely influencing/contributing to the introduction of water to the basement.

NOTES:

1. AERIAL IMAGE PROVIDED FROM GOOGLE MAPS.
2. TEST BORING LOCATIONS SHOWN HEREON WERE WITNESSED BY CHAZEN ON APRIL 19, 2021.

LEGEND:

B1 TEST BORING LOCATION

N

SOIL DESCRIPTION:

B1
0–0.5' ASPHALT AND SUBBASE
0.5'–2.5' – FILL – POORLY GRADED SAND (SP), BROWN/GREY AND MOIST–WET
2.5'–4' – FILL – CLAYEY SAND (SC), GRAY AND WET–SATURATED
4'–10' – FILL – POORLY GRADED SAND (SP), BROWN AND MOIST
GROUNDWATER AT 3'

B2
0–0.5' ASPHALT AND SUBBASE
0.5'–5' – FILL – POORLY GRADED SAND WITH SILT (SP–SM), BROWN AND MOIST
5'–10' – FILL – CLAYEY SAND (SC), BROWN AND MOIST–WET

B3
0–0.5' ASPHALT AND SUBBASE
0.5'–4' – FILL – POORLY GRADED SAND WITH SILT (SP–SM), BROWN AND WET
4'–6' – FILL – CLAYEY SAND (SC), GRAY AND WET
6'–10' – FILL – SILTY SAND (SM), RED/BROWN, MOIST
GROUNDWATER AT 1.5'

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- White Plains, NY
- New York City, NY

NANUET MIDDLE SCHOOL

EXPLORATION LOCATION PLAN

HAMLET OF NANUET, ROCKLAND COUNTY, NEW YORK

design	chked
JDB	MAK
date	scale
5/3/21	1"=60'
project no.	
31963.04	
sheet no.	
FIG1	

Drawing Name: Z:\projects\31900-31999\31963.04 Nanuet School District_Geotech\DWG\31963.-04_MIDDLESCHOOL.dwg Date Printed: May 04, 2021, 8:17am

SECTION 02 33 13 – UNDERGROUND UTILITY LOCATOR SERVICE

PART 1 - GENERAL

1.1 DESCRIPTION

A. Contractor is to retain an independent utility locator service company with a minimum of five (5) years experience to field locate, mark, and stakeout existing underground utilities and service connections.

1. Include a minimum of 8 hours of “locator service” to locate underground utilities.

2. If required determine the exact location of utilities by hand excavated test pits or through vacuum methods. Support and protect all utilities to remain in place.

3. Contractor shall provide a minimum of 4 hours of test pit excavation within their base bid contract.

4. Contractor shall field locate, mark, and stakeout underground utilities prior to excavation.

5. Contractor will be responsible for the location of all utilities within areas of excavation, and all costs associated with the repair of utilities hit/damaged during construction.

6. Contractor shall locate and identify invert elevation of sewers at proposed connection points prior to installation of new pipes and structures.

1.2 SUBMITTALS

A. Submit detailed experience and qualifications description of underground utility locator service. Experience and qualifications package should include a description of the types of utility locator equipment and experience that can be provided.

1.3 DELIVERABLES

A. At the conclusion of this project, provide three (3) sets of paper and one (1) copy of electronic plans documenting all utilities located and identified. All documentation shall be referenced to existing data (horizontal and vertical) previously established.

1.4 COORDINATION AND SCHEDULING

A. General Location: Within areas of excavations all utilities shall be field located/marked.

B. Exact Location: The performance of hand excavated test pits or vacuum excavations to determine the utilities exact location shall be performed just prior to performing the work to minimize the time that excavated areas will be exposed to erosive conditions.

C. Coordinate work with Utility Providers and the District to minimize utility disruptions and facility operations. Utility Providers and the District shall be notified at least three (3) working days prior to performing the work, and should be provided a schedule for the works progression.

PART 2 - (Not Used)

PART 3 - EXECUTION

3.1 WORK AREAS AND PERFORMANCE

A. The District may limit or restrict scheduling of the utility locator service based upon project progress.

END OF SECTION 02 33 13

SECTION 02 41 19 – SELECTIVE DEMOLITION (CIVIL)

PART 1 - GENERAL

1.1 RELATED WORK SPECIFICED ELSEWHERE

A. Contract drawings and general provisions of the Contract, including Special Notes and Special Conditions and Division 01 Specification Sections, apply to this Section.

B. Section 01 32 33: Photographic Documentation

C. Section 31 10 00: Site Clearing

D. Section 31 25 00: Erosion and Sedimentation Controls

1.2 SUMMARY

A. Section Includes:

1. Demolition and removal of selected site elements.

2. Salvage of existing items to be reused or recycled.

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, and deliver to Owner ready for reuse.

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.

1.4 MATERIALS OWNERSHIP

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

B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.

1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

1.5 INFORMATIONAL SUBMITTALS

A. Proposed Protection Measures: Submit report, including drawings, that indicates the measures proposed for protecting individuals and property, for dust control, and for 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. Interruption of utility services. Indicate how long utility services will be interrupted.

3. Coordination for shutoff, capping, and continuation of utility services.

4. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.

C. Pre-demolition Photographs or Video: Show existing conditions of adjoining construction, including finish surfaces, that might be misconstrued as damage caused by salvage and demolition operations. Comply with Section 013233 "Photographic Documentation." Submit before Work begins.

1.6 CLOSEOUT SUBMITTALS

A. Inventory: Submit a list of items that have been removed and salvaged.

1.7 FIELD CONDITIONS

A. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

B. Notify Owner’s Representative of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

C. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.

1. If suspected hazardous materials are encountered, do not disturb; immediately notify Engineer/Landscape Architect and Owner. If applicable, hazardous materials will be removed by Owner under a separate contract.

D. Storage or sale of removed items or materials on-site is not permitted.

E. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

1.8 COORDINATION

A. Arrange selective demolition schedule so as not to interfere with Owner's operations.

PART 2 - PRODUCTS

2.1 PEFORMANCE 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. Review record documents of existing construction provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in record documents.

B. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.

C. Locate all underground infrastructure and utilities and determine requirement for their protection. Preserve in operating condition all active utilities traversing the site that are not designated for removal.

D. Verify that utilities to be removed have been disconnected and capped before starting selective demolition operations.

E. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Owner’s Representative.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage during demolition operations.

B. For underground utilities, notify UDig, New York, 811 or 1-800-962-7962, 72 hours prior to commencing work.

C. Do not interrupt existing utilities or operating facilities unless authorized in writing by Owner and authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to Owner.

1. Provide at least 72 hours notice to Owner if shutdown of service is required during changeover.

3.3 PREPARATION

A. Perform the following prior to starting site preparation work:

1. Inspect the entire project site including all objects that are designated to remain or to be removed.

2. Schedule site preparation work in consideration of adjacent public and private property owners. Avoid interference with use of and passage to and from adjacent buildings and facilities.

B. Protect existing objects designated to remain, both on and off the project site. In the event of damage, immediately make all repairs and replacements necessary for approval of the Owner's Representative and the Engineer.

C. Prevent spread of dust during performance of the work throughout the life of the project. Thoroughly moisten all site areas as required to prevent dust from being a nuisance to the Owner, public, neighbors and performance of other work on the site.

D. Install erosion and sedimentation controls prior to start of selective demolition activities. Refer to Section 31 25 00.

E. 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.

F. 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.

2. Comply with requirements for temporary enclosures and dust control, specified in Section 01 50 00 "Temporary Facilities and Controls."

3.4 SELECTIVE DEMOLITION, GENERAL

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

1. Dispose of demolished items and materials promptly. Refer to Part 3.5 below.

B. Removed and Salvaged Items:

1. Clean salvaged items.

2. Pack or crate items after cleaning. Identify contents of containers.

3. Store items in a secure area until delivery to Owner.

4. Transport items to Owner's storage area designated by Owner.

5. Protect items from damage during transport and storage.

C. 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.

D. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Owner's Representative, items may be removed to a suitable, protected storage location during selective demolition and reinstalled in their original locations after selective demolition operations are complete.

3.5 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill.

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.

B. Burning: Do not burn demolished materials.

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

3.6 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.

END OF SECTION 02 41 19

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SECTION 02 82 00 – Asbestos Abatement Specification

PART 1 GENERAL

1.01 SCOPE OF WORK

A. This asbestos abatement project will consist of the removal and disposal of asbestos containing materials (ACM) and Presumed ACM (PACM) as it pertains to the Bond Projects Phase 2 for the A. Macarthur Barr Middle School, 143 Church Street, Nanuet, NY as indicated in the asbestos removal plans.

B. The work shall include but not be limited to the removal of the below asbestos-containing materials (See Attachment 1 - project drawing **BM-ASB1 and BM-ASB2** for types, locations and approximate quantities per Green Path Environmental, Inc's asbestos survey report dated March 14, 2022 and supplemental asbestos survey report dated June 14, 2022). The asbestos abatement removal procedure will be in accordance with 12 NYCRR Part 56 - 8.6 for the work.

A. Macarthur Barr Middle School

Location	Material	Estimated Quantity
Interior Security Vestibule - Above Ceiling	White elbow insulation on 2", 4" and 6" pipes (all pipes)	40 Square Feet
Interior Tech Classroom	White elbow insulation	12 Square Feet
Interior Woodshop	White elbow insulation	8 Square Feet
Paint Studio	Window gray glazing	4 Square Feet
Entire hallway, storage room and woodshop (rear south wall) above ceiling	Pipe elbow and fitting insulation - 118 elbows and fittings [2" and 4"-6"] connecting to fiberglass straight runs	70 Square Feet of 2" 48 Square Feet of 4"-6"
	TOTAL ACM	**182 SF**

C. **The Contractor shall be aware of all conditions of the Project and is responsible for verifying quantities and locations of all Work to be performed. Failure to do so shall not relieve the Contractor of its obligation to furnish all labor and materials necessary to perform the Work.**

D. All Work shall be performed in strict accordance with the Project Documents and all governing codes, rules, and regulations. Where conflicts occur between the Project Documents and applicable codes, rules, and regulations, the more stringent shall apply.

E. Working hours shall be as required and approved by the Owner. Asbestos abatement activities including, but not limited to, work area preparation, gross removal activities, cleaning

activities, waste removal, etc. may need to be performed during 'off-hours' (including nights and weekends). In addition, multiple mobilizations may be required to perform the work identified in this project. The Contractor shall coordinate and schedule all Work with the facility and Owner's representative.

1.02 SPECIAL JOB CONDITIONS

A. Any special job conditions are described below.

1. **The contractor shall field verify the amount of ACM and familiarize himself in all variable field conditions in the building before the submission of their bid. See drawings (BM-ASB1 and BM-ASB2) for locations, types and approximate quantities.**
2. Abatement activities shall be performed during weekdays and weekends and as permitted by owner.
3. The abatement contractor is responsible for filing and acquiring all notifications and variances in connection with this abatement work.
4. Any waste transported through the building shall use canvas carts covered and lined with plastic sheeting.
5. The contractor shall notify the local Fire Department of any obstruction to the outside leading to the exit stair, obstruction to any fire rated corridor and disengagement or obstruction to any exit signage or lighting system.
6. All connections/disconnections to existing electrical panels, fixtures, etc. shall be conducted by a licensed electrician/restricted asbestos handler.
7. Temporary water and power connections to internal sources shall be extended at ceiling level and disconnected when not in use.
8. The contractor shall assume that all components in direct contact with concealed and exposed ACM and/or assumed ACM is contaminated and is to be disposed of as ACM-containing waste. In lieu of disposing these materials as such, the contractor may opt to decontaminate these components if they are non-porous, and dispose of as regular C&D waste at no additional cost to the authority.
9. The asbestos contractor shall be responsible for protecting all areas (floor and fixed items) around the containment.
10. The asbestos contractor shall be responsible for all repairs to finish surfaces which are damaged during the course of the abatement work which are not included in the proposed scope of work.
11. Abatement will take place in the identified work areas separately and sequentially unless approved otherwise by the Owner.

1.03 PERMITS AND COMPLIANCE

A. The Contractor shall assume full responsibility and liability for compliance with all applicable Federal, State, and local laws, rules, and regulations pertaining to Work practices, protection of Workers, authorized visitors to the site, persons, and property adjacent to the Work.

B. Perform asbestos related Work in accordance with New York State Industrial Code Rule 56 (herein referred to as Code Rule 56), 40 CFR 61, and 29 CFR 1926. Where more stringent requirements are specified, adhere to the more stringent requirements.

C. The Contractor must maintain current licenses pursuant to New York State Department of Labor and Department of Environmental Conservation for all Work related to this Project, including the removal, handling, transport, and disposal of asbestos containing materials.

E. The Contractor must have and submit proof upon request that any persons employed by the Contractor to engage in or supervise Work on any asbestos Project have a valid NYS asbestos handling certificate pursuant to Code Rule 56.

F. Failure to adhere to the Project Documents shall constitute a 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.

1.04 SUBMITTALS

A. Pre-Work Submittals: Within 7 days prior to the pre-construction conference, the Contractor shall submit 3 copies of the documents listed below, with 1 copy going directly to the Owner's representative for review and approval prior to the commencement of asbestos abatement activities:
   1. Contractor license issued by New York State Department of Labor.
   2. A list of Projects performed within the past two (2) years and include the dollar value of all Projects. Provide Project references to include Owner, consultant, and air monitoring firm's name, contact persons, address, and phone number.
   3. Progress Schedule:
      a. Show the complete sequence of abatement activities and the sequencing of Work within each building or building section.
      b. Show the dates for the beginning and completion of each major element of Work including substantial completion dates for each Work Area, building, or phase.
   4. Project Notifications: As required by Federal and State regulatory agencies together with proof of transmittal (i.e. certified mail return receipt).
   5. Building Occupant Notification: As required by regulatory agencies.
   6. Abatement Work Plan: Provide plans that clearly indicate the following:
      a. All Work Areas/containments numbered sequentially.
      b. Locations and types of all decontamination enclosures.
      c. Entrances and exits to the Work Areas/containments.
      d. Type of abatement activity/technique for each Work Area/containment.
      e. Number and location of negative air units and exhaust. Also provide calculations for determining number of negative air pressure units.
      f. Proposed location and construction of storage facilities and field office.
      g. Location of water and electrical connections to building services.
      h. Waste transport routes through the building to the waste storage container.
   7. Disposal Site/Landfill Permit from applicable regulatory agency.
   8. NYS Department of Environmental Conservation Waste Transporter Permit.

B. On-Site Submittals: Refer to Part 3.01.C for all submittals, documentation, and postings required to be maintained on-site during abatement activities.

C. Project Close-out Submittals: Within 30 days of the completion of each abatement phase, the Contractor shall submit 4 copies of the documents listed below. One set of the documents shall be transmitted to the Facility and one set to the Owner's representative for review and approval prior to the Contractor's final payment.
   1. **Originals** of all waste disposal manifests, seals, and disposal logs.
   2. OSHA compliance air monitoring records conducted during the Work.
   3. Daily progress log, including the entry/exit log.

4. A list of all Workers used in the performance of the Project, including name, social security number, NYS DOL certification number and type of certification (i.e. supervisor, asbestos handler, etc.).
5. For each Worker used in the performance of the Project, submit the Worker's Acknowledgment Statement.
6. Disposal Site/Landfill Permit from applicable regulatory agency.
7. Project notifications, amended notifications and any Variances.

1.05 PRE-CONSTRUCTION CONFERENCE

A. Prior to start of preparatory Work under this Contract, the Contractor shall attend a pre-construction conference attended by Owner, Facility Personnel, and Green Path Environmental, Inc (Environmental Consultant).

B. Agenda for this conference shall include but not necessarily be limited to:
1. Contractor's scope of Work, Work plan, and schedule to include number of workers and shifts.
2. Contractor's safety and health precautions including protective clothing and equipment and decontamination procedures.
3. Environmental Consultant's duties, functions, and authority.
4. Contractor's Work procedures including:
   a. Methods of job site preparation and removal methods.
   b. Respiratory protection.
   c. Disposal procedures.
   d. Cleanup procedures.
   e. Fire exits and emergency procedures.
5. Contractor's required pre-work and on-site submittals, documentation, and postings.
6. Contractor's plan for twenty-four (24) hour Project security both for prevention of theft and for barring entry of unauthorized personnel into Work Areas.
7. Temporary utilities.
8. Handling of furniture and other moveable objects.
9. Storage of removed asbestos containing materials.
10. Waste disposal requirements and procedures, including use of the Owner supplied waste manifest and container seals.

B. In conjunction with the conference the Contractor shall accompany the Owner and Environmental Consultant on a pre-construction walk-through documenting existing condition of finishes and furnishings, reviewing overall Work plan, location of fire exits, fire protection equipment, water supply and temporary electric tie-in.

1.06 APPLICABLE STANDARDS AND REGULATIONS

A. The Contractor shall comply with the following codes and standards, except where more stringent requirements are shown or specified:

B. Federal Regulations:
1. 29 CFR 1910.1001, "Asbestos" (OSHA)
2. 29 CFR 1910.1200, "Hazard Communication" (OSHA)
3. 29 CFR 1910.134, "Respiratory Protection" (OSHA)
4. 29 CFR 1910.145, "Specification for Accident Prevention Signs and Tags" (OSHA)
5. 29 CFR 1926, "Construction Industry" (OSHA)
6. 29 CFR 1926.1101, "Asbestos, Tremolite, Anthophyllite, and Actinolite" (OSHA)

7. 29 CFR 1926.500 "Guardrails, Handrails and Covers" (OSHA)
8. 40 CFR 61, Subpart A, "General Provisions" (EPA)
9. 40 CFR 61, Subpart M, "National Emission Standard for Asbestos" (EPA)
10. 49 CFR 171-172, Transportation Standards (DOT)

C. New York State Regulations:
1. 12 NYCRR, Part 56, "Asbestos", Industrial Code Rule 56 (DOL) (amended March 21, 2007).
2. 6 NYCRR, Parts 360, 364, Disposal and Transportation (DEC)
3. 10 NYCRR, Part 73, "Asbestos Safety Program Requirements" (DOH)

D. Standards and Guidance Documents:
1. American National Standard Institute (ANSI) Z88.2-80, Practices for Respiratory Protection
2. ANSI Z9.2-79, Fundamentals Governing the Design and Operation of Local Exhaust Systems
3. EPA 560/585-024, Guidance for Controlling Asbestos Containing Materials in Buildings (Purple Book)
4. EPA 530-SW-85-007, Asbestos Waste Management Guidance
5. ASTM Standard E1368 “Standard Practice for Visual Inspection of Asbestos Abatement Projects.”

1.07 NOTICES

A. The Contractor shall provide notification of intent to commence asbestos abatement activities as indicated below.
1. At least ten (10) Working days prior to beginning abatement activities, send written notification to:
U.S. Environmental Protection Agency
National Emissions Standards for Hazardous Air Pollutants (NESHAPS) Coordinator
26 Federal Plaza
New York, NY 10007
2. At least ten (10) days prior to beginning abatement activities send written notification to:
New York State Department of Labor
Division of Safety and Health, Asbestos Control Program.
State Office Campus
Building 12 - Room 454
Albany, NY 12240

B. The Contractor is required to send notifications to regulatory agencies via mail or package delivery service that will provide proof of delivery and receipt.

C. The Contractor shall be responsible for maintaining current project filings with regulatory agencies for the duration of the project.

D. The Contractor shall post and/or provide Building Occupant Notification at least 10 days prior to beginning abatement activities as required by Code Rule 56.

1.08 PROJECT MONITORING AND AIR SAMPLING

A. The Owner has engaged the services of Green Path Environmental, Inc (Environmental Consultant) who shall serve as the Owner's Representative in regard to the performance of the

asbestos abatement Project and provide direction as required throughout the entire abatement Project period.

B. The Contractor is required to ensure cooperation of its personnel with the Consultant for the air sampling and Project monitoring functions described in this section. The Contractor shall comply with all direction given by the Consultant during the course of the Project.

C. The Consultant shall provide the following administrative services:

1. Review and approve or disapprove all submittals, shop drawings, schedules, and samples.
2. Assure that all notifications to governmental agencies by the Contractor are submitted in a timely manner and are correct in content.

D. The Consultant shall staff the Project with a trained and certified person (s) to act on the Owner's behalf at the job site. This individual shall be designated as the Abatement Project Monitor (APM).
1. The APM shall be on-site at all times the Contractor is on-site. The Contractor shall not be permitted to conduct any Work unless the APM is on-site (except for inspection of barriers and negative air system during non-working days).
2. The APM shall have the authority to direct the actions of the Contractor verbally and in writing to ensure compliance with the Project documents and all regulations. The APM shall have the authority to Stop Work when gross Work practice deficiencies or unsafe practices are observed, or when ambient fiber concentrations outside the removal area exceed .01 f/cc or background level.
    a. Such Stop Work order shall be effective immediately and remain in effect until corrective measures have been taken and the situation has been corrected.
    b. Standby time required to resolve the situation shall be at the Contractor's expense.
3. The APM shall provide the following services:
    a. Inspection of the Contractor's Work, practices, and procedures, including temporary protection requirements, for compliance with all regulations and Project specifications.
    b. Provide abatement Project air sampling as required by applicable regulations (NYS, AHERA) and the Owner. Sampling will include background, work area preparation, asbestos handling, and final cleaning and clearance air sampling.
    c. Verify daily that all Workers used in the performance of the Project are certified by the appropriate regulatory agency.
    d. Monitor the progress of the Contractor's Work, and report any deviations from the schedule to the Owner.
    e. Monitor, verify, and document all waste load-out operations.
    f. Verify that the Contractor is performing personal air monitoring daily, and that results are being returned and posted at the site as required.
    g. The APM shall maintain a log on site that documents all project related and Consultant and Contractor actions, activities, and occurrences.

4. The following minimum inspections shall be conducted by the APM. Additional inspections shall be conducted as required by Project conditions. Progression from one phase of Work to the next by the Contractor is only permitted with the written approval of the APM.
    a. Pre-Construction Inspection: The purpose of this inspection is to verify the existing conditions of the Work Areas and to document these conditions.

b. Pre-Commencement Inspection: The purpose of this inspection is to verify the integrity of each containment system prior to disturbance of any asbestos containing material. This inspection shall take place only after the Work Area is fully prepped for removal.

c. Work Inspections: The purpose of this inspection is to monitor the Work practices and procedures employed on the Project and to monitor the continued integrity of the containment system. Inspections within the removal areas shall be conducted by the APM during all preparation, removal, and cleaning activities at least twice every Work shift. Additional inspections shall be conducted as warranted.

d. Pre-Encapsulation Inspection: The purpose of this inspection is to ensure the complete removal of Asbestos Containing Material (ACM), from all surfaces in the Work Area prior to encapsulation.

e. Visual Clearance Inspection: The purpose of this inspection is to verify that: all materials in the scope of work have been properly removed; no visible asbestos debris/residue remains; no pools of liquid or condensation remains; and all required cleanings are complete. This inspection shall be conducted before final air clearance testing.

f. Post-Clearance Inspection: The purpose of this inspection is to ensure the complete removal of ACM, including debris, from the Work Area after satisfactory final clearance sampling and removal of all isolation and critical barriers and equipment from the Work Area.

g. Punch List Inspection: The purpose of this inspection is to verify the Contractor's certification that all Work has been completed as contracted and the existing condition of the area prior to its release to the Owner.

E. The Consultant shall provide abatement Project air sampling and analysis as required by applicable regulations (New York State and/or AHERA). Sampling will include background, work area preparation, asbestos handling, and final cleaning and clearance air sampling.

1. Unless otherwise required by applicable regulations, the Consultant shall have samples analyzed by Phase Contrast Microscopy (PCM). Results shall be available within 24 hours of completion of sampling.
2. Samples shall be collected as required by applicable regulations (New York State and/or AHERA) and these specifications. If Transmission Electron Microscopy (TEM) clearance air sampling is utilized by the owner, the clearance criteria and sampling protocols must be in compliance with AHERA. If PCM air sample analysis results exceed the satisfactory clearance criteria, then TEM analysis of the entire set of clearance air samples may be used, provided that a standard NIOSH/ELAP accepted laboratory analysis method is utilized that shall report each air sample result in fibers per cubic centimeter.
3. If the air sampling during any phase of the abatement project reveals airborne fiber levels at or above .01 fibers/cc or the established background level, whichever is greater, outside the regulated Work Area, Work shall stop immediately and corrective measures required by Code Rule 56 shall be initiated. Notify all employers and occupants in adjacent areas. The Contractor shall bear the burden of any and all costs incurred by this delay.
4. The Environmental Consultant shall submit copies of all elevated air sampling results collected during abatement and all final air clearance results to the Commissioner of Labor.

1.09 CONTRACTOR AIR SAMPLING

A. In addition to the requirements of OSHA 1926.1101, the Contractor shall be required to perform personal air monitoring every Work shift in each Work Area during which abatement activities occur in order to determine that appropriate respiratory protection is being worn and utilized.

B. The Contractor shall conduct air sampling that is representative of both the 8-hour time weighted average and 30-minute short-term exposures to indicate compliance with the permissible exposure and excursion limits.

C. The Contractor's laboratory analysis of air samples shall be conducted by an NYS DOH ELAP approved laboratory.

D. Results of personnel air sample analyses shall be available, verbally, within twenty-four (24) hours of sampling and shall be posted upon receipt. Written laboratory reports shall be delivered and posted at the Work site within five (5) days. Failure to comply with these requirements may result in all work being stopped until compliance is achieved.

1.10 PROJECT SUPERVISOR

A. The Contractor shall designate a full-time Project Supervisor who shall meet the following qualifications:
   1. The Project Supervisor shall hold New York State certification as an Asbestos Supervisor.
   2. The Project Supervisor shall meet the requirements of a "Competent Person" as defined by OSHA 1926.1101 and shall have a minimum of one year experience as a supervisor.
   3. The Project Supervisor must be able to speak, read, and write English fluently, as well as communicate in the primary language of the Workers.

B. If the Project Supervisor is not on-site at any time whatsoever, all Work shall be stopped. The Project Supervisor shall remain on-site until the Project is complete. The Project Supervisor cannot be removed from the Project without the written consent of the Owner and the Environmental Consultant. The Project Supervisor shall be removed from the Project if so requested by the Owner.

C. The Project Supervisor shall maintain the bound Daily Project Log that also includes the entry/exit logs as required by New York State Department of Labor and section 2.03 of the specifications and the Waste Disposal Log required by section 4.04 of the specifications.

D. The Project Supervisor shall be responsible for the performance of the Work and shall represent the Contractor in all respects at the Project site. The Supervisor shall be the primary point of contact for the Asbestos Project Monitor.

1.11 MEDICAL REQUIREMENTS

A. Before exposure to airborne asbestos fibers, provide Workers with a comprehensive medical examination as required by 29 CFR 1910.1001, and 29 CFR 1926.1101.
   1. This examination is not required if adequate records show the employee has been examined as required by 29 CFR 1910.1001, and 29 CFR 1926.1101 within the past year.
   2. The same medical examination shall be given on an annual basis to employees engaged in an occupation involving asbestos fibers and within thirty (30) calendar days before or after the termination of employment in such occupations.

1.12 TRAINING

A. As required by applicable regulations, prior to assignment to asbestos Work instruct each employee with regard to the hazards of asbestos, safety and health precautions, and the use and requirements of protective clothing and equipment.

B. Establish a respirator program as required by ANSI Z88.2 and 29 CFR 1910.134, and 29 CFR 1926.1101. Provide respirator training and fit testing.

1.13 RESPIRATORY PROTECTION

A. Select respirators from those approved by the Mine Safety and Health Administration (MSHA), and the National Institute for Occupational Safety and Health (NIOSH), Department of Health and Human Services.

B. Respirators shall be individually fit-tested to personnel under the direction of an Industrial Hygienist on a yearly basis. Fit-tested respirators shall be permanently marked to identify the individual fitted, and use shall be limited to that individual. Fit-test records shall be maintained on site for each employee.

C. Where fiber levels permit, and in compliance with regulatory requirements, half-faced respirators are the minimum allowable respiratory protection permitted to be utilized during gross removal operations of OSHA Class I or OSHA Class II ACM.

D. No respirators shall be issued to personnel without such personnel participating in a respirator training program.

E. High Efficiency Particulate Air (HEPA) respirator filters shall be approved by NIOSH and shall conform to the OSHA requirements in 29 CFR 1910.134 and 29 CFR 1926.1101.

F. A storage area for respirators shall be provided by the Contractor in the clean room side of the personnel decontamination enclosure where they will be kept in a clean environment.

G. The Contractor shall provide and make available a sufficient quantity of respirator filters so that filter changes can be made as necessary during the work day. Filters will be removed and discarded during the decontamination process. Filters cannot be reused. Filters must be changed if breathing becomes difficult.

H. Filters used with negative pressure air purifying respirators shall not be used any longer than one eight (8) hour work day.

I. Any authorized visitor, Worker, or supervisor found in the Work Area not wearing the required respiratory protection shall be removed from the Project site and not be permitted to return.

J. The Contractor shall have at least two (2) half-faced respirators stored on site designated for authorized visitors use. Appropriate respirator filters for authorized visitors shall be made available by the Contractor.

1.14 DELIVERY AND STORAGE

A. Deliver all materials to the job site in original packages with containers bearing manufacturer's name and label.

B. Store all materials at the job site in a suitable and designated area.
   1. Store materials subject to deterioration or damage away from wet or damp surfaces and under cover.
   1. Protect materials from unintended contamination and theft.
   2. Storage areas shall be kept clean and organized.

C. Remove damaged or deteriorated materials from the job site. Materials contaminated with asbestos shall be disposed of as asbestos debris as herein specified.

1.15 TEMPORARY UTILITIES

A. Shut down and lock out all electrical power to the asbestos Work Areas.

B. Provide temporary 120–240-volt, single phase, three wire, 100-amp electric service with Ground Fault Circuit Interrupters (GFCI) for all electric requirements within the asbestos Work Area.
   1. Where available, obtain from Owner's existing system. Otherwise provide power from other sources (i.e. generator).
   2. Provide temporary wiring and "weatherproof" receptacles in sufficient quantity and location to serve all HEPA equipment and tools.
   3. Provide wiring and receptacles as required by the Environmental Consultant for air sampling equipment.
   4. All power to the Work Area shall be brought in from outside the area through GFCI's at the source.

C. Provide temporary lighting with "weatherproof" fixtures for all Work Areas including decontamination chambers.
   1. The entire Work Area shall be kept illuminated at all times.
   2. Provide lighting as required by the Environmental Consultant for the purposes of performing required inspections.

D. All temporary devices and wiring used in the Work Area shall be capable of decontamination procedures including HEPA vacuuming and wet-wiping.

C. Utilize domestic water service, if available, from Owner's existing system. Provide hot water heaters with sufficient capacity to meet Project demands.

PART 2 PRODUCTS

2.01 PROTECTIVE CLOTHING

A. Provide personnel utilized during the Project with disposable protective whole body clothing, head coverings, gloves and foot coverings. Provide disposable plastic or rubber gloves to protect hands. Cloth gloves may be worn inside the plastic or rubber for comfort, but shall not be used alone. Make sleeves secure at the wrists and make foot coverings secure at the ankles by the use of tape, or provide disposable coverings with elastic wrists or tops.

B. Provide sufficient quantities of protective clothing to assure a minimum of four (4) complete disposable outfits per day for each individual performing abatement Work.

C. Eye protection and hard hats shall be provided and made available for all personnel entering any Work Area.

D. Authorized visitors shall be provided with suitable protective clothing, headgear, eye protection, and footwear whenever they enter the Work Area.

2.02 SIGNS AND LABELS

A. Provide warning signs and barrier tapes at all approaches to asbestos Work Areas. Locate signs at such distance that personnel may read the sign and take the necessary protective steps required before entering the area.

1. Provide danger signs in vertical format conforming to 29 CFR 1926.1101, minimum 20" x 14" displaying the following legend.

DANGER
ASBESTOS CANCER AND LUNG DISEASE
HAZARD
AUTHORIZED PERSONNEL ONLY
RESPIRATORS AND PROTECTIVE CLOTHING
ARE REQUIRED IN THIS AREA

2. Provide 3" wide yellow barrier tape printed with black lettered, "DANGER ASBESTOS REMOVAL". Locate barrier tape across all corridors, entrances and access routes to asbestos Work Area. Install tape 3' to 4' AFF.

B. Provide asbestos danger labels affixed to all asbestos materials, scrap, waste, debris and other products contaminated with asbestos.

1. Provide asbestos danger labels of sufficient size to be clearly legible, displaying the following legend:

DANGER
CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST
CANCER AND LUNG DISEASE HAZARD

2. Provide the following asbestos labels, of sufficient size to be clearly legible, for display on waste containers (bags or drums) which will be used to transport asbestos contaminated material in accordance with United States Department of Transportation 49 CFR Parts 171 and 172: (Note: Include “RQ” for friable asbestos waste only.)
RQ, (WASTE) ASBESTOS, 9, NA2212, PGIII

3. Generator identification information shall be affixed to each waste container indicating the following printed in indelible ink:
Generator Name
Facility Name
Facility Address

2.03 DAILY PROJECT LOG

A. Provide a Daily Project Log. The log shall contain on title page the Project name, name, address and phone number of Owner; name, address and phone number of Environmental Consultant; name, address and phone number of Abatement Contractor; emergency numbers including, but not limited to local Fire/Rescue department and all other New York State Department of Labor requirements.

B. All entries into the log shall be made in non-washable, permanent ink and such pen shall be strung to or otherwise attached to the log to prevent removal from the log-in area. Under no circumstances shall pencil entries be permitted.

C. All persons entering and exiting the Work Area shall sign the log and include name, title, work performed and time.

D. The Project Supervisor shall document all Work performed daily and note all inspections required by Code Rule 56, i.e. testing and inspection of barriers and enclosures.

2.04 SCAFFOLDING AND LADDERS

A. Provide all scaffolding and/or staging as necessary to accomplish the Work of this Contract. Scaffolding may be of suspension type or standing type such as metal tube and coupler, tubular welded frame, pole or outrigger type or cantilever type. The type, erection and use of all scaffolding and ladders shall comply with all applicable OSHA construction industry standards.

B. Provide scaffolding and ladders as required by the Environmental Consultant for the purposes of performing required inspections.

2.05 SURFACTANT (AMENDED WATER)

A. Wet all asbestos-containing materials prior to removal with surfactant mixed and applied in accordance with manufacturer's printed instructions.

2.06 ENCAPSULANT

A. Encapsulant shall be tinted or pigmented so that application when dry is readily discernible.

B. The encapsulant solvent or vehicle shall not contain a volatile hydrocarbon.

2.07 DISPOSAL BAGS, DRUMS, AND CONTAINERS

A. Provide 6 mil polyethylene disposal bags printed with asbestos caution labels. Bags shall also be imprinted with U.S. Department of Transportation required markings.

B. Provide 30- or 55-gallon capacity fiber, plastic, or metal drums capable of being sealed air and water tight if asbestos waste has the potential to damage or puncture disposal bags. Affix asbestos caution labels on lids and at one-third points around drum circumference to assure ready identification.

C. Containers and bags must be labeled accordance with 40 CFR Part 61 NESHAPS and Code Rule 56. When the bags/containers are moved to the lockable hardtop dumpster from the waste decontamination system washroom, the bags must also be appropriately labeled with the date they are moved on the bag/container in waterproof markings.

D. Labeled ACM waste containers or bags shall not be used for non-ACM waste or trash. Any material placed in labeled containers or bags, whether turned inside out or not shall be handled and disposed of as ACM waste.

2.08 HEPA VACUUM EQUIPMENT

A. All dry vacuuming performed under this contract shall be performed with High Efficiency Particulate Absolute (HEPA) filter equipped industrial vacuums conforming to ANSI Z9.2.

B. Provide tools and specialized equipment including scraping nozzles with integral vacuum hoods connected to a HEPA vacuum with flexible hose.

2.09 POWER TOOLS

A. Any power tools used to drill, cut into, or otherwise disturb asbestos material shall be manufacturer equipped with HEPA filtered local exhaust ventilation.

2.10 POLYETHYLENE SHEETING

A. All polyethylene (plastic) sheeting used on the Project (including but not limited to sheeting used for critical and isolation barriers, fixed objects, walls, floors, ceilings, waste container) shall be at least 6 mil fire retardant sheeting.

B. Decontamination enclosure systems shall utilize at least 6 mil opaque fire-retardant plastic sheeting. At least 2 layers of 6 mil reinforced fire-retardant plastic sheeting shall be used for the flooring.

PART 3 EXECUTION

3.01 GENERAL REQUIREMENTS

A. Should visible emissions or water leaks be observed outside the Work Area, immediately stop Work and institute emergency procedures per Code Rule 56. Should there be elevated fiber levels outside the Work Area, immediately stop Work, institute emergency procedures per Code Rule 56, and notify all employers and occupants in adjacent areas. All costs incurred in decontaminating such non-Work Areas and the contents thereof shall be borne by the Contractor, at no additional cost to the Owner.

B. Medical approval, fit test reports, Worker Acknowledgments, and NYS DOL certificates shall be on site prior to admittance of any Contractor's employees to the asbestos Work Area.

C. The following submittals, documentation, and postings shall be maintained on-site by the Contractor during abatement activities at a location approved by the Abatement Project Monitor:
   1. Contractor license issued by New York State Department of Labor.
   2. Certification, Worker Training, Medical Surveillance, Acknowledgments:
      a. NYS DOL Asbestos Handler certification cards for each person employed in the removal, handling, or disturbance of asbestos.
      b. Evidence that Workers have received proper training required by the regulations and the medical examinations required by OSHA 29 CFR 1926.1101.
      c. Documentation that Workers have been fit tested specifically for respirators used on the Project.
      d. Worker's Acknowledgments: 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.
   3. Daily OSHA personal air monitoring results.
   4. NYS Department of Health ELAP certification for the laboratory that will be analyzing the OSHA personnel air samples.
   5. NYS Department of Environmental Conservation Waste Transporter Permit.

6. Project documents (specifications and drawings.)
7. Notifications and Variances. Ensure that the most up-to-date notifications and Variances are on-site.
8. Applicable regulations.
9. Material Safety Data Sheets of supplies/chemicals used on the Project.
10. Approved Abatement Work Plan.
11. List of emergency telephone numbers.
12. Magnahelic manometer semi-annual calibration certification.
13. Waste Disposal Log.
14. Daily Project Log.

D. The following documentation shall be maintained on-site by the Abatement Project Monitor during abatement activities:
1. Contractor license issued by New York State Department of Labor.
2. Air Sample Log.
3. Air sample results.
4. Project Monitor Daily Log
7. A copy of ASTM Standard E1368 "Standard Practice for Visual Inspection of Asbestos Abatement Projects."

E. The Work Area must be vacated by building occupants prior to decontamination enclosure construction and Work Area preparation.

F. All demolition necessary to access asbestos containing materials for removal must be conducted within negative pressure enclosures by licensed asbestos handlers. Demolition debris may be disposed of as construction and demolition debris provided the Abatement Project Monitor determines that it is not contaminated with asbestos and there has been no disturbance of ACM within the enclosure. If the demolition debris is determined to be contaminated or ACM has been disturbed, it must be disposed of as asbestos waste.

3.02 PERSONNEL DECONTAMINATION ENCLOSURE

A. Provide personnel decontamination enclosure contiguous to the Work Area as per NYS ICR 56. The decontamination enclosure may be attached to or remote from the Work Area and not located within it unless isolation barriers are installed. If the decontamination chamber is accessible to the public, it shall be fully framed and sheathed to prevent unauthorized entry.

B. Access to the Work Area will be from the clean room through an air-lock to the shower and through an air lock to the equipment room. Each airlock shall be a minimum of three feet from door to door. Additional air locks shall be provided as required by Code Rule 56 for remote decontamination enclosures.

C. The decontamination enclosure ceiling and walls shall be covered with one layer of opaque 6 mil polyethylene sheeting. Two layers of reinforced polyethylene sheeting shall be used to cover the floor.

D. The entrance to the clean room shall have a lockable door. Provide suitable lockers for storage of Worker's street clothes. Storage for respirators along with replacement filters and disposable towels shall also be provided.

E. Provide a temporary shower with individual hot and cold-water supplies and faucets. Provide a sufficient supply of soap and shampoo. There shall be one shower for every six Workers.

The shower room shall be constructed in such a way so that travel through the shower chamber shall be through the shower. The shower shall not be able to be bypassed.

F. Shower water shall be drained, collected and filtered through a system with at least a 5.0-micron particle size collection capability containing a series of several filters with progressively smaller pore sizes to avoid rapid clogging of the system. The filtered waste water shall then be discharged in accordance with applicable codes and the contaminated filters disposed of as asbestos waste.

G. The equipment room shall be used for the storage of tools and equipment. A walk-off pan filled with water shall be located in the Work Area outside the equipment room for Workers to clean foot coverings when leaving the Work Area. A labeled 6 mil plastic ACM waste bag for collection of contaminated clothing shall be located in this room.

H. The personal decontamination enclosure shall be cleaned and disinfected minimally at the end of each Work shift and as otherwise directed by the Asbestos Project Monitor.

3.03 WASTE DECONTAMINATION ENCLOSURE

A. Provide a waste decontamination enclosure contiguous to the Work area. The decontamination enclosure shall be attached to the Work Area and not located within it unless isolation barriers are installed. If the decontamination chamber is accessible to the public, it shall be fully framed and sheathed to prevent unauthorized entry.

B. The waste decontamination enclosure system shall consist of a holding area, air lock and washroom. The airlock shall be a minimum of three feet from door to door. The entrance to the holding area shall have a lockable door.

C. The decontamination enclosure ceiling and walls shall be covered with one layer of opaque 6 mil polyethylene sheeting on walls and ceiling. Two layers of reinforced polyethylene sheeting shall be used to cover the floor.

D. Where there is only one egress from the Work Area, the holding area of the waste decontamination enclosure system may branch off from the personnel decontamination enclosure equipment room, which then serves as the waste wash room.

E. The waste wash room water shall be drained, collected, and filtered through a system with at least a 5.0-micron particle size collection capability containing a series of several filters with progressively smaller pore sizes to avoid rapid clogging of the system. The filtered waste water shall then be discharged in accordance with applicable codes and the contaminated filters disposed of as asbestos waste.

F. In small asbestos Projects where only one egress from the Work Area exists, the shower room may be used as a waste washroom. In this instance, the clean room shall not be used for waste storage, but shall be used for waste transfer to carts, which shall immediately be removed from this enclosure.

3.04 WORK AREA ENTRY AND EXIT PROCEDURES

A. Access to and from the asbestos Work Area is permitted only through the personnel decontamination enclosure unless otherwise stipulated in a Site-Specific Variance.

B. Workers shall sign the entry/exit log upon every entry and exit.

C. The following procedures shall be followed when entering the Work Area:
   1. Before entering the Work Area, Workers shall proceed to the clean room, remove all street clothes, and don protective clothing, equipment, and respirators.
   2. Workers shall proceed from the clean room through the shower room and the equipment room and into the Work Area.

D. The following procedures shall be followed when exiting the Work Area:

   1. Before leaving the Work Area, gross asbestos contamination will be removed by brushing, wet cleaning and/or HEPA vacuuming.
   2. In the equipment room, Workers shall remove disposable clothing, but not respirators, and shall place clothing in plastic disposal bags for disposal as contaminated debris prior to entering the shower room.
   3. Workers shall shower thoroughly while wearing respirators, then wash respirator with soap and water prior to removal.
   4. Upon exiting the shower, Workers shall don new disposable clothing if the Work shift is to continue or street clothes to exit area. Under no circumstances shall Workers enter public non-Work Areas in disposable protective clothing.

E. If remote decontamination enclosures are permitted by Code Rule 56 or a Site-Specific Variance, workers shall wear two disposable suits for all phases of Work. Workers exiting the work area shall HEPA vacuum the outer suit, enter the airlock, remove the outer suit and then place it back into the Work Area. A clean second suit shall be donned before exiting the airlock and proceeding to the decontamination enclosure or another work area via the designated pathway required by Code Rule 56.

3.05 WORK AREA PREPARATION

A. Asbestos danger signs shall be posted at all approaches to the asbestos Work Area. Post all emergency exits as emergency exits only on the Work Area side, post with asbestos caution signs on the non-Work Area side. Provide all non-Work Area stairs and corridors accessible to the asbestos Work Area with warning tapes at the base of stairs and beginning of corridors. Warning tapes shall be in addition to caution signs.

B. Shut down and lock out the building heating, ventilating, and air conditioning systems. Electrical systems and circuits shall also be shut down unless permitted to remain active per Code Rule 56 and appropriately protected and labeled. Existing lighting sources shall not be utilized. Provide temporary electric power and lighting as specified herein.

C. All surfaces and objects within the Work Area shall be pre-cleaned using HEPA vacuuming and/or wet-wiping methods. Dry sweeping and any other methods that raise dust shall be prohibited. ACM shall not be disturbed during pre-cleaning.

D. Movable objects within the Work Area shall be HEPA vacuumed and/or wet-wiped and removed from the Work Area.

E. All non-movable equipment in the Work Area shall be completely covered with 2 layers of polyethylene sheeting, at least 6 mil in thickness, and secured in place with duct tape and/or spray adhesive.

F. Provide enclosure of the asbestos Work Area necessary to isolate it from unsealed areas of the building in accordance with the approved asbestos Work plan and as specified herein.

G. Provide critical barriers by sealing off all openings including but not limited to windows, diffusers, grills, electrical outlets and boxes, doors, floor drains, and any other penetrations of the Work Area enclosure, using 2 layers of at least 6 mil polyethylene sheeting.

H. Provide isolation barriers by installing temporary framing and sheathing at openings larger than 32 square feet forming the limits of the asbestos Work Area. Sheathing thickness must be

a minimum of 3/8 inch and all sheathing shall be caulked and the Work Area side sealed with two layers of 6 mil polyethylene sheeting.

I. (if applicable) Isolation barriers shall be installed at all elevator openings in the Work Area. Elevators running through the regulated abatement work area shall be shut down or isolated as per Code Rule 56. Elevator controls shall be modified so that elevators bypass the Work Area

J. For interior scope of work provide two layers of 6 mil polyethylene sheeting over all floor, wall, and ceiling surfaces. Isolation barriers shall also be covered with two layers (for a total of four layers). Sheeting shall be secured with spray adhesive and then sealed with duct tape. All joints in polyethylene sheeting shall overlap 12" minimum.

K. Frame out emergency exits. Provide double layer 6 mil polyethylene sheeting and tape seal opening. Post as emergency exits only. Within the Work Area, mark the locations and directions of emergency exits throughout the Work Area using exit signs and/or duct tape.

L. Remove all items attached to or in contact with ACM only after the Work Area enclosure is in place. HEPA vacuum and wet wipe with amended water all removed items prior to their removal from the Work Area and before the start of asbestos removal operations.

M. Suspended ceiling tiles shall only be removed after Work Area preparation is complete. If possible, non-contaminated ceiling tiles shall be HEPA vacuumed and removed from the Work Area before asbestos removals begin. Contaminated ceiling tiles shall be disposed of as asbestos waste.

3.06 NEGATIVE AIR PRESSURE FILTRATION SYSTEM

A. Provide a portable asbestos filtration system that develops a minimum pressure differential of negative 0.02 in. of water column within all full enclosure areas relative to adjacent unsealed areas and that provides a minimum of 6 air changes per hour in the Work Area during abatement.

B. Such filtration systems must be made operational after critical and isolation barriers are installed but before wall, floor, and ceilings are plasticized and shall be operated 24 hours per day during the entire Project until the final cleanup is completed and satisfactory results of the final air samples are received from the laboratory.

C. The system shall include a series of pre-filters and filters to provide High Efficiency Particulate Air (HEPA) filtration of particles down to 0.3 microns at 100% efficiency and below 0.3 microns at 99.9% efficiency. Provide sufficient replacement filters to replace pre-filters every 2 hours, secondary pre-filters every 24 hours, and primary HEPA filters every 600 hours of operation.

D. A minimum of one additional filtration unit of at least the same capacity as the primary unit(s) shall be installed and fully functional to be used during primary unit (s) filter changing and in case of primary failure.

E. At no time will the unit exhaust indoors, within 15 feet of a receptor, including but not limited to windows and doors, or adversely affect the air intake of the building. Exhaust ducting shall not exceed 25' in length. Provide construction fencing at ground level exhaust termination locations per Code Rule 56.

F. Upon electric power failure or shut-down of any filtration unit, all abatement activities shall stop immediately and only resume after power is restored and all filtration units are fully operating. For shut-downs longer than one hour, all openings into the Work Area, including the decontamination enclosures, shall be sealed.

G. The Contractor shall provide a manometer to verify negative air pressure. Manometers shall be read twice daily and recorded within the Daily Project Log.

H. There shall be at least a 4-hour settling period after the Work Area is fully prepared and the negative filtration units have been started to ensure integrity of the barriers.

I. Once installed and operational, the Contractor's Supervisor shall conduct daily inspections of the Work Area to ensure the airtight integrity of the enclosure and operation of the negative air system. Findings shall be recorded within the Daily Project Log. Inspections shall also be conducted on days when no abatement activities are in progress per Code Rule 56 (i.e. weekends).

3.07 REMOVAL OF ASBESTOS CONTAINING MATERIALS

A. Asbestos-containing materials shall be removed in accordance with the Contract Documents and the approved Asbestos Work Plan. Only one type of ACM shall be abated at a time within a Work Area. Where there are multiple types of ACM requiring abatement, Code Rule 56 procedures for sequential abatement shall be followed.

B. Sufficiently wet asbestos materials with a low pressure, airless fine spray of surfactant to ensure full penetration prior to material removal. Re-wet material that does not display evidence of saturation.

C. One Worker shall continuously apply amended water while ACM is being removed.

D. Perform cutting, drilling, abrading, or any penetration or disturbance of asbestos containing material in a manner to minimize the dispersal of asbestos fibers into the air. Use equipment and methods specifically designed to limit generation of airborne asbestos particles. All power operated tools used shall be provided with HEPA equipped filtered local exhaust ventilation.

E. Upon removal of ACM from the substrate, the newly exposed surfaces shall be HEPA vacuumed and/or wet cleaned. Surfaces must be thoroughly cleaned using necessary methods and any required solvents to completely remove any adhesive, mastic, etc.

F. All removed material shall be placed into 6 mil plastic disposal bags or other suitable container upon detachment from the substrate. Cleanup of accumulations of loose debris or waste shall

be performed whenever there is enough accumulation to fill a single bag or container and minimally at the end of each workshift.

G. Large components shall be wrapped in two layers of 6 mil polyethylene sheeting. Sharp components likely to tear disposal bags shall be placed in fiber drums or boxes and then wrapped with sheeting.

H. Power or pressure washers are not permitted for asbestos removal or clean-up procedures unless approved in a Site-Specific Variance.

I. All construction and demolition debris determined by the Environmental Consultant to be contaminated with asbestos shall be handled and disposed of as asbestos waste.

J. The use of metal shovels, metal dust pans, etc. are not permitted inside the work area.

3.08 EQUIPMENT AND WASTE CONTAINER DECONTAMINATION AND REMOVAL PROCEDURES

A. External surfaces of contaminated containers and equipment shall be cleaned by wet cleaning and/or HEPA vacuuming in the Work Area before moving such items into the waste decontamination enclosure system airlock by persons assigned to this duty. The persons in the Work Area shall not enter the airlock. No gross removal operations are permitted when waste transfer is in progress.

B. The containers and equipment shall be removed from the airlock by persons stationed in the washroom during waste removal operations. The external surfaces of containers and equipment shall be cleaned a second time by wet cleaning.

C. The cleaned containers of asbestos material and equipment are to be dried of any excessive pooled or beaded liquid, placed in uncontaminated 6 mil plastic bags or sheeting, as the item's physical characteristics demand, and sealed airtight.

D. The clean re-containerized items shall be moved into the airlock that leads to the holding area. Workers in the washroom shall not enter this airlock.

E. Containers and equipment shall be moved from the airlock and into the holding area by persons dressed in clean personal protective equipment, who have entered from the holding area.

F. The cleaned containers of asbestos material and equipment shall be placed in water tight carts with doors or tops that shall be closed and secured. These carts shall be held in the holding area pending removal. The carts shall be wet cleaned and/or HEPA vacuumed at least once each day.

G. The exit from the decontamination enclosure system shall be secured to prevent unauthorized entry.

H. Where the waste removal enclosure is part of the personnel decontamination enclosure, waste removal shall not occur during shift changes or when otherwise occupied. Precautions shall be taken to prevent short circuiting and cycling of air outward through the shower and clean room.

3.09 WORK AREA DECONTAMINATION, CLEANING, AND CLEARANCE PROCEDURES

A. Following completion of gross abatement and after all accumulations of asbestos waste materials have been containerized, the following decontamination procedures shall be followed unless modified by a Site-Specific Variance.

B. On completion of each type of asbestos abatement within these work area enclosures, a complete single clean of all surfaces in the entire area – ceiling, walls and floors - shall be performed by HEPA vacuuming and wet wiping. No final clearance air samples shall be required for each individual type of material abatement, until the last type of ACM, PACM or asbestos material is abated. Each intermediate completion shall include a visual inspection for completeness by the asbestos abatement contractor's supervisor. Results of the visual inspection and time of intermediate completion shall be documented by the asbestos abatement contractor's supervisor in the daily project log.

C. **Final Required Cleaning**. A complete single clean of all surfaces in the entire area – ceiling, walls and floors, followed by a visual inspection as described in Subpart 56-9 shall be performed by HEPA vacuuming and wet wiping, after all abatement is complete.

E. **Final Clearance Air Samples**. After the final cleaning and visual inspection requirements are completed and the final settling/drying period is observed, prior to dismantling the regulated abatement work area, Phase IIC final clearance air samples shall be collected and satisfactory clearance air results obtained as per Section 56-9.2 of this Part.

3.10 TENT ENCLOSURES

A. Tent enclosures may only be used where specifically permitted by Code Rule 56 or a Site-Specific Variance issued by the NYS Department of Labor.

B. The Contractor shall restrict access to the immediate area where tent removal procedures are taking place using barrier tape and/or construction barriers. Caution signs shall be posted.

C. Remote personnel and waste decontamination enclosures shall be constructed. Configuration shall be as required by Project size. For tent enclosures with gross abatement of friable materials, a contiguous decontamination system shall be constructed, maintained and utilized, except for minor size tent enclosure work areas where a remote decontamination enclosure is permitted by Code Rule 56.

D. The Work Area shall be precleaned. All objects and equipment that will remain in the restricted area during abatement shall be sealed with two layers of six mil polyethylene and tape.

E. The tent shall be a single use barrier constructed with a rigid frame and at least two layers of six mil polyethylene unless one layer of six mil polyethylene is otherwise permitted by Code Rule 56. Tents with twenty (20) square feet or less of floor space or no gross removal of friable ACM shall be constructed of one (1) layer of six mil polyethylene and shall include walls, ceilings and a floor (except portions of walls, floors and ceilings that are the removal surface) with double folded seams. All seams shall be sealed airtight using duct tape and/or spray adhesive.

F. The tent shall be constructed with at least one airlock for worker/waste egress.

G. A monometer shall be used for all OSHA Class I abatement.

H. Negative air shall be maintained at four (4) air changes per hour for non-friable and glovebag abatement tent enclosure work areas. Eight (8) air changes shall be maintained for friable gross removal tent enclosure work areas. In a Minor size abatement tent enclosure work area a HEPA vacuum may be used to maintain the required air changes.

I. OSHA compliance air monitoring is required per section 1.09.

J. ACM removal shall follow procedures defined in section 3.07.

K. Waste material shall be placed in properly labeled 6 mil plastic bags or other appropriate containers. The outside of the bags or containers shall be wet wiped and/or HEPA vacuumed and shall then be placed in a second bag/container before being transported to the waste storage container. All transportation of waste bags and containers outside the Work Area shall be in watertight carts. These carts shall be held in the holding area pending removal. The carts shall be wet cleaned and/or HEPA vacuumed at least once each day.

L. Following completion of gross abatement and after all accumulations of asbestos waste materials have been containerized, the following decontamination procedures shall be followed.
   1. All bagged asbestos waste and unnecessary equipment shall be decontaminated and removed from the Work Area.
   2. All surfaces in the Work Area shall be wet cleaned. A wet-purpose shop vacuum may be used to pick up excess liquid, and shall be decontaminated prior to removal from the Work Area.
   3. The Asbestos Project Monitor shall conduct a visual inspection of the Work Area for cleanliness and completion of abatement.
   4. After the waiting/settling and drying time requirements have elapsed, aggressive final clearance air sampling shall then be conducted by the Environmental Consultant.
   5. Upon receipt of satisfactory final clearance air sampling results, the tent shall be collapsed into itself, placed in suitable disposal bags, and transported to the waste decontamination enclosure. Isolation and critical barriers shall then be removed.

3.11 GLOVE BAG REMOVAL

A. Glove bag removals may only be used as specifically permitted by Code Rule 56 or a Site-Specific Variance issued by the NYS Department of Labor. Glove bags may only be used on piping.

B. In addition to conformance with applicable regulations and variances, glove bag removals are only permitted to be conducted within tent enclosures complying with these specifications.

C. The Contractor shall restrict access to the immediate area where tent/glove bag removal procedures are taking place using barrier tape and/or construction barriers. Caution signs shall be posted.

D. Remote personnel and waste decontamination enclosures shall be constructed. Configuration shall be as required by Project size.

E. Glove bag removals shall utilize commercially available glove bags of at least six mil thickness. Use shall be in accordance with the manufacturer's instructions and the following minimum requirements:

1. The sides of the glove bag shall be cut to fit the size pipe being removed. Tools shall be inserted into the attached tool pocket.
2. The glove bag shall be placed around the pipe and the open edges shall be folded and sealed with staples and duct tape. The glove bag shall also be sealed at the pipe to form a tight seal.
3. Openings shall be made in the glove bag for the wetting tube and HEPA vacuum hose. The opening shall be sealed to form a tight seal.
4. All glove bags shall be smoke tested by the Asbestos Project Monitor under negative pressure using the HEPA vacuum before removal operations commence. Glove bags that do not pass the smoke test shall be resealed and then retested.
5. After first wetting the materials to be removed, removal may commence. ACM shall be continuously wetted. After removal of the ACM, the piping shall be scrubbed or brushed so that no visible ACM remains. Open ends of pipe insulation shall be encapsulated.
6. After the piping is cleaned, the inside of the glove bag shall be washed down and the wetting tube removed. Using the HEPA vacuum, the glove bag shall be collapsed and then twisted and sealed with tape with the ACM at the bottom of the bag.
7. A disposal bag shall be placed around the glove bag that is then detached from the pipe. The disposal bag is then sealed and transported to the decontamination enclosure.

F. After glove bag removals are complete, tent decontamination procedures shall be followed.

3.12 RESTORATION OF UTILITIES, FIRESTOPPING, AND FINISHES

A. After final clearance, remove locks and restore electrical and HVAC systems. All temporary power shall be disconnected, power lockouts removed and power restored. All temporary plumbing shall be removed.

B. Finishes damaged by asbestos abatement activities including, but not limited to, plaster/paint damage due to duct tape and spray adhesives, and floor tile lifted due to wet or humid conditions, shall be restored prior to final payment.
1. Finishes unable to be restored shall be replaced under this Contract.
2. All foam and expandable foam products and materials used to seal Work Area openings shall be completely removed upon completion of abatement activities.

A. All penetrations (including, but not limited to, pipes, ducts, etc.) through fire rated construction shall be firestopped using materials and systems tested in accordance with ASTM E814 on Projects where reinsulation is part of the required work.

PART 4 DISPOSAL OF ASBESTOS WASTE

4.01 TRANSPORTATION AND DISPOSAL SITE

A. The Contractor's Hauler and Disposal Site shall be approved by the Owner.

B. The Contractor shall give twenty-four (24) hour notification prior to removing any waste from the site. Waste shall be removed from the site only during normal working hours unless otherwise specified. No waste may be taken from the site unless the Contractor and

Environmental Consultant are present and the Environmental Consultant authorizes the release of the waste as described herein.

C. All waste generated as part of the asbestos project shall be removed from the site within ten (10) calendar days after successful completion of all asbestos abatement work.

D. Upon arrival at the Project Site, the Hauler must possess and present to the Environmental Consultant a valid New York State Department of Environmental Conservation Part 364 Asbestos Hauler's Permit. The Environmental Consultant may verify the authenticity of the hauler's permit with the proper authority.

E. The Hauler, with the Contractor and the Environmental Consultant, shall inspect all material in the transport container prior to taking possession and signing the Asbestos Waste Manifests.

F. Unless specifically approved by the Owner, the Contractor shall not permit any off-site transfers of the waste or allow the waste to be transported or combined with any other off-site asbestos material. The Hauler must travel directly to the disposal site as identified on the notifications with no unauthorized stops.

4.02 WASTE STORAGE CONTAINERS

A. 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.) unless specifically permitted by a Site Specific Variance. When asbestos contaminated waste must be kept on the work site overnight or longer, it shall be double bagged and stored in accordance with Federal, State, and local laws.

B. The Environmental Consultant shall verify that the waste storage container and/or truck tags (license plates) match that listed on the New York State Department of Environmental Conservation Part 364 permit. Any container not listed on the permit shall be removed from the site immediately.

C. The container shall be plasticized and sealed with two (2) layers of 6 mil polyethylene. Once on site, it shall be kept locked at all times, except during load out. The waste container shall not be used for storage of equipment or contractor supplies.

D. While on-site, the container shall be labeled with EPA Danger signage:

DANGER
CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST
CANCER AND LUNG DISEASE HAZARD

E. The New York State Department of Environmental Conservation Asbestos Hauler's Permit number shall be stenciled on both sides and back of the container.

F. The container is not permitted to be loaded unless it is properly plasticized, has the appropriate danger signage affixed, and has the permit number appropriately stenciled on the container.

G. Before an enclosed container is removed from the Project Site for transportation to the Disposal Site, a seal will be placed on the door(s) of the container by the Environmental Consultant. The door(s) shall also be locked. The seals and locks shall be removed at the

Disposal Site by the operator of the Disposal Facility and the seals shall be returned by the Disposal Facility to the Contractor.

H. If a lined and sealed open-top container is used pursuant to a Site-Specific Variance, a seal is not required.

I. The Owner may initiate random checks at the Disposal Site to ensure that the procedures outlined herein are complied with.

4.03 OWNER'S AND HAULER'S ASBESTOS WASTE MANIFESTS

A. The Hauler's Manifest shall be completed by the Contractor and verified by the Environmental Consultant that all the information and amounts are accurate and the proper signatures are in place.

C. The Manifest shall have the appropriate signatures of the Environmental Consultant, the Contractor, and the Hauler representatives prior to any waste being removed from the site.

D. Copies of the completed Hauler's Manifest shall be retained by the Environmental Consultant and the Contractor and shall remain on site for inspection.

E. Upon arrival at the Disposal Site, the Hauler's Manifest shall be signed by the Disposal Facility operator to certify receipt of ACM covered by the manifest.

F. The Disposal Facility operator shall return the original the Hauler's Manifest and the container seals to the Contractor.

G. The Contractor shall forward copies of the Hauler's Manifest and the container seals to the Environmental Consultant within 14 days of the waste container being removed from the site. Failure to do so may result in payment being withheld from the Contractor.

H. Originals of all waste disposal manifests, seals, and disposal logs shall be submitted by the Contractor to the Owner with the final close-out documentation.

END OF SECTION 02 82 00

ATTACHMENT 1
(Project Drawing BM-ASB1 and BM-ASB2)

SECTION 02 82 00 – Asbestos Abatement Specification

PART 1 GENERAL

1.01 SCOPE OF WORK

A. This asbestos abatement Project will consist of the removal and disposal of asbestos containing materials (ACM) and Presumed ACM (PACM) regarding the Bond Projects Phase 2 at the Nanuet High School, 103 Church Street, Nanuet, NY as indicated in the asbestos removal plans.

B. The work shall include but not be limited to the removal of the below asbestos-containing materials (See Attachment 1 - project drawings HS-ASB2, HS-ASB3, HS-ASB4 and HS-ASB5 for types, locations and approximate quantities per Green Path Environmental, Inc's asbestos survey reports dated March 14, 2022, September 29, 2021 [classroom survey] and supplemental asbestos survey report dated June 14, 2022). The asbestos abatement removal procedure will be in accordance with 12 NYCRR Part 56 - 8.6 for all interior work and 12 NYCRR Part 56 - 11.6 for all exterior work.

Nanuet High School – Storefront (Interior and Exterior), Exterior Façade, Security Foyer Roof, Interior Science Wing and 2nd Floor Mechanical Room

Location	Material	Estimated Quantity
Interior Storefront (Security vestibule)	White Caulking to metal frame and ceramic tile (horizontal and vertical)	1 Square Feet
Exterior Storefront Frame (Security vestibule)	Beige Caulking to metal frame (horizontal) and metal frame to brick wall (vertical)	10 Square Feet
Exterior Storefront above Window Soffit (Security vestibule)	Gray Transite Panels	60 Square Feet
Exterior Facade (all sides)	Wall Waterproofing Black Tar Paper Behind Bricks and Behind Lintels	215 Square Feet
Exterior Façade (all sides)	Exterior Frame Black Caulking	206 Square Feet
Science Wing - Classrooms 206, 214, 230 - 235	Chalkboard Adhesive	56 Square Feet
Science Classroom 206/207	Floor Tiles with Associated Mastic	1020 Square Feet
Science Classroom 206/207	Cove Base with Adhesive Glue	42 Square Feet
Science Classroom 214	Floor Tiles with Associated Mastic	721 Square Feet
Science Classroom 214	Cove Base with Adhesive Glue	27 Square Feet
Mechanical Room – 2nd Floor	Spot Abatement of 2 posts that will be tie/bolt into the existing beam	2 Square Feet
Security foyer roof	4th layer brown rigid insulation	300 Square Feet
	TOTAL ACM	**2660 SF**

C. **The Contractor shall be aware of all conditions of the Project and is responsible for verifying quantities and locations of all Work to be performed. Failure to do so shall not relieve the Contractor of its obligation to furnish all labor and materials necessary to perform the Work.**

D. All Work shall be performed in strict accordance with the Project Documents and all governing codes, rules, and regulations. Where conflicts occur between the Project Documents and applicable codes, rules, and regulations, the more stringent shall apply.

E. Working hours shall be as required and approved by the Owner. Asbestos abatement activities including, but not limited to, work area preparation, gross removal activities, cleaning activities, waste removal, etc. may need to be performed during 'off-hours' (including nights and weekends). In addition, multiple mobilizations may be required to perform the work identified in this project. The Contractor shall coordinate and schedule all Work with the facility and Owner's representative.

1.02 SPECIAL JOB CONDITIONS

A. Any special job conditions are described below.

1. **The contractor shall field verify the amount of ACM and familiarize himself in all variable field conditions in the building before the submission of their bid. See drawings (HS-ASB2, HS-ASB3, HS-ASB4 & HS-ASB5) for locations, types and approximate quantities**.
2. Abatement activities shall be performed during weekdays and weekends and as permitted by owner.
3. The abatement contractor is responsible for filing and acquiring all notifications and variances in connection with this abatement work.
4. Any waste transported through the building shall use canvas carts covered and lined with plastic sheeting.
5. The contractor shall notify the local Fire Department of any obstruction to the outside leading to the exit stair, obstruction to any fire rated corridor and disengagement or obstruction to any exit signage or lighting system.
6. All connections/disconnections to existing electrical panels, fixtures, etc. shall be conducted by a licensed electrician/restricted asbestos handler.
7. Temporary water and power connections to internal sources shall be extended at ceiling level and disconnected when not in use.
8. The contractor shall assume that all components in direct contact with concealed and exposed ACM and/or assumed ACM is contaminated and is to be disposed of as ACM-containing waste. In lieu of disposing these materials as such, the contractor may opt to decontaminate these components if they are non-porous, and dispose of as regular C&D waste at no additional cost to the authority.
9. The asbestos contractor shall be responsible for protecting all areas (floor and fixed items) around the containment.
10. The asbestos contractor shall be responsible for all repairs to finish surfaces which are damaged during the course of the abatement work which are not included in the proposed scope of work.
11. Abatement will take place in the identified work areas separately and sequentially unless approved otherwise by the Owner.

1.03 PERMITS AND COMPLIANCE

A. The Contractor shall assume full responsibility and liability for compliance with all applicable Federal, State, and local laws, rules, and regulations pertaining to Work practices, protection of Workers, authorized visitors to the site, persons, and property adjacent to the Work.

B. Perform asbestos related Work in accordance with New York State Industrial Code Rule 56 (herein referred to as Code Rule 56), 40 CFR 61, and 29 CFR 1926. Where more stringent requirements are specified, adhere to the more stringent requirements.

C. The Contractor must maintain current licenses pursuant to New York State Department of Labor and Department of Environmental Conservation for all Work related to this Project, including the removal, handling, transport, and disposal of asbestos containing materials.

E. The Contractor must have and submit proof upon request that any persons employed by the Contractor to engage in or supervise Work on any asbestos Project have a valid NYS asbestos handling certificate pursuant to Code Rule 56.

F. Failure to adhere to the Project Documents shall constitute a 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.

1.04 SUBMITTALS

A. Pre-Work Submittals: Within 7 days prior to the pre-construction conference, the Contractor shall submit 3 copies of the documents listed below, with 1 copy going directly to the Owner's representative for review and approval prior to the commencement of asbestos abatement activities:

1. Contractor license issued by New York State Department of Labor.
2. A list of Projects performed within the past two (2) years and include the dollar value of all Projects. Provide Project references to include Owner, consultant, and air monitoring firm's name, contact persons, address, and phone number.
3. Progress Schedule:
   a. Show the complete sequence of abatement activities and the sequencing of Work within each building or building section.
   b. Show the dates for the beginning and completion of each major element of Work including substantial completion dates for each Work Area, building, or phase.
4. Project Notifications: As required by Federal and State regulatory agencies together with proof of transmittal (i.e. certified mail return receipt).
5. Building Occupant Notification: As required by regulatory agencies.
6. Abatement Work Plan: Provide plans that clearly indicate the following:
   a. All Work Areas/containments numbered sequentially.
   b. Locations and types of all decontamination enclosures.
   c. Entrances and exits to the Work Areas/containments.
   d. Type of abatement activity/technique for each Work Area/containment.
   e. Number and location of negative air units and exhaust. Also provide calculations for determining number of negative air pressure units.
   f. Proposed location and construction of storage facilities and field office.
   g. Location of water and electrical connections to building services.
   h. Waste transport routes through the building to the waste storage container.

7. Disposal Site/Landfill Permit from applicable regulatory agency.
8. NYS Department of Environmental Conservation Waste Transporter Permit.

B. On-Site Submittals: Refer to Part 3.01.C for all submittals, documentation, and postings required to be maintained on-site during abatement activities.

C. Project Close-out Submittals: Within 30 days of the completion of each abatement phase, the Contractor shall submit 4 copies of the documents listed below. One set of the documents shall be transmitted to the Facility and one set to the Owner's representative for review and approval prior to the Contractor's final payment.
1. **Originals** of all waste disposal manifests, seals, and disposal logs.
2. OSHA compliance air monitoring records conducted during the Work.
3. Daily progress log, including the entry/exit log.
4. A list of all Workers used in the performance of the Project, including name, social security number, NYS DOL certification number and type of certification (i.e. supervisor, asbestos handler, etc.).
5. For each Worker used in the performance of the Project, submit the Worker's Acknowledgment Statement.
6. Disposal Site/Landfill Permit from applicable regulatory agency.
7. Project notifications, amended notifications and any Variances.

1.05 PRE-CONSTRUCTION CONFERENCE

A. Prior to start of preparatory Work under this Contract, the Contractor shall attend a pre-construction conference attended by Owner, Facility Personnel, and Green Path Environmental, Inc (Environmental Consultant).

B. Agenda for this conference shall include but not necessarily be limited to:
1. Contractor's scope of Work, Work plan, and schedule to include number of workers and shifts.
2. Contractor's safety and health precautions including protective clothing and equipment and decontamination procedures.
3. Environmental Consultant's duties, functions, and authority.
4. Contractor's Work procedures including:
   a. Methods of job site preparation and removal methods.
   b. Respiratory protection.
   c. Disposal procedures.
   d. Cleanup procedures.
   e. Fire exits and emergency procedures.
5. Contractor's required pre-work and on-site submittals, documentation, and postings.
6. Contractor's plan for twenty-four (24) hour Project security both for prevention of theft and for barring entry of unauthorized personnel into Work Areas.
7. Temporary utilities.
8. Handling of furniture and other moveable objects.
9. Storage of removed asbestos containing materials.
10. Waste disposal requirements and procedures, including use of the Owner supplied waste manifest and container seals.

C. In conjunction with the conference the Contractor shall accompany the Owner and Environmental Consultant on a pre-construction walk-through documenting existing condition

of finishes and furnishings, reviewing overall Work plan, location of fire exits, fire protection equipment, water supply and temporary electric tie-in.

1.06 APPLICABLE STANDARDS AND REGULATIONS

A. The Contractor shall comply with the following codes and standards, except where more stringent requirements are shown or specified:

B. Federal Regulations:
1. 29 CFR 1910.1001, "Asbestos" (OSHA)
2. 29 CFR 1910.1200, "Hazard Communication" (OSHA)
3. 29 CFR 1910.134, "Respiratory Protection" (OSHA)
4. 29 CFR 1910.145, "Specification for Accident Prevention Signs and Tags" (OSHA)
5. 29 CFR 1926, "Construction Industry" (OSHA)
6. 29 CFR 1926.1101, "Asbestos, Tremolite, Anthophyllite, and Actinolite" (OSHA)
7. 29 CFR 1926.500 "Guardrails, Handrails and Covers" (OSHA)
8. 40 CFR 61, Subpart A, "General Provisions" (EPA)
9. 40 CFR 61, Subpart M, "National Emission Standard for Asbestos" (EPA)
10. 49 CFR 171-172, Transportation Standards (DOT)

C. New York State Regulations:
1. 12 NYCRR, Part 56, "Asbestos", Industrial Code Rule 56 (DOL) (amended March 21, 2007).
2. 6 NYCRR, Parts 360, 364, Disposal and Transportation (DEC)
3. 10 NYCRR, Part 73, "Asbestos Safety Program Requirements" (DOH)

D. Standards and Guidance Documents:
1. American National Standard Institute (ANSI) Z88.2-80, Practices for Respiratory Protection
2. ANSI Z9.2-79, Fundamentals Governing the Design and Operation of Local Exhaust Systems
3. EPA 560/585-024, Guidance for Controlling Asbestos Containing Materials in Buildings (Purple Book)
4. EPA 530-SW-85-007, Asbestos Waste Management Guidance
5. ASTM Standard E1368 “Standard Practice for Visual Inspection of Asbestos Abatement Projects.”

1.07 NOTICES

A. The Contractor shall provide notification of intent to commence asbestos abatement activities as indicated below.
1. At least ten (10) Working days prior to beginning abatement activities, send written notification to:
U.S. Environmental Protection Agency
National Emissions Standards for Hazardous Air Pollutants (NESHAPS) Coordinator
26 Federal Plaza
New York, NY 10007
2. At least ten (10) days prior to beginning abatement activities send written notification to:
New York State Department of Labor
Division of Safety and Health, Asbestos Control Program.

State Office Campus
Building 12 - Room 454
Albany, NY 12240

B. The Contractor is required to send notifications to regulatory agencies via mail or package delivery service that will provide proof of delivery and receipt.

C. The Contractor shall be responsible for maintaining current project filings with regulatory agencies for the duration of the project.

D. The Contractor shall post and/or provide Building Occupant Notification at least 10 days prior to beginning abatement activities as required by Code Rule 56.

1.08 PROJECT MONITORING AND AIR SAMPLING

A. The Owner has engaged the services of Green Path Environmental, Inc (Environmental Consultant) who shall serve as the Owner's Representative in regard to the performance of the asbestos abatement Project and provide direction as required throughout the entire abatement Project period.

B. The Contractor is required to ensure cooperation of its personnel with the Consultant for the air sampling and Project monitoring functions described in this section. The Contractor shall comply with all direction given by the Consultant during the course of the Project.

C. The Consultant shall provide the following administrative services:

1. Review and approve or disapprove all submittals, shop drawings, schedules, and samples.
2. Assure that all notifications to governmental agencies by the Contractor are submitted in a timely manner and are correct in content.

D. The Consultant shall staff the Project with a trained and certified person (s) to act on the Owner's behalf at the job site. This individual shall be designated as the Abatement Project Monitor (APM).
1. The APM shall be on-site at all times the Contractor is on-site. The Contractor shall not be permitted to conduct any Work unless the APM is on-site (except for inspection of barriers and negative air system during non-working days).
2. The APM shall have the authority to direct the actions of the Contractor verbally and in writing to ensure compliance with the Project documents and all regulations. The APM shall have the authority to Stop Work when gross Work practice deficiencies or unsafe practices are observed, or when ambient fiber concentrations outside the removal area exceed .01 f/cc or background level.
    a. Such Stop Work order shall be effective immediately and remain in effect until corrective measures have been taken and the situation has been corrected.
    b. Standby time required to resolve the situation shall be at the Contractor's expense.
3. The APM shall provide the following services:
    a. Inspection of the Contractor's Work, practices, and procedures, including temporary protection requirements, for compliance with all regulations and Project specifications.

b. Provide abatement Project air sampling as required by applicable regulations (NYS, AHERA) and the Owner. Sampling will include background, work area preparation, asbestos handling, and final cleaning and clearance air sampling.
c. Verify daily that all Workers used in the performance of the Project are certified by the appropriate regulatory agency.
d. Monitor the progress of the Contractor's Work, and report any deviations from the schedule to the Owner.
e. Monitor, verify, and document all waste load-out operations.
f. Verify that the Contractor is performing personal air monitoring daily, and that results are being returned and posted at the site as required.
g. The APM shall maintain a log on site that documents all project related and Consultant and Contractor actions, activities, and occurrences.

4. The following minimum inspections shall be conducted by the APM. Additional inspections shall be conducted as required by Project conditions. Progression from one phase of Work to the next by the Contractor is only permitted with the written approval of the APM.
   a. Pre-Construction Inspection: The purpose of this inspection is to verify the existing conditions of the Work Areas and to document these conditions.
   b. Pre-Commencement Inspection: The purpose of this inspection is to verify the integrity of each containment system prior to disturbance of any asbestos containing material. This inspection shall take place only after the Work Area is fully prepped for removal.
   c. Work Inspections: The purpose of this inspection is to monitor the Work practices and procedures employed on the Project and to monitor the continued integrity of the containment system. Inspections within the removal areas shall be conducted by the APM during all preparation, removal, and cleaning activities at least twice every Work shift. Additional inspections shall be conducted as warranted.
   d. Pre-Encapsulation Inspection: The purpose of this inspection is to ensure the complete removal of Asbestos Containing Material (ACM), from all surfaces in the Work Area prior to encapsulation.
   e. Visual Clearance Inspection: The purpose of this inspection is to verify that: all materials in the scope of work have been properly removed; no visible asbestos debris/residue remains; no pools of liquid or condensation remains; and all required cleanings are complete. This inspection shall be conducted before final air clearance testing.
   f. Post-Clearance Inspection: The purpose of this inspection is to ensure the complete removal of ACM, including debris, from the Work Area after satisfactory final clearance sampling and removal of all isolation and critical barriers and equipment from the Work Area.
   g. Punch List Inspection: The purpose of this inspection is to verify the Contractor's certification that all Work has been completed as contracted and the existing condition of the area prior to its release to the Owner.

E. The Consultant shall provide abatement Project air sampling and analysis as required by applicable regulations (New York State and/or AHERA). Sampling will include background, work area preparation, asbestos handling, and final cleaning and clearance air sampling.

1. Unless otherwise required by applicable regulations, the Consultant shall have samples analyzed by Phase Contrast Microscopy (PCM). Results shall be available within 24 hours of completion of sampling.
2. Samples shall be collected as required by applicable regulations (New York State and/or AHERA) and these specifications. If Transmission Electron Microscopy (TEM) clearance air sampling is utilized by the owner, the clearance criteria and sampling protocols must be in compliance with AHERA. If PCM air sample analysis results exceed the satisfactory clearance criteria, then TEM analysis of the entire set of clearance air samples may be used, provided that a standard NIOSH/ELAP accepted laboratory analysis method is utilized that shall report each air sample result in fibers per cubic centimeter.
3. If the air sampling during any phase of the abatement project reveals airborne fiber levels at or above .01 fibers/cc or the established background level, whichever is greater, outside the regulated Work Area, Work shall stop immediately and corrective measures required by Code Rule 56 shall be initiated. Notify all employers and occupants in adjacent areas. The Contractor shall bear the burden of any and all costs incurred by this delay.
4. The Environmental Consultant shall submit copies of all elevated air sampling results collected during abatement and all final air clearance results to the Commissioner of Labor.

1.09 CONTRACTOR AIR SAMPLING

A. In addition to the requirements of OSHA 1926.1101, the Contractor shall be required to perform personal air monitoring every Work shift in each Work Area during which abatement activities occur in order to determine that appropriate respiratory protection is being worn and utilized.

B. The Contractor shall conduct air sampling that is representative of both the 8-hour time weighted average and 30-minute short-term exposures to indicate compliance with the permissible exposure and excursion limits.

C. The Contractor's laboratory analysis of air samples shall be conducted by an NYS DOH ELAP approved laboratory.

D. Results of personnel air sample analyses shall be available, verbally, within twenty-four (24) hours of sampling and shall be posted upon receipt. Written laboratory reports shall be delivered and posted at the Work site within five (5) days. Failure to comply with these requirements may result in all work being stopped until compliance is achieved.

1.10 PROJECT SUPERVISOR

A. The Contractor shall designate a full-time Project Supervisor who shall meet the following qualifications:
   1. The Project Supervisor shall hold New York State certification as an Asbestos Supervisor.
   2. The Project Supervisor shall meet the requirements of a "Competent Person" as defined by OSHA 1926.1101 and shall have a minimum of one year experience as a supervisor.
   3. The Project Supervisor must be able to speak, read, and write English fluently, as well as communicate in the primary language of the Workers.

B. If the Project Supervisor is not on-site at any time whatsoever, all Work shall be stopped. The Project Supervisor shall remain on-site until the Project is complete. The Project Supervisor cannot be removed from the Project without the written consent of the Owner and the Environmental Consultant. The Project Supervisor shall be removed from the Project if so requested by the Owner.

C. The Project Supervisor shall maintain the bound Daily Project Log that also includes the entry/exit logs as required by New York State Department of Labor and section 2.03 of the specifications and the Waste Disposal Log required by section 4.04 of the specifications.

D. The Project Supervisor shall be responsible for the performance of the Work and shall represent the Contractor in all respects at the Project site. The Supervisor shall be the primary point of contact for the Asbestos Project Monitor.

1.11 MEDICAL REQUIREMENTS

A. Before exposure to airborne asbestos fibers, provide Workers with a comprehensive medical examination as required by 29 CFR 1910.1001, and 29 CFR 1926.1101.
   1. This examination is not required if adequate records show the employee has been examined as required by 29 CFR 1910.1001, and 29 CFR 1926.1101 within the past year.
   2. The same medical examination shall be given on an annual basis to employees engaged in an occupation involving asbestos fibers and within thirty (30) calendar days before or after the termination of employment in such occupations.

1.12 TRAINING

A. As required by applicable regulations, prior to assignment to asbestos Work instruct each employee with regard to the hazards of asbestos, safety and health precautions, and the use and requirements of protective clothing and equipment.

B. Establish a respirator program as required by ANSI Z88.2 and 29 CFR 1910.134, and 29 CFR 1926.1101. Provide respirator training and fit testing.

1.13 RESPIRATORY PROTECTION

A. Select respirators from those approved by the Mine Safety and Health Administration (MSHA), and the National Institute for Occupational Safety and Health (NIOSH), Department of Health and Human Services.

B. Respirators shall be individually fit-tested to personnel under the direction of an Industrial Hygienist on a yearly basis. Fit-tested respirators shall be permanently marked to identify the individual fitted, and use shall be limited to that individual. Fit-test records shall be maintained on site for each employee.

C. Where fiber levels permit, and in compliance with regulatory requirements, half-faced respirators are the minimum allowable respiratory protection permitted to be utilized during gross removal operations of OSHA Class I or OSHA Class II ACM.

D. No respirators shall be issued to personnel without such personnel participating in a respirator training program.

E. High Efficiency Particulate Air (HEPA) respirator filters shall be approved by NIOSH and shall conform to the OSHA requirements in 29 CFR 1910.134 and 29 CFR 1926.1101.

F. A storage area for respirators shall be provided by the Contractor in the clean room side of the personnel decontamination enclosure where they will be kept in a clean environment.

G. The Contractor shall provide and make available a sufficient quantity of respirator filters so that filter changes can be made as necessary during the work day. Filters will be removed and discarded during the decontamination process. Filters cannot be reused. Filters must be changed if breathing becomes difficult.

H. Filters used with negative pressure air purifying respirators shall not be used any longer than one eight (8) hour work day.

I. Any authorized visitor, Worker, or supervisor found in the Work Area not wearing the required respiratory protection shall be removed from the Project site and not be permitted to return.

J. The Contractor shall have at least two (2) half-faced respirators stored on site designated for authorized visitors use. Appropriate respirator filters for authorized visitors shall be made available by the Contractor.

1.14 DELIVERY AND STORAGE

A. Deliver all materials to the job site in original packages with containers bearing manufacturer's name and label.

B. Store all materials at the job site in a suitable and designated area.
   1. Store materials subject to deterioration or damage away from wet or damp surfaces and under cover.
   1. Protect materials from unintended contamination and theft.
   2. Storage areas shall be kept clean and organized.

C. Remove damaged or deteriorated materials from the job site. Materials contaminated with asbestos shall be disposed of as asbestos debris as herein specified.

1.15 TEMPORARY UTILITIES

A. Shut down and lock out all electrical power to the asbestos Work Areas.

B. Provide temporary 120–240-volt, single phase, three wire, 100-amp electric service with Ground Fault Circuit Interrupters (GFCI) for all electric requirements within the asbestos Work Area.
   1. Where available, obtain from Owner's existing system. Otherwise provide power from other sources (i.e. generator).
   2. Provide temporary wiring and "weatherproof" receptacles in sufficient quantity and location to serve all HEPA equipment and tools.
   3. Provide wiring and receptacles as required by the Environmental Consultant for air sampling equipment.
   4. All power to the Work Area shall be brought in from outside the area through GFCI's at the source.

C. Provide temporary lighting with "weatherproof" fixtures for all Work Areas including decontamination chambers.
   1. The entire Work Area shall be kept illuminated at all times.
   2. Provide lighting as required by the Environmental Consultant for the purposes of performing required inspections.

D. All temporary devices and wiring used in the Work Area shall be capable of decontamination procedures including HEPA vacuuming and wet-wiping.

E. Utilize domestic water service, if available, from Owner's existing system. Provide hot water heaters with sufficient capacity to meet Project demands.

END OF PART 1

PART 2 PRODUCTS

2.01 PROTECTIVE CLOTHING

A. Provide personnel utilized during the Project with disposable protective whole body clothing, head coverings, gloves and foot coverings. Provide disposable plastic or rubber gloves to protect hands. Cloth gloves may be worn inside the plastic or rubber for comfort, but shall not be used alone. Make sleeves secure at the wrists and make foot coverings secure at the ankles by the use of tape, or provide disposable coverings with elastic wrists or tops.

B. Provide sufficient quantities of protective clothing to assure a minimum of four (4) complete disposable outfits per day for each individual performing abatement Work.

C. Eye protection and hard hats shall be provided and made available for all personnel entering any Work Area.

C. Authorized visitors shall be provided with suitable protective clothing, headgear, eye protection, and footwear whenever they enter the Work Area.

2.02 SIGNS AND LABELS

A. Provide warning signs and barrier tapes at all approaches to asbestos Work Areas. Locate signs at such distance that personnel may read the sign and take the necessary protective steps required before entering the area.

1. Provide danger signs in vertical format conforming to 29 CFR 1926.1101, minimum 20" x 14" displaying the following legend.

DANGER
ASBESTOS CANCER AND LUNG DISEASE
HAZARD
AUTHORIZED PERSONNEL ONLY
RESPIRATORS AND PROTECTIVE CLOTHING
ARE REQUIRED IN THIS AREA

2. Provide 3" wide yellow barrier tape printed with black lettered, "DANGER ASBESTOS REMOVAL". Locate barrier tape across all corridors, entrances and access routes to asbestos Work Area. Install tape 3' to 4' AFF.

B. Provide asbestos danger labels affixed to all asbestos materials, scrap, waste, debris and other products contaminated with asbestos.

1. Provide asbestos danger labels of sufficient size to be clearly legible, displaying the following legend:

DANGER
CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST
CANCER AND LUNG DISEASE HAZARD

2. Provide the following asbestos labels, of sufficient size to be clearly legible, for display on waste containers (bags or drums) which will be used to transport asbestos contaminated material in accordance with United States Department of Transportation 49 CFR Parts 171 and 172: (Note: Include “RQ” for friable asbestos waste only.)

RQ, (WASTE) ASBESTOS, 9, NA2212, PGIII

3. Generator identification information shall be affixed to each waste container indicating the following printed in indelible ink:
   Generator Name
   Facility Name
   Facility Address

2.03 DAILY PROJECT LOG

A. Provide a Daily Project Log. The log shall contain on title page the Project name, name, address and phone number of Owner; name, address and phone number of Environmental Consultant; name, address and phone number of Abatement Contractor; emergency numbers including, but not limited to local Fire/Rescue department and all other New York State Department of Labor requirements.

B. All entries into the log shall be made in non-washable, permanent ink and such pen shall be strung to or otherwise attached to the log to prevent removal from the log-in area. Under no circumstances shall pencil entries be permitted.

C. All persons entering and exiting the Work Area shall sign the log and include name, title, work performed and time.

D. The Project Supervisor shall document all Work performed daily and note all inspections required by Code Rule 56, i.e. testing and inspection of barriers and enclosures.

2.04 SCAFFOLDING AND LADDERS

A. Provide all scaffolding and/or staging as necessary to accomplish the Work of this Contract. Scaffolding may be of suspension type or standing type such as metal tube and coupler, tubular welded frame, pole or outrigger type or cantilever type. The type, erection and use of all scaffolding and ladders shall comply with all applicable OSHA construction industry standards.

B. Provide scaffolding and ladders as required by the Environmental Consultant for the purposes of performing required inspections.

2.05 SURFACTANT (AMENDED WATER)

A. Wet all asbestos-containing materials prior to removal with surfactant mixed and applied in accordance with manufacturer's printed instructions.

2.06 ENCAPSULANT

A. Encapsulant shall be tinted or pigmented so that application when dry is readily discernible.

B. The encapsulant solvent or vehicle shall not contain a volatile hydrocarbon.

2.07 DISPOSAL BAGS, DRUMS, AND CONTAINERS

A. Provide 6 mil polyethylene disposal bags printed with asbestos caution labels. Bags shall also be imprinted with U.S. Department of Transportation required markings.

B. Provide 30- or 55-gallon capacity fiber, plastic, or metal drums capable of being sealed air and water tight if asbestos waste has the potential to damage or puncture disposal bags. Affix asbestos caution labels on lids and at one-third points around drum circumference to assure ready identification.

C. Containers and bags must be labeled accordance with 40 CFR Part 61 NESHAPS and Code Rule 56. When the bags/containers are moved to the lockable hardtop dumpster from the waste decontamination system washroom, the bags must also be appropriately labeled with the date they are moved on the bag/container in waterproof markings.

D. Labeled ACM waste containers or bags shall not be used for non-ACM waste or trash. Any material placed in labeled containers or bags, whether turned inside out or not shall be handled and disposed of as ACM waste.

2.08 HEPA VACUUM EQUIPMENT

A. All dry vacuuming performed under this contract shall be performed with High Efficiency Particulate Absolute (HEPA) filter equipped industrial vacuums conforming to ANSI Z9.2.

B. Provide tools and specialized equipment including scraping nozzles with integral vacuum hoods connected to a HEPA vacuum with flexible hose.

2.09 POWER TOOLS

A. Any power tools used to drill, cut into, or otherwise disturb asbestos material shall be manufacturer equipped with HEPA filtered local exhaust ventilation.

2.10 POLYETHYLENE SHEETING

A. All polyethylene (plastic) sheeting used on the Project (including but not limited to sheeting used for critical and isolation barriers, fixed objects, walls, floors, ceilings, waste container) shall be at least 6 mil fire retardant sheeting.

B. Decontamination enclosure systems shall utilize at least 6 mil opaque fire-retardant plastic sheeting. At least 2 layers of 6 mil reinforced fire-retardant plastic sheeting shall be used for the flooring.

END OF PART 2

PART 3 EXECUTION

3.01 GENERAL REQUIREMENTS

A. Should visible emissions or water leaks be observed outside the Work Area, immediately stop Work and institute emergency procedures per Code Rule 56. Should there be elevated fiber levels outside the Work Area, immediately stop Work, institute emergency procedures per Code Rule 56, and notify all employers and occupants in adjacent areas. All costs incurred in decontaminating such non-Work Areas and the contents thereof shall be borne by the Contractor, at no additional cost to the Owner.

B. Medical approval, fit test reports, Worker Acknowledgments, and NYS DOL certificates shall be on site prior to admittance of any Contractor's employees to the asbestos Work Area.

C. The following submittals, documentation, and postings shall be maintained on-site by the Contractor during abatement activities at a location approved by the Abatement Project Monitor:
   1. Contractor license issued by New York State Department of Labor.
   2. Certification, Worker Training, Medical Surveillance, Acknowledgments:
      a. NYS DOL Asbestos Handler certification cards for each person employed in the removal, handling, or disturbance of asbestos.
      b. Evidence that Workers have received proper training required by the regulations and the medical examinations required by OSHA 29 CFR 1926.1101.
      c. Documentation that Workers have been fit tested specifically for respirators used on the Project.
      d. Worker's Acknowledgments: 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.
   3. Daily OSHA personal air monitoring results.
   4. NYS Department of Health ELAP certification for the laboratory that will be analyzing the OSHA personnel air samples.
   5. NYS Department of Environmental Conservation Waste Transporter Permit.
   6. Project documents (specifications and drawings.)
   7. Notifications and Variances. Ensure that the most up-to-date notifications and Variances are on-site.
   8. Applicable regulations.
   9. Material Safety Data Sheets of supplies/chemicals used on the Project.
   10. Approved Abatement Work Plan.
   11. List of emergency telephone numbers.
   12. Magnahelic manometer semi-annual calibration certification.
   13. Waste Disposal Log.
   14. Daily Project Log.

D. The following documentation shall be maintained on-site by the Abatement Project Monitor during abatement activities:
   1. Contractor license issued by New York State Department of Labor.
   2. Air Sample Log.
   3. Air sample results.
   4. Project Monitor Daily Log

7. A copy of ASTM Standard E1368 "Standard Practice for Visual Inspection of Asbestos Abatement Projects."

E. The Work Area must be vacated by building occupants prior to decontamination enclosure construction and Work Area preparation.

F. All demolition necessary to access asbestos containing materials for removal must be conducted within negative pressure enclosures by licensed asbestos handlers. Demolition debris may be disposed of as construction and demolition debris provided the Abatement Project Monitor determines that it is not contaminated with asbestos and there has been no disturbance of ACM within the enclosure. If the demolition debris is determined to be contaminated or ACM has been disturbed, it must be disposed of as asbestos waste.

3.02 PERSONNEL DECONTAMINATION ENCLOSURE

A. Provide personnel decontamination enclosure contiguous to the Work Area as per NYS ICR 56. The decontamination enclosure may be attached to or remote from the Work Area and not located within it unless isolation barriers are installed. If the decontamination chamber is accessible to the public, it shall be fully framed and sheathed to prevent unauthorized entry.

B. Access to the Work Area will be from the clean room through an air-lock to the shower and through an air lock to the equipment room. Each airlock shall be a minimum of three feet from door to door. Additional air locks shall be provided as required by Code Rule 56 for remote decontamination enclosures.

C. The decontamination enclosure ceiling and walls shall be covered with one layer of opaque 6 mil polyethylene sheeting. Two layers of reinforced polyethylene sheeting shall be used to cover the floor.

D. The entrance to the clean room shall have a lockable door. Provide suitable lockers for storage of Worker's street clothes. Storage for respirators along with replacement filters and disposable towels shall also be provided.

E. Provide a temporary shower with individual hot and cold-water supplies and faucets. Provide a sufficient supply of soap and shampoo. There shall be one shower for every six Workers. The shower room shall be constructed in such a way so that travel through the shower chamber shall be through the shower. The shower shall not be able to be bypassed.

F. Shower water shall be drained, collected and filtered through a system with at least a 5.0-micron particle size collection capability containing a series of several filters with progressively smaller pore sizes to avoid rapid clogging of the system. The filtered waste water shall then be discharged in accordance with applicable codes and the contaminated filters disposed of as asbestos waste.

G. The equipment room shall be used for the storage of tools and equipment. A walk-off pan filled with water shall be located in the Work Area outside the equipment room for Workers to clean foot coverings when leaving the Work Area. A labeled 6 mil plastic ACM waste bag for collection of contaminated clothing shall be located in this room.

H. The personal decontamination enclosure shall be cleaned and disinfected minimally at the end of each Work shift and as otherwise directed by the Asbestos Project Monitor.

3.03 WASTE DECONTAMINATION ENCLOSURE

A. Provide a waste decontamination enclosure contiguous to the Work area. The decontamination enclosure shall be attached to the Work Area and not located within it unless isolation barriers are installed. If the decontamination chamber is accessible to the public, it shall be fully framed and sheathed to prevent unauthorized entry.

B. The waste decontamination enclosure system shall consist of a holding area, air lock and washroom. The airlock shall be a minimum of three feet from door to door. The entrance to the holding area shall have a lockable door.

C. The decontamination enclosure ceiling and walls shall be covered with one layer of opaque 6 mil polyethylene sheeting on walls and ceiling. Two layers of reinforced polyethylene sheeting shall be used to cover the floor.

D. Where there is only one egress from the Work Area, the holding area of the waste decontamination enclosure system may branch off from the personnel decontamination enclosure equipment room, which then serves as the waste wash room.

E. The waste wash room water shall be drained, collected, and filtered through a system with at least a 5.0-micron particle size collection capability containing a series of several filters with progressively smaller pore sizes to avoid rapid clogging of the system. The filtered waste water shall then be discharged in accordance with applicable codes and the contaminated filters disposed of as asbestos waste.

F. In small asbestos Projects where only one egress from the Work Area exists, the shower room may be used as a waste washroom. In this instance, the clean room shall not be used for waste storage, but shall be used for waste transfer to carts, which shall immediately be removed from this enclosure.

3.04 WORK AREA ENTRY AND EXIT PROCEDURES

A. Access to and from the asbestos Work Area is permitted only through the personnel decontamination enclosure unless otherwise stipulated in a Site-Specific Variance.

B. Workers shall sign the entry/exit log upon every entry and exit.

C. The following procedures shall be followed when entering the Work Area:
   1. Before entering the Work Area, Workers shall proceed to the clean room, remove all street clothes, and don protective clothing, equipment, and respirators.
   2. Workers shall proceed from the clean room through the shower room and the equipment room and into the Work Area.

D. The following procedures shall be followed when exiting the Work Area:

   1. Before leaving the Work Area, gross asbestos contamination will be removed by brushing, wet cleaning and/or HEPA vacuuming.

2. In the equipment room, Workers shall remove disposable clothing, but not respirators, and shall place clothing in plastic disposal bags for disposal as contaminated debris prior to entering the shower room.
3. Workers shall shower thoroughly while wearing respirators, then wash respirator with soap and water prior to removal.
4. Upon exiting the shower, Workers shall don new disposable clothing if the Work shift is to continue or street clothes to exit area. Under no circumstances shall Workers enter public non-Work Areas in disposable protective clothing.

E. If remote decontamination enclosures are permitted by Code Rule 56 or a Site-Specific Variance, workers shall wear two disposable suits for all phases of Work. Workers exiting the work area shall HEPA vacuum the outer suit, enter the airlock, remove the outer suit and then place it back into the Work Area. A clean second suit shall be donned before exiting the airlock and proceeding to the decontamination enclosure or another work area via the designated pathway required by Code Rule 56.

3.05 WORK AREA PREPARATION

A. Asbestos danger signs shall be posted at all approaches to the asbestos Work Area. Post all emergency exits as emergency exits only on the Work Area side, post with asbestos caution signs on the non-Work Area side. Provide all non-Work Area stairs and corridors accessible to the asbestos Work Area with warning tapes at the base of stairs and beginning of corridors. Warning tapes shall be in addition to caution signs.

B. Shut down and lock out the building heating, ventilating, and air conditioning systems. Electrical systems and circuits shall also be shut down unless permitted to remain active per Code Rule 56 and appropriately protected and labeled. Existing lighting sources shall not be utilized. Provide temporary electric power and lighting as specified herein.

C. All surfaces and objects within the Work Area shall be pre-cleaned using HEPA vacuuming and/or wet-wiping methods. Dry sweeping and any other methods that raise dust shall be prohibited. ACM shall not be disturbed during pre-cleaning.

D. Movable objects within the Work Area shall be HEPA vacuumed and/or wet-wiped and removed from the Work Area.

E. All non-movable equipment in the Work Area shall be completely covered with 2 layers of polyethylene sheeting, at least 6 mil in thickness, and secured in place with duct tape and/or spray adhesive.

F. Provide enclosure of the asbestos Work Area necessary to isolate it from unsealed areas of the building in accordance with the approved asbestos Work plan and as specified herein.

G. Provide critical barriers by sealing off all openings including but not limited to windows, diffusers, grills, electrical outlets and boxes, doors, floor drains, and any other penetrations of the Work Area enclosure, using 2 layers of at least 6 mil polyethylene sheeting.

H. Provide isolation barriers by installing temporary framing and sheathing at openings larger than 32 square feet forming the limits of the asbestos Work Area. Sheathing thickness must be

a minimum of 3/8 inch and all sheathing shall be caulked and the Work Area side sealed with two layers of 6 mil polyethylene sheeting.

I. (If applicable) Isolation barriers shall be installed at all elevator openings in the Work Area. Elevators running through the regulated abatement work area shall be shut down or isolated as per Code Rule 56. Elevator controls shall be modified so that elevators bypass the Work Area

J. For interior scope of work provide two layers of 6 mil polyethylene sheeting over all floor, wall, and ceiling surfaces. Isolation barriers shall also be covered with two layers (for a total of four layers). Sheeting shall be secured with spray adhesive and then sealed with duct tape. All joints in polyethylene sheeting shall overlap 12" minimum.

K. Frame out emergency exits. Provide double layer 6 mil polyethylene sheeting and tape seal opening. Post as emergency exits only. Within the Work Area, mark the locations and directions of emergency exits throughout the Work Area using exit signs and/or duct tape.

L. Remove all items attached to or in contact with ACM only after the Work Area enclosure is in place. HEPA vacuum and wet wipe with amended water all removed items prior to their removal from the Work Area and before the start of asbestos removal operations.

M. Suspended ceiling tiles shall only be removed after Work Area preparation is complete. If possible, non-contaminated ceiling tiles shall be HEPA vacuumed and removed from the Work Area before asbestos removals begin. Contaminated ceiling tiles shall be disposed of as asbestos waste.

3.06 NEGATIVE AIR PRESSURE FILTRATION SYSTEM

A. Provide a portable asbestos filtration system that develops a minimum pressure differential of negative 0.02 in. of water column within all full enclosure areas relative to adjacent unsealed areas and that provides a minimum of 6 air changes per hour in the Work Area during abatement.

B. Such filtration systems must be made operational after critical and isolation barriers are installed but before wall, floor, and ceilings are plasticized and shall be operated 24 hours per day during the entire Project until the final cleanup is completed and satisfactory results of the final air samples are received from the laboratory.

C. The system shall include a series of pre-filters and filters to provide High Efficiency Particulate Air (HEPA) filtration of particles down to 0.3 microns at 100% efficiency and below 0.3 microns at 99.9% efficiency. Provide sufficient replacement filters to replace pre-filters every 2 hours, secondary pre-filters every 24 hours, and primary HEPA filters every 600 hours of operation.

D. A minimum of one additional filtration unit of at least the same capacity as the primary unit(s) shall be installed and fully functional to be used during primary unit (s) filter changing and in case of primary failure.

E. At no time will the unit exhaust indoors, within 15 feet of a receptor, including but not limited to windows and doors, or adversely affect the air intake of the building. Exhaust ducting shall

not exceed 25' in length. Provide construction fencing at ground level exhaust termination locations per Code Rule 56.

F. Upon electric power failure or shut-down of any filtration unit, all abatement activities shall stop immediately and only resume after power is restored and all filtration units are fully operating. For shut-downs longer than one hour, all openings into the Work Area, including the decontamination enclosures, shall be sealed.

G. The Contractor shall provide a manometer to verify negative air pressure. Manometers shall be read twice daily and recorded within the Daily Project Log.

H. There shall be at least a 4-hour settling period after the Work Area is fully prepared and the negative filtration units have been started to ensure integrity of the barriers.

I. Once installed and operational, the Contractor's Supervisor shall conduct daily inspections of the Work Area to ensure the airtight integrity of the enclosure and operation of the negative air system. Findings shall be recorded within the Daily Project Log. Inspections shall also be conducted on days when no abatement activities are in progress per Code Rule 56 (i.e. weekends).

3.07 REMOVAL OF ASBESTOS CONTAINING MATERIALS

A. Asbestos-containing materials shall be removed in accordance with the Contract Documents and the approved Asbestos Work Plan. Only one type of ACM shall be abated at a time within a Work Area. Where there are multiple types of ACM requiring abatement, Code Rule 56 procedures for sequential abatement shall be followed.

B. Sufficiently wet asbestos materials with a low pressure, airless fine spray of surfactant to ensure full penetration prior to material removal. Re-wet material that does not display evidence of saturation.

C. One Worker shall continuously apply amended water while ACM is being removed.

D. Perform cutting, drilling, abrading, or any penetration or disturbance of asbestos containing material in a manner to minimize the dispersal of asbestos fibers into the air. Use equipment and methods specifically designed to limit generation of airborne asbestos particles. All power operated tools used shall be provided with HEPA equipped filtered local exhaust ventilation.

E. Upon removal of ACM from the substrate, the newly exposed surfaces shall be HEPA vacuumed and/or wet cleaned. Surfaces must be thoroughly cleaned using necessary methods and any required solvents to completely remove any adhesive, mastic, etc.

F. All removed material shall be placed into 6 mil plastic disposal bags or other suitable container upon detachment from the substrate. Cleanup of accumulations of loose debris or waste shall be performed whenever there is enough accumulation to fill a single bag or container and minimally at the end of each workshift.

G. Large components shall be wrapped in two layers of 6 mil polyethylene sheeting. Sharp components likely to tear disposal bags shall be placed in fiber drums or boxes and then wrapped with sheeting.

H. Power or pressure washers are not permitted for asbestos removal or clean-up procedures unless approved in a Site-Specific Variance.

I. All construction and demolition debris determined by the Environmental Consultant to be contaminated with asbestos shall be handled and disposed of as asbestos waste.

J. The use of metal shovels, metal dust pans, etc. are not permitted inside the work area.

3.08 EQUIPMENT AND WASTE CONTAINER DECONTAMINATION AND REMOVAL PROCEDURES

A. External surfaces of contaminated containers and equipment shall be cleaned by wet cleaning and/or HEPA vacuuming in the Work Area before moving such items into the waste decontamination enclosure system airlock by persons assigned to this duty. The persons in the Work Area shall not enter the airlock. No gross removal operations are permitted when waste transfer is in progress.

B. The containers and equipment shall be removed from the airlock by persons stationed in the washroom during waste removal operations. The external surfaces of containers and equipment shall be cleaned a second time by wet cleaning.

C. The cleaned containers of asbestos material and equipment are to be dried of any excessive pooled or beaded liquid, placed in uncontaminated 6 mil plastic bags or sheeting, as the item's physical characteristics demand, and sealed airtight.

D. The clean re-containerized items shall be moved into the airlock that leads to the holding area. Workers in the washroom shall not enter this airlock.

E. Containers and equipment shall be moved from the airlock and into the holding area by persons dressed in clean personal protective equipment, who have entered from the holding area.

F. The cleaned containers of asbestos material and equipment shall be placed in water tight carts with doors or tops that shall be closed and secured. These carts shall be held in the holding area pending removal. The carts shall be wet cleaned and/or HEPA vacuumed at least once each day.

G. The exit from the decontamination enclosure system shall be secured to prevent unauthorized entry.

H. Where the waste removal enclosure is part of the personnel decontamination enclosure, waste removal shall not occur during shift changes or when otherwise occupied. Precautions shall be taken to prevent short circuiting and cycling of air outward through the shower and clean room.

3.09 WORK AREA DECONTAMINATION, CLEANING, AND CLEARANCE PROCEDURES

A. Following completion of gross abatement and after all accumulations of asbestos waste materials have been containerized, the following decontamination procedures shall be followed unless modified by a Site-Specific Variance.

B. On completion of each type of asbestos abatement within these work area enclosures, a complete single clean of all surfaces in the entire area – ceiling, walls and floors - shall be performed by HEPA vacuuming and wet wiping. No final clearance air samples shall be required for each individual type of material abatement, until the last type of ACM, PACM or asbestos material is abated. Each intermediate completion shall include a visual inspection for completeness by the asbestos abatement contractor's supervisor. Results of the visual inspection and time of intermediate completion shall be documented by the asbestos abatement contractor's supervisor in the daily project log.

C. **Final Required Cleaning**. A complete single clean of all surfaces in the entire area – ceiling, walls and floors, followed by a visual inspection as described in Subpart 56-9 shall be performed by HEPA vacuuming and wet wiping, after all abatement is complete.

D. **Final Clearance Air Samples**. After the final cleaning and visual inspection requirements are completed and the final settling/drying period is observed, prior to dismantling the regulated abatement work area, Phase IIC final clearance air samples shall be collected and satisfactory clearance air results obtained as per Section 56-9.2 of this Part.

3.10 TENT ENCLOSURES

A. Tent enclosures may only be used where specifically permitted by Code Rule 56 or a Site-Specific Variance issued by the NYS Department of Labor.

B. The Contractor shall restrict access to the immediate area where tent removal procedures are taking place using barrier tape and/or construction barriers. Caution signs shall be posted.

C. Remote personnel and waste decontamination enclosures shall be constructed. Configuration shall be as required by Project size. For tent enclosures with gross abatement of friable materials, a contiguous decontamination system shall be constructed, maintained and utilized, except for minor size tent enclosure work areas where a remote decontamination enclosure is permitted by Code Rule 56.

D. The Work Area shall be precleaned. All objects and equipment that will remain in the restricted area during abatement shall be sealed with two layers of six mil polyethylene and tape.

E. The tent shall be a single use barrier constructed with a rigid frame and at least two layers of six mil polyethylene unless one layer of six mil polyethylene is otherwise permitted by Code Rule 56. Tents with twenty (20) square feet or less of floor space or no gross removal of friable ACM shall be constructed of one (1) layer of six mil polyethylene and shall include walls, ceilings and a floor (except portions of walls, floors and ceilings that are the removal surface) with double folded seams. All seams shall be sealed airtight using duct tape and/or spray adhesive.

F. The tent shall be constructed with at least one airlock for worker/waste egress.

G. A monometer shall be used for all OSHA Class I abatement.

H. Negative air shall be maintained at four (4) air changes per hour for non-friable and glovebag abatement tent enclosure work areas. Eight (8) air changes shall be maintained for friable gross removal tent enclosure work areas. In a Minor size abatement tent enclosure work area a HEPA vacuum may be used to maintain the required air changes.

I. OSHA compliance air monitoring is required per section 1.09.

J. ACM removal shall follow procedures defined in section 3.07.

K. Waste material shall be placed in properly labeled 6 mil plastic bags or other appropriate containers. The outside of the bags or containers shall be wet wiped and/or HEPA vacuumed and shall then be placed in a second bag/container before being transported to the waste storage container. All transportation of waste bags and containers outside the Work Area shall be in watertight carts. These carts shall be held in the holding area pending removal. The carts shall be wet cleaned and/or HEPA vacuumed at least once each day.

L. Following completion of gross abatement and after all accumulations of asbestos waste materials have been containerized, the following decontamination procedures shall be followed.
   1. All bagged asbestos waste and unnecessary equipment shall be decontaminated and removed from the Work Area.
   2. All surfaces in the Work Area shall be wet cleaned. A wet-purpose shop vacuum may be used to pick up excess liquid, and shall be decontaminated prior to removal from the Work Area.
   3. The Asbestos Project Monitor shall conduct a visual inspection of the Work Area for cleanliness and completion of abatement.
   4. After the waiting/settling and drying time requirements have elapsed, aggressive final clearance air sampling shall then be conducted by the Environmental Consultant.
   5. Upon receipt of satisfactory final clearance air sampling results, the tent shall be collapsed into itself, placed in suitable disposal bags, and transported to the waste decontamination enclosure. Isolation and critical barriers shall then be removed.

3.11 NON-FRIABLE FLOORING AND/OR MASTIC REMOVALS

A. The following procedures may only be used for the removal of non-friable flooring and/or mastic materials using manual and chemical methods. These procedures shall not apply to bead blaster use or other abrasive abatement methods.

B. The Contractor shall restrict access to the immediate area where tent removal procedures are taking place using barrier tape and/or construction barriers. Caution signs shall be posted.

C. Remote personnel and waste decontamination enclosures may be utilized and shall be constructed at a location in accordance with the approved Work Plan.

E. The Work Area shall be prepared per section 3.05, except that ceilings, walls, and floors need not be plasticized as per Section 56-7.11(e) for manual or chemical removal methods

E. Negative air shall be maintained at six (6) air changes per hour.

F. OSHA compliance air monitoring is required per section 1.09.

G. ACM removal shall follow procedures defined in section 3.07.

H. Waste material shall be placed in properly labeled 6 mil plastic bags or other appropriate containers. The outside of the bags or containers shall be wet wiped and/or HEPA vacuumed before being passed into the airlock for double- bagging. The bags or containers shall then be transported to the waste storage container. All transportation of waste bags and containers outside the Work Area shall be in watertight carts.

I. Following completion of gross abatement and after all accumulations of asbestos waste materials have been containerized, the following decontamination procedures shall be followed.
   1. All bagged asbestos waste and unnecessary equipment shall be decontaminated and removed from the Work Area.
   2. All surfaces in the Work Area shall be wet cleaned. A wet-purpose shop vacuum may be used to pick up excess liquid, and shall be decontaminated prior to removal from the Work Area.
   3. The Asbestos Project Monitor shall conduct a visual inspection of the Work Area for cleanliness and completion of abatement.
   4. The Contractor shall then apply a thin coat of encapsulant to all non-removal surfaces covered with plastic in the Work Area. In no event shall encapsulant be applied to any surface that was the subject of removal prior to obtaining satisfactory air monitoring results. Encapsulants shall be pigmented or tinted to provide an indication for completeness of coverage. The Asbestos Project Monitor shall determine adequacy of coverage.
   5. After the encapsulant has been applied and the required waiting/settling and drying time has elapsed, aggressive final clearance air sampling shall then be conducted by the Environmental Consultant.
   6. Upon receipt of satisfactory final clearance air sampling results, the isolation and critical barriers shall be removed. Following this, the decontamination enclosures shall be removed.

3.12 EXTERIOR PROJECT REMOVAL OF NON-FRIABLE ACM CAULKING, TARS, TAR PAPER AND OTHER NOB ACMS

A. Establishment and Isolation of Regulated Abatement Work Area. The immediate work area shall be considered to be the area from which the asbestos containing materials are actively being removed - building wall. The asbestos project regulated abatement work area shall extend twenty-five (25') feet from the perimeter of the immediate work area and shall have signage in accordance with Section 56-7.4. An airlock shall be required at the entrance to the regulated abatement work area to serve as a changing area, if the workers shall have to pass through enclosed publicly occupied space, such as from a roof through an interior stairway, to access the decontamination units.

B. Where the asbestos project regulated abatement work area extends outward twenty-five (25) feet and extends downward one (1) floor to encompass a passage or vehicular door which must be used for either a primary entrance or by an emergency vehicle, thereby precluding sealing such door, a tunnel structure (with sides and roof) built of plywood sheeting, covered with at least two (2) layers of at least six (6) mil plastic, shall extend outward twenty-five (25) feet horizontally from the line of vertical projection of the roof edge downward to grade level

C. Preliminary Preparation. Regulated abatement work area preparation shall also comply with Sections 56-7.2, 7.3, 7.4, 7.5, 7.6, 7.7 and 7.9.

D. Decontamination System Location. The personal [and waste] decontamination system enclosures can be remote but must be within fifty (50) feet of the building/structure entrance used by the asbestos handlers (workers), and shall be removed only after obtaining satisfactory clearance air results for the regulated abatement work area or an acceptable visual inspection has determined that the abatement is complete, as per Section 56-9. 2(e).

E. ***Facades***

Plasticizing or sealing of nearby windows within twenty-five (25) feet of the immediate work area, placement of dropcloths, plasticizing of a man-lift or scaffolding and other operational safeguards as outlined below:

a. two (2) layers of six (6) mil fire retardant polyethylene sheeting. The windows can be plasticized outdoors, or for reasons of safety, from the indoors. Window, door and louver units subject to complete removal must have their openings plasticized at the interior of the building. Windows that are fixed or non-operable and that will remain sealed airtight for the duration of abatement activities, do not require installation of critical barriers.

b. where non-friable materials are removed without tents, a dropcloths, made of six (6) mil fire retardant polyethylene sheeting, shall be placed on the ground below the work area to prevent spread of any ACM remnants. This dropcloths shall be a minimum of ten (10) feet wide with an additional ten (10) feet of width for every floor above a 1st floor level where removal work will take place, up to a maximum of thirty (30) feet of width measured perpendicular to the building/structure. In addition, if a straight scaffolding, man-lift, swing scaffolding or similar equipment is used for areas above the 1st floor, the lift/scaffolding unit shall be plasticized with two (2) layers of six (6) mil fire retardant polyethylene on the platform, with plastic sheeting extended vertically to waist-high (as so equipped) guardrail sides and back of the lift unit. While the platform/lift walking surfaces must be plasticized, the asbestos abatement contractor must provide proper traction surfaces or equipment to assure the safety and comfort of abatement workers while performing abatement activities on the lift/scaffold equipment. After non-friable ACM is removed from each work location, the platform and plasticized surfaces toward the building shall be wet wiped and/or HEPA vacuumed clean before reuse. The plasticizing on the lift or scaffolding shall be periodically inspected during use and repaired as needed.

c. Under façade areas where non-friable ACM tar paper/tar is to be removed behind the face brick, whenever possible, an asbestos handler (worker) with a HEPA vacuum will position the vacuum hose within four (4) inches of the material being removed to capture small pieces of non-friable ACM and asbestos fines. The hose end will be positioned so that as many smaller pieces of material as possible will fall into the vacuum hose end. Larger pieces of ACM should be immediately bagged or containerized.

F. Visible accumulations of loose asbestos containing waste material shall be cleaned up using rubber or plastic dustpans and rubber squeegees or HEPA filtered vacuums. Metal shovels may also be used, except in the vicinity of plastic sheeting, critical barriers and isolation barriers, which could be perforated by these tools. To pick up excess water and gross wet debris, a wet-dry HEPA filtered shop vacuum dedicated to asbestos abatement may be used. This cleaning shall be done whenever there is sufficient asbestos waste material to fill a single leak-tight bag/container,

or this cleaning shall be done at the end of each work shift whichever shall occur first. Visible debris shall be maintained adequately wet. Work shall stop whenever excessive water accumulation or flooding is present in the area and shall not resume until the water is collected and disposed of properly.

G. Final clean-up and clearance procedures for abatement shall comply with Section 56-9, except that only one (1) stage of cleaning (final) is to be performed. Lockdown encapsulant use is not required.

3.13 REMOVAL OF ROOFING MATERIAL

GENERAL

The client must be notified at least 24 hours in advance of any waste removed from the containment. All applicable requirements of OSHA, EPA, and DOT shall be followed to ensure that outdoor work areas are in compliance so that workers, the general public and the environment are protected. Keep materials intact; do not disturb; wet while working with it; wrap as soon as possible with 2 layers of 6 mil plastic for disposal.

A. Roofing material shall be removed in an intact state to the extent that it is feasible.

B. Wet methods shall be used to remove roofing materials that are not intact, or that will be rendered not intact during removal, unless such wet methods are not feasible or will create safety hazards

C. Cutting machines shall be continuously misted during use, unless a competent person determines that misting substantially decreases worker safe

D. When removing built-up roofs with asbestos-containing roofing felts and an aggregate surface using a power roof cutter, all dust resulting from the cutting operation shall be collected by a HEPA dust collector, or shall be HEPA vacuumed by vacuuming along the cut line. When removing built-up roofs with asbestos-containing roofing felts and a smooth surface using a power roof cutter, the dust resulting from the cutting operation shall be collected either by a HEPA dust collector or HEPA vacuuming along the cut line, or by gently sweeping and then carefully and completely wiping up the still-wet dust and debris left along the cut line.

E. Asbestos-containing material that has been removed from a roof shall not be dropped or thrown to the ground. Unless the material is carried or passed to the ground by hand, it shall be lowered to the ground via covered, dust-tight chute, crane or hoist

F. Any ACM that is not intact shall be lowered to the ground as soon as is practicable, but in any event no later than the end of the work shift. While the material remains on the roof it shall either be kept wet, placed in an impermeable waste bag, or wrapped in plastic sheeting

G. Intact ACM shall be lowered to the ground as soon as is practicable, but in any event no later than the end of the work shift

H. Upon being lowered, unwrapped material shall be transferred to a closed receptacle in such manner so as to preclude the dispersion of dust

I. Roof level heating and ventilation air intake sources shall be isolated or the ventilation system shall be shut down. The sealing of air intake sources shall be coordinated with Client and

occupant location to ensure acceptable IAQ is maintained within the facility as per ASHRAE Standard 1955.

J. Notwithstanding any other provision of this section, removal or repair of sections of intact roofing less than 25 square feet in area does not require use of wet methods or HEPA vacuuming as long as manual methods which do not render the material non-intact are used to remove the material and no visible dust is created by the removal method used. In determining whether a job involves less than 25 square feet, the employer shall include all removal and repair work performed on the same roof on the same day.

All waste must be wrapped in two layers of 6 mil poly and lowered carefully to the ground. Roofing may be lowered by way of a dust-tight chute.

3.14 RESTORATION OF UTILITIES, FIRESTOPPING, AND FINISHES

A. After final clearance, remove locks and restore electrical and HVAC systems. All temporary power shall be disconnected, power lockouts removed and power restored. All temporary plumbing shall be removed.

B. Finishes damaged by asbestos abatement activities including, but not limited to, plaster/paint damage due to duct tape and spray adhesives, and floor tile lifted due to wet or humid conditions, shall be restored prior to final payment.
   1. Finishes unable to be restored shall be replaced under this Contract.
   2. All foam and expandable foam products and materials used to seal Work Area openings shall be completely removed upon completion of abatement activities.

C. All penetrations (including, but not limited to, pipes, ducts, etc.) through fire rated construction shall be firestopped using materials and systems tested in accordance with ASTM E814 on Projects where reinsulation is part of the required work.

END OF PART 3

PART 4 DISPOSAL OF ASBESTOS WASTE

4.01 TRANSPORTATION AND DISPOSAL SITE

A. The Contractor's Hauler and Disposal Site shall be approved by the Owner.

B. The Contractor shall give twenty-four (24) hour notification prior to removing any waste from the site. Waste shall be removed from the site only during normal working hours unless otherwise specified. No waste may be taken from the site unless the Contractor and Environmental Consultant are present and the Environmental Consultant authorizes the release of the waste as described herein.

C. All waste generated as part of the asbestos project shall be removed from the site within ten (10) calendar days after successful completion of all asbestos abatement work.

D. Upon arrival at the Project Site, the Hauler must possess and present to the Environmental Consultant a valid New York State Department of Environmental Conservation Part 364 Asbestos Hauler's Permit. The Environmental Consultant may verify the authenticity of the hauler's permit with the proper authority.

E. The Hauler, with the Contractor and the Environmental Consultant, shall inspect all material in the transport container prior to taking possession and signing the Asbestos Waste Manifests.

F. Unless specifically approved by the Owner, the Contractor shall not permit any off-site transfers of the waste or allow the waste to be transported or combined with any other off-site asbestos material. The Hauler must travel directly to the disposal site as identified on the notifications with no unauthorized stops.

4.02 WASTE STORAGE CONTAINERS

A. 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.) unless specifically permitted by a Site Specific Variance. When asbestos contaminated waste must be kept on the work site overnight or longer, it shall be double bagged and stored in accordance with Federal, State, and local laws.

B. The Environmental Consultant shall verify that the waste storage container and/or truck tags (license plates) match that listed on the New York State Department of Environmental Conservation Part 364 permit. Any container not listed on the permit shall be removed from the site immediately.

C. The container shall be plasticized and sealed with two (2) layers of 6 mil polyethylene. Once on site, it shall be kept locked at all times, except during load out. The waste container shall not be used for storage of equipment or contractor supplies.

D. While on-site, the container shall be labeled with EPA Danger signage:

DANGER
CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST
CANCER AND LUNG DISEASE HAZARD

E. The New York State Department of Environmental Conservation Asbestos Hauler's Permit number shall be stenciled on both sides and back of the container.

F. The container is not permitted to be loaded unless it is properly plasticized, has the appropriate danger signage affixed, and has the permit number appropriately stenciled on the container.

G. Before an enclosed container is removed from the Project Site for transportation to the Disposal Site, a seal will be placed on the door(s) of the container by the Environmental Consultant. The door(s) shall also be locked. The seals and locks shall be removed at the Disposal Site by the operator of the Disposal Facility and the seals shall be returned by the Disposal Facility to the Contractor.

H. If a lined and sealed open-top container is used pursuant to a Site-Specific Variance, a seal is not required.

I. The Owner may initiate random checks at the Disposal Site to ensure that the procedures outlined herein are complied with.

4.03 OWNER'S AND HAULER'S ASBESTOS WASTE MANIFESTS

A. The Hauler's Manifest shall be completed by the Contractor and verified by the Environmental Consultant that all the information and amounts are accurate and the proper signatures are in place.

C. The Manifest shall have the appropriate signatures of the Environmental Consultant, the Contractor, and the Hauler representatives prior to any waste being removed from the site.

D. Copies of the completed Hauler's Manifest shall be retained by the Environmental Consultant and the Contractor and shall remain on site for inspection.

E. Upon arrival at the Disposal Site, the Hauler's Manifest shall be signed by the Disposal Facility operator to certify receipt of ACM covered by the manifest.

F. The Disposal Facility operator shall return the original the Hauler's Manifest and the container seals to the Contractor.

G. The Contractor shall forward copies of the Hauler's Manifest and the container seals to the Environmental Consultant within 14 days of the waste container being removed from the site. Failure to do so may result in payment being withheld from the Contractor.

H. Originals of all waste disposal manifests, seals, and disposal logs shall be submitted by the Contractor to the Owner with the final close-out documentation.

END OF PART 4

END OF SECTION 02 82 00

ATTACHMENT 1
(Project Drawings
HS-ASB2, HS-ASB3, HS-ASB4 & HS-ASB5)

SECTION 02 82 00 – Asbestos Abatement Specification

PART 1 GENERAL

1.01 SCOPE OF WORK

A. This asbestos abatement Bond Projects Phase 2 will consist of the removal and disposal of **Asbestos Containing Material (ACM) and Presumed ACM (PACM) in Boys Restroom C124, Girls Restroom C126, Restrooms C128, C129, C134, C135, Kindergarten Restrooms C132 and C133, Storage Room C220, Mechanical Switchgear Room and Roof #3** located at the George W. Miller Elementary School, 50 Blauvelt Street, Nanuet, New York as indicated in the asbestos removal plan.

B. The work shall include but not be limited to the removal of asbestos-containing ceiling plaster, pipe insulation, pegboards, switchgear room transite panels, wire insulation and roofing material (See Attachment 1 - project drawings ME-ASB1, ME-ASB2, ME-ASB3, ME-ASB4 and ME-ASB5 for locations and estimated quantities. The asbestos abatement removal procedure will be in accordance with 12 NYCRR Part 56 - 7 Full Containment and/or Tent Procedure, Glove bag and Roofing Material removal.

George W. Miller Elementary School – Level 1

Location	Material	Estimated Quantity
Boys Restroom C124	Ceiling White Plaster	253 Square Feet
Boys Restroom C124	Wet Wall Black Pipe Insulation - Outer Coat Tar Paper and Brown Inner Coat Paper	160 Linear Feet
Girls Restroom C126	Ceiling White Plaster	208 Square Feet
Girls Restroom C126	Wet Wall Black Pipe Insulation - Outer Coat Tar Paper and Brown Inner Coat Paper	160 Linear Feet
Boys Restroom C128	Wet Wall Black Pipe Insulation - Outer Coat Tar Paper and Brown Inner Coat Paper	100 Linear Feet
Boys Restroom C128	Wet Wall Grey Elbow Insulation	12 Linear Feet
Girls Restroom C129	Wet Wall Black Pipe Insulation - Outer Coat Tar Paper and Brown Inner Coat Paper	100 Linear Feet
Girls Restroom C129	Wet Wall Grey Elbow Insulation	12 Linear Feet
Faculty Restroom C134	Wet Wall Black Pipe Insulation - Outer Coat Tar Paper and Brown Inner Coat Paper	12 Linear Feet
Faculty Restroom C134	Wall Radiator Pipe Insulation - Black Outer Coat Tar Paper and Beige Inner Layer Air Cell	30 Linear Feet

Location	Material	Estimated Quantity
Faculty Restroom C135	Wet Wall Black Pipe Insulation - Outer Coat Tar Paper and Brown Inner Coat Paper	12 Linear Feet
Faculty Restroom C135	Wall Radiator Pipe Insulation - Black Outer Coat Tar Paper and Beige Inner Layer Air Cell	30 Linear Feet
Kindergarten Restroom - C132	Lower Ceiling White Plaster	24 Square Feet
Kindergarten Restroom - C132	Floor Ceramic Thin Set with Grey-Brown Blue	24 Square Feet
Kindergarten Restrooms -C132	Outside Wall Light Brown Pegboards	30 Square Feet
Kindergarten Restroom - C133	Lower Ceiling White Plaster	24 Square Feet
Kindergarten Restroom - C133	Floor Ceramic Thin Set with Grey-Brown Blue	24 Square Feet
Kindergarten Restrooms - C133	Outside Wall Light Brown Pegboards	30 Square Feet
Storage Room - C220	9" X 9" Floor Tiles and Associated Mastic	78 Square Feet
Storage Room - C220	Cove Base and Associated Adhesive-Glue	18 Square Feet
Mechanical Switchgear Room	Black Transit Back Panels	40 Square Feet
Mechanical Switchgear Room	Wiring Insulation Wrap	50 Linear Feet
Roof 3 (see roof location drawing)	Black 2nd Layer from Bottom	20 Square Feet
	TOTAL ACM	**773 SF**
		678 LF

C. **The Contractor shall be aware of all conditions of the Project and is responsible for verifying quantities and locations of all Work to be performed. Failure to do so shall not relieve the Contractor of its obligation to furnish all labor and materials necessary to perform the Work.**

D. All Work shall be performed in strict accordance with the Project Documents and all governing codes, rules, and regulations. Where conflicts occur between the Project Documents and applicable codes, rules, and regulations, the more stringent shall apply.

E. Working hours shall be as required and approved by the Owner. Asbestos abatement activities including, but not limited to, work area preparation, gross removal activities, cleaning activities, waste removal, etc. may need to be performed during 'off-hours' (including nights and weekends). In addition, multiple mobilizations may be required to perform the work identified in this project. The Contractor shall coordinate and schedule all Work with the facility and Owner's representative.

1.02 SPECIAL JOB CONDITIONS

A. Any special job conditions are described below.

1. **The contractor shall field verify the amount of ACM and familiarize oneself in all variable field conditions in the building before the submission of their bid. See drawings (ME-ASB1, M-ASB2, ME-ASB3, ME-ASB4 and ME-ASB5) for locations, types and estimated quantities.**
2. Abatement activities shall be performed during weekdays and weekends and as permitted by owner.
3. The abatement contractor is responsible for filing and acquiring all notifications and variances in connection with this abatement work.
4. Any waste transported through the building shall use canvas carts covered and lined with plastic sheeting.
5. The contractor shall notify the local Fire Department of any obstruction to the outside leading to the exit stair, obstruction to any fire rated corridor and disengagement or obstruction to any exit signage or lighting system.
6. All connections/disconnections to existing electrical panels, fixtures, etc. shall be conducted by a licensed electrician/restricted asbestos handler.
7. Temporary water and power connections to internal sources shall be extended at ceiling level and disconnected when not in use.
8. ACM/ACM-Contaminated flooring materials shall be removed completely down to substrate, to a surface that is free and clear of all residues and made suitable for replacement materials.
9. The contractor shall assume that all components in direct contact with concealed and exposed ACM and/or assumed ACM is contaminated and is to be disposed of as ACM-containing waste. In lieu of disposing these materials as such, the contractor may opt to decontaminate these components if they are non-porous, and dispose of as regular C&D waste at no additional cost to the authority.
10. The asbestos contractor shall be responsible for protecting all areas (floor and fixed items) around the containment.
11. The asbestos contractor shall be responsible for all repairs to finish surfaces which are damaged during the course of the abatement work which are not included in the proposed scope of work.
12. Abatement will take place in the identified work areas separately and sequentially unless approved otherwise by the Owner.
13. In lieu of the full containment procedure, the Contractor shall have the option to break up the work area to accommodate the requirements of the tent procedures.

1.03 PERMITS AND COMPLIANCE

A. The Contractor shall assume full responsibility and liability for compliance with all applicable Federal, State, and local laws, rules, and regulations pertaining to Work practices, protection of Workers, authorized visitors to the site, persons, and property adjacent to the Work.

B. Perform asbestos related Work in accordance with New York State Industrial Code Rule 56 (herein referred to as Code Rule 56), 40 CFR 61, and 29 CFR 1926. Where more stringent requirements are specified, adhere to the more stringent requirements.

C. The Contractor must maintain current licenses pursuant to New York State Department of Labor and Department of Environmental Conservation for all Work related to this Project, including the removal, handling, transport, and disposal of asbestos containing materials.

E. The Contractor must have and submit proof upon request that any persons employed by the Contractor to engage in or supervise Work on any asbestos Project have a valid NYS asbestos handling certificate pursuant to Code Rule 56.

F. Failure to adhere to the Project Documents shall constitute a 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.

1.04 SUBMITTALS

A. Pre-Work Submittals: Within 7 days prior to the pre-construction conference, the Contractor shall submit 3 copies of the documents listed below, with 1 copy going directly to the Owner's representative for review and approval prior to the commencement of asbestos abatement activities:
   1. Contractor license issued by New York State Department of Labor.
   2. A list of Projects performed within the past two (2) years and include the dollar value of all Projects. Provide Project references to include Owner, consultant, and air monitoring firm's name, contact persons, address, and phone number.
   3. Progress Schedule:
      a. Show the complete sequence of abatement activities and the sequencing of Work within each building or building section.
      b. Show the dates for the beginning and completion of each major element of Work including substantial completion dates for each Work Area, building, or phase.
   4. Project Notifications: As required by Federal and State regulatory agencies together with proof of transmittal (i.e. certified mail return receipt).
   5. Building Occupant Notification: As required by regulatory agencies.
   6. Abatement Work Plan: Provide plans that clearly indicate the following:
      a. All Work Areas/containments numbered sequentially.
      b. Locations and types of all decontamination enclosures.
      c. Entrances and exits to the Work Areas/containments.
      d. Type of abatement activity/technique for each Work Area/containment.
      e. Number and location of negative air units and exhaust. Also provide calculations for determining number of negative air pressure units.
      f. Proposed location and construction of storage facilities and field office.
      g. Location of water and electrical connections to building services.
      h. Waste transport routes through the building to the waste storage container.
   7. Disposal Site/Landfill Permit from applicable regulatory agency.
   8. NYS Department of Environmental Conservation Waste Transporter Permit.

B. On-Site Submittals: Refer to Part 3.01.C for all submittals, documentation, and postings required to be maintained on-site during abatement activities.

C. Project Close-out Submittals: Within 30 days of the completion of each abatement phase, the Contractor shall submit 4 copies of the documents listed below. One set of the documents shall be transmitted to the Facility and one set to the Owner's representative for review and approval prior to the Contractor's final payment.

1. **Originals** of all waste disposal manifests, seals, and disposal logs.
2. OSHA compliance air monitoring records conducted during the Work.
3. Daily progress log, including the entry/exit log.
4. A list of all Workers used in the performance of the Project, including name, social security number, NYS DOL certification number and type of certification (i.e. supervisor, asbestos handler, etc.).
5. For each Worker used in the performance of the Project, submit the Worker's Acknowledgment Statement.
6. Disposal Site/Landfill Permit from applicable regulatory agency.
7. Project notifications, amended notifications and any Variances.

1.05 PRE-CONSTRUCTION CONFERENCE

A. Prior to start of preparatory Work under this Contract, the Contractor shall attend a pre-construction conference attended by Owner, Facility Personnel, and Green Path Environmental, Inc (Environmental Consultant).

B. Agenda for this conference shall include but not necessarily be limited to:
   1. Contractor's scope of Work, Work plan, and schedule to include number of workers and shifts.
   2. Contractor's safety and health precautions including protective clothing and equipment and decontamination procedures.
   3. Environmental Consultant's duties, functions, and authority.
   4. Contractor's Work procedures including:
      a. Methods of job site preparation and removal methods.
      b. Respiratory protection.
      c. Disposal procedures.
      d. Cleanup procedures.
      e. Fire exits and emergency procedures.
   5. Contractor's required pre-work and on-site submittals, documentation, and postings.
   6. Contractor's plan for twenty-four (24) hour Project security both for prevention of theft and for barring entry of unauthorized personnel into Work Areas.
   7. Temporary utilities.
   8. Handling of furniture and other moveable objects.
   9. Storage of removed asbestos containing materials.
   10. Waste disposal requirements and procedures, including use of the Owner supplied waste manifest and container seals.

C. In conjunction with the conference the Contractor shall accompany the Owner and Environmental Consultant on a pre-construction walk-through documenting existing condition of finishes and furnishings, reviewing overall Work plan, location of fire exits, fire protection equipment, water supply and temporary electric tie-in.

1.06 APPLICABLE STANDARDS AND REGULATIONS

A. The Contractor shall comply with the following codes and standards, except where more stringent requirements are shown or specified:

B. Federal Regulations:
   1. 29 CFR 1910.1001, "Asbestos" (OSHA)

2. 29 CFR 1910.1200, "Hazard Communication" (OSHA)
3. 29 CFR 1910.134, "Respiratory Protection" (OSHA)
4. 29 CFR 1910.145, "Specification for Accident Prevention Signs and Tags" (OSHA)
5. 29 CFR 1926, "Construction Industry" (OSHA)
6. 29 CFR 1926.1101, "Asbestos, Tremolite, Anthophyllite, and Actinolite" (OSHA)
7. 29 CFR 1926.500 "Guardrails, Handrails and Covers" (OSHA)
8. 40 CFR 61, Subpart A, "General Provisions" (EPA)
9. 40 CFR 61, Subpart M, "National Emission Standard for Asbestos" (EPA)
10. 49 CFR 171-172, Transportation Standards (DOT)

C. New York State Regulations:
1. 12 NYCRR, Part 56, "Asbestos", Industrial Code Rule 56 (DOL) (amended March 21, 2007).
2. 6 NYCRR, Parts 360, 364, Disposal and Transportation (DEC)
3. 10 NYCRR, Part 73, "Asbestos Safety Program Requirements" (DOH)

D. Standards and Guidance Documents:
1. American National Standard Institute (ANSI) Z88.2-80, Practices for Respiratory Protection
2. ANSI Z9.2-79, Fundamentals Governing the Design and Operation of Local Exhaust Systems
3. EPA 560/585-024, Guidance for Controlling Asbestos Containing Materials in Buildings (Purple Book)
4. EPA 530-SW-85-007, Asbestos Waste Management Guidance
5. ASTM Standard E1368 “Standard Practice for Visual Inspection of Asbestos Abatement Projects.”

1.07 NOTICES

A. The Contractor shall provide notification of intent to commence asbestos abatement activities as indicated below.
1. At least ten (10) Working days prior to beginning abatement activities, send written notification to:
U.S. Environmental Protection Agency
National Emissions Standards for Hazardous Air Pollutants (NESHAPS) Coordinator
26 Federal Plaza
New York, NY 10007
2. At least ten (10) days prior to beginning abatement activities send written notification to:
New York State Department of Labor
Division of Safety and Health, Asbestos Control Program.
State Office Campus
Building 12 - Room 454
Albany, NY 12240

B. The Contractor is required to send notifications to regulatory agencies via mail or package delivery service that will provide proof of delivery and receipt.

C. The Contractor shall be responsible for maintaining current project filings with regulatory agencies for the duration of the project.

D. The Contractor shall post and/or provide Building Occupant Notification at least 10 days prior to beginning abatement activities as required by Code Rule 56.

1.08 PROJECT MONITORING AND AIR SAMPLING

A. The Owner has engaged the services of Green Path Environmental, Inc (Environmental Consultant) who shall serve as the Owner's Representative in regard to the performance of the asbestos abatement Project and provide direction as required throughout the entire abatement Project period.

B. The Contractor is required to ensure cooperation of its personnel with the Consultant for the air sampling and Project monitoring functions described in this section. The Contractor shall comply with all direction given by the Consultant during the course of the Project.

C. The Consultant shall provide the following administrative services:

1. Review and approve or disapprove all submittals, shop drawings, schedules, and samples.
2. Assure that all notifications to governmental agencies by the Contractor are submitted in a timely manner and are correct in content.

D. The Consultant shall staff the Project with a trained and certified person (s) to act on the Owner's behalf at the job site. This individual shall be designated as the Abatement Project Monitor (APM).
   1. The APM shall be on-site at all times the Contractor is on-site. The Contractor shall not be permitted to conduct any Work unless the APM is on-site (except for inspection of barriers and negative air system during non-working days).
   2. The APM shall have the authority to direct the actions of the Contractor verbally and in writing to ensure compliance with the Project documents and all regulations. The APM shall have the authority to Stop Work when gross Work practice deficiencies or unsafe practices are observed, or when ambient fiber concentrations outside the removal area exceed .01 f/cc or background level.
      a. Such Stop Work order shall be effective immediately and remain in effect until corrective measures have been taken and the situation has been corrected.
      b. Standby time required to resolve the situation shall be at the Contractor's expense.
   3. The APM shall provide the following services:
      a. Inspection of the Contractor's Work, practices, and procedures, including temporary protection requirements, for compliance with all regulations and Project specifications.
      b. Provide abatement Project air sampling as required by applicable regulations (NYS, AHERA) and the Owner. Sampling will include background, work area preparation, asbestos handling, and final cleaning and clearance air sampling.
      c. Verify daily that all Workers used in the performance of the Project are certified by the appropriate regulatory agency.
      d. Monitor the progress of the Contractor's Work, and report any deviations from the schedule to the Owner.
      e. Monitor, verify, and document all waste load-out operations.
      f. Verify that the Contractor is performing personal air monitoring daily, and that results are being returned and posted at the site as required.
      g. The APM shall maintain a log on site that documents all project related and Consultant and Contractor actions, activities, and occurrences.

4. The following minimum inspections shall be conducted by the APM. Additional inspections shall be conducted as required by Project conditions. Progression from one phase of Work to the next by the Contractor is only permitted with the written approval of the APM.
   a. Pre-Construction Inspection: The purpose of this inspection is to verify the existing conditions of the Work Areas and to document these conditions.
   b. Pre-Commencement Inspection: The purpose of this inspection is to verify the integrity of each containment system prior to disturbance of any asbestos containing material. This inspection shall take place only after the Work Area is fully prepped for removal.
   c. Work Inspections: The purpose of this inspection is to monitor the Work practices and procedures employed on the Project and to monitor the continued integrity of the containment system. Inspections within the removal areas shall be conducted by the APM during all preparation, removal, and cleaning activities at least twice every Work shift. Additional inspections shall be conducted as warranted.
   d. Pre-Encapsulation Inspection: The purpose of this inspection is to ensure the complete removal of Asbestos Containing Material (ACM), from all surfaces in the Work Area prior to encapsulation.
   e. Visual Clearance Inspection: The purpose of this inspection is to verify that: all materials in the scope of work have been properly removed; no visible asbestos debris/residue remains; no pools of liquid or condensation remains; and all required cleanings are complete. This inspection shall be conducted before final air clearance testing.
   f. Post-Clearance Inspection: The purpose of this inspection is to ensure the complete removal of ACM, including debris, from the Work Area after satisfactory final clearance sampling and removal of all isolation and critical barriers and equipment from the Work Area.
   g. Punch List Inspection: The purpose of this inspection is to verify the Contractor's certification that all Work has been completed as contracted and the existing condition of the area prior to its release to the Owner.

E. The Consultant shall provide abatement Project air sampling and analysis as required by applicable regulations (New York State and/or AHERA). Sampling will include background, work area preparation, asbestos handling, and final cleaning and clearance air sampling.
   1. Unless otherwise required by applicable regulations, the Consultant shall have samples analyzed by Phase Contrast Microscopy (PCM). Results shall be available within 24 hours of completion of sampling.
   2. Samples shall be collected as required by applicable regulations (New York State and/or AHERA) and these specifications. If Transmission Electron Microscopy (TEM) clearance air sampling is utilized by the owner, the clearance criteria and sampling protocols must be in compliance with AHERA. If PCM air sample analysis results exceed the satisfactory clearance criteria, then TEM analysis of the entire set of clearance air samples may be used, provided that a standard NIOSH/ELAP accepted laboratory analysis method is utilized that shall report each air sample result in fibers per cubic centimeter.
   3. If the air sampling during any phase of the abatement project reveals airborne fiber levels at or above .01 fibers/cc or the established background level, whichever is greater, outside

the regulated Work Area, Work shall stop immediately and corrective measures required by Code Rule 56 shall be initiated. Notify all employers and occupants in adjacent areas. The Contractor shall bear the burden of any and all costs incurred by this delay.

4. The Environmental Consultant shall submit copies of all elevated air sampling results collected during abatement and all final air clearance results to the Commissioner of Labor.

1.09 CONTRACTOR AIR SAMPLING

A. In addition to the requirements of OSHA 1926.1101, the Contractor shall be required to perform personal air monitoring every Work shift in each Work Area during which abatement activities occur in order to determine that appropriate respiratory protection is being worn and utilized.

B. The Contractor shall conduct air sampling that is representative of both the 8-hour time weighted average and 30-minute short-term exposures to indicate compliance with the permissible exposure and excursion limits.

C. The Contractor's laboratory analysis of air samples shall be conducted by an NYS DOH ELAP approved laboratory.

D. Results of personnel air sample analyses shall be available, verbally, within twenty-four (24) hours of sampling and shall be posted upon receipt. Written laboratory reports shall be delivered and posted at the Work site within five (5) days. Failure to comply with these requirements may result in all work being stopped until compliance is achieved.

1.10 PROJECT SUPERVISOR

A. The Contractor shall designate a full-time Project Supervisor who shall meet the following qualifications:
   1. The Project Supervisor shall hold New York State certification as an Asbestos Supervisor.
   2. The Project Supervisor shall meet the requirements of a "Competent Person" as defined by OSHA 1926.1101 and shall have a minimum of one year experience as a supervisor.
   3. The Project Supervisor must be able to speak, read, and write English fluently, as well as communicate in the primary language of the Workers.

B. If the Project Supervisor is not on-site at any time whatsoever, all Work shall be stopped. The Project Supervisor shall remain on-site until the Project is complete. The Project Supervisor cannot be removed from the Project without the written consent of the Owner and the Environmental Consultant. The Project Supervisor shall be removed from the Project if so requested by the Owner.

C. The Project Supervisor shall maintain the bound Daily Project Log that also includes the entry/exit logs as required by New York State Department of Labor and section 2.03 of the specifications and the Waste Disposal Log required by section 4.04 of the specifications.

C. The Project Supervisor shall be responsible for the performance of the Work and shall represent the Contractor in all respects at the Project site. The Supervisor shall be the primary point of contact for the Asbestos Project Monitor.

1.11 MEDICAL REQUIREMENTS

A. Before exposure to airborne asbestos fibers, provide Workers with a comprehensive medical examination as required by 29 CFR 1910.1001, and 29 CFR 1926.1101.
   1. This examination is not required if adequate records show the employee has been examined as required by 29 CFR 1910.1001, and 29 CFR 1926.1101 within the past year.
   2. The same medical examination shall be given on an annual basis to employees engaged in an occupation involving asbestos fibers and within thirty (30) calendar days before or after the termination of employment in such occupations.

1.12 TRAINING

A. As required by applicable regulations, prior to assignment to asbestos Work instruct each employee with regard to the hazards of asbestos, safety and health precautions, and the use and requirements of protective clothing and equipment.

B. Establish a respirator program as required by ANSI Z88.2 and 29 CFR 1910.134, and 29 CFR 1926.1101. Provide respirator training and fit testing.

1.13 RESPIRATORY PROTECTION

A. Select respirators from those approved by the Mine Safety and Health Administration (MSHA), and the National Institute for Occupational Safety and Health (NIOSH), Department of Health and Human Services.

B. Respirators shall be individually fit-tested to personnel under the direction of an Industrial Hygienist on a yearly basis. Fit-tested respirators shall be permanently marked to identify the individual fitted, and use shall be limited to that individual. Fit-test records shall be maintained on site for each employee.

C. Where fiber levels permit, and in compliance with regulatory requirements, half-faced respirators are the minimum allowable respiratory protection permitted to be utilized during gross removal operations of OSHA Class I or OSHA Class II ACM.

D. No respirators shall be issued to personnel without such personnel participating in a respirator training program.

E. High Efficiency Particulate Air (HEPA) respirator filters shall be approved by NIOSH and shall conform to the OSHA requirements in 29 CFR 1910.134 and 29 CFR 1926.1101.

F. A storage area for respirators shall be provided by the Contractor in the clean room side of the personnel decontamination enclosure where they will be kept in a clean environment.

G. The Contractor shall provide and make available a sufficient quantity of respirator filters so that filter changes can be made as necessary during the work day. Filters will be removed and discarded during the decontamination process. Filters cannot be reused. Filters must be changed if breathing becomes difficult.

H. Filters used with negative pressure air purifying respirators shall not be used any longer than one eight (8) hour work day.

I. Any authorized visitor, Worker, or supervisor found in the Work Area not wearing the required respiratory protection shall be removed from the Project site and not be permitted to return.

J. The Contractor shall have at least two (2) half-faced respirators stored on site designated for authorized visitors use. Appropriate respirator filters for authorized visitors shall be made available by the Contractor.

1.14 DELIVERY AND STORAGE

A. Deliver all materials to the job site in original packages with containers bearing manufacturer's name and label.

B. Store all materials at the job site in a suitable and designated area.
   1. Store materials subject to deterioration or damage away from wet or damp surfaces and under cover.
   1. Protect materials from unintended contamination and theft.
   2. Storage areas shall be kept clean and organized.

C. Remove damaged or deteriorated materials from the job site. Materials contaminated with asbestos shall be disposed of as asbestos debris as herein specified.

1.15 TEMPORARY UTILITIES

A. Shut down and lock out all electrical power to the asbestos Work Areas.

B. Provide temporary 120–240 volt, single phase, three wire, 100 amp electric service with Ground Fault Circuit Interrupters (GFCI) for all electric requirements within the asbestos Work Area.
   1. Where available, obtain from Owner's existing system. Otherwise provide power from other sources (i.e. generator).
   2. Provide temporary wiring and "weatherproof" receptacles in sufficient quantity and location to serve all HEPA equipment and tools.
   3. Provide wiring and receptacles as required by the Environmental Consultant for air sampling equipment.
   4. All power to the Work Area shall be brought in from outside the area through GFCI's at the source.

C. Provide temporary lighting with "weatherproof" fixtures for all Work Areas including decontamination chambers.
   1. The entire Work Area shall be kept illuminated at all times.
   2. Provide lighting as required by the Environmental Consultant for the purposes of performing required inspections.

D. All temporary devices and wiring used in the Work Area shall be capable of decontamination procedures including HEPA vacuuming and wet-wiping.

E. Utilize domestic water service, if available, from Owner's existing system. Provide hot water heaters with sufficient capacity to meet Project demands.

END OF PART 1

SECTION 02 82 00 – Asbestos Abatement Specification

PART 2 PRODUCTS

2.01 PROTECTIVE CLOTHING

A. Provide personnel utilized during the Project with disposable protective whole body clothing, head coverings, gloves and foot coverings. Provide disposable plastic or rubber gloves to protect hands. Cloth gloves may be worn inside the plastic or rubber for comfort, but shall not be used alone. Make sleeves secure at the wrists and make foot coverings secure at the ankles by the use of tape, or provide disposable coverings with elastic wrists or tops.

B. Provide sufficient quantities of protective clothing to assure a minimum of four (4) complete disposable outfits per day for each individual performing abatement Work.

C. Eye protection and hard hats shall be provided and made available for all personnel entering any Work Area.

D. Authorized visitors shall be provided with suitable protective clothing, headgear, eye protection, and footwear whenever they enter the Work Area.

2.02 SIGNS AND LABELS

A. Provide warning signs and barrier tapes at all approaches to asbestos Work Areas. Locate signs at such distance that personnel may read the sign and take the necessary protective steps required before entering the area.

1. Provide danger signs in vertical format conforming to 29 CFR 1926.1101, minimum 20" x 14" displaying the following legend.

DANGER
ASBESTOS CANCER AND LUNG DISEASE
HAZARD
AUTHORIZED PERSONNEL ONLY
RESPIRATORS AND PROTECTIVE CLOTHING
ARE REQUIRED IN THIS AREA

2. Provide 3" wide yellow barrier tape printed with black lettered, "DANGER ASBESTOS REMOVAL". Locate barrier tape across all corridors, entrances and access routes to asbestos Work Area. Install tape 3' to 4' AFF.

B. Provide asbestos danger labels affixed to all asbestos materials, scrap, waste, debris and other products contaminated with asbestos.

1. Provide asbestos danger labels of sufficient size to be clearly legible, displaying the following legend:

DANGER
CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST
CANCER AND LUNG DISEASE HAZARD

2. Provide the following asbestos labels, of sufficient size to be clearly legible, for display on waste containers (bags or drums) which will be used to transport asbestos contaminated material in accordance with United States Department of Transportation 49 CFR Parts 171 and 172: (Note: Include “RQ” for friable asbestos waste only.)

RQ, (WASTE) ASBESTOS, 9, NA2212, PGIII

3. Generator identification information shall be affixed to each waste container indicating the following printed in indelible ink:
   Generator Name
   Facility Name
   Facility Address

2.03 DAILY PROJECT LOG

A. Provide a Daily Project Log. The log shall contain on title page the Project name, name, address and phone number of Owner; name, address and phone number of Environmental Consultant; name, address and phone number of Abatement Contractor; emergency numbers including, but not limited to local Fire/Rescue department and all other New York State Department of Labor requirements.

B. All entries into the log shall be made in non-washable, permanent ink and such pen shall be strung to or otherwise attached to the log to prevent removal from the log-in area. Under no circumstances shall pencil entries be permitted.

C. All persons entering and exiting the Work Area shall sign the log and include name, title, work performed and time.

D. The Project Supervisor shall document all Work performed daily and note all inspections required by Code Rule 56, i.e. testing and inspection of barriers and enclosures.

2.04 SCAFFOLDING AND LADDERS

A. Provide all scaffolding and/or staging as necessary to accomplish the Work of this Contract. Scaffolding may be of suspension type or standing type such as metal tube and coupler, tubular welded frame, pole or outrigger type or cantilever type. The type, erection and use of all scaffolding and ladders shall comply with all applicable OSHA construction industry standards.

B. Provide scaffolding and ladders as required by the Environmental Consultant for the purposes of performing required inspections.

2.05 SURFACTANT (AMENDED WATER)

A. Wet all asbestos-containing materials prior to removal with surfactant mixed and applied in accordance with manufacturer's printed instructions.

2.06 ENCAPSULANT

A. Encapsulant shall be tinted or pigmented so that application when dry is readily discernible.

B. The encapsulant solvent or vehicle shall not contain a volatile hydrocarbon.

2.07 DISPOSAL BAGS, DRUMS, AND CONTAINERS

A. Provide 6 mil polyethylene disposal bags printed with asbestos caution labels. Bags shall also be imprinted with U.S. Department of Transportation required markings.

B. Provide 30- or 55-gallon capacity fiber, plastic, or metal drums capable of being sealed air and water tight if asbestos waste has the potential to damage or puncture disposal bags. Affix asbestos caution labels on lids and at one-third points around drum circumference to assure ready identification.

C. Containers and bags must be labeled accordance with 40 CFR Part 61 NESHAPS and Code Rule 56. When the bags/containers are moved to the lockable hardtop dumpster from the waste decontamination system washroom, the bags must also be appropriately labeled with the date they are moved on the bag/container in waterproof markings.

D. Labeled ACM waste containers or bags shall not be used for non-ACM waste or trash. Any material placed in labeled containers or bags, whether turned inside out or not shall be handled and disposed of as ACM waste.

2.08 HEPA VACUUM EQUIPMENT

A. All dry vacuuming performed under this contract shall be performed with High Efficiency Particulate Absolute (HEPA) filter equipped industrial vacuums conforming to ANSI Z9.2.

B. Provide tools and specialized equipment including scraping nozzles with integral vacuum hoods connected to a HEPA vacuum with flexible hose.

2.09 POWER TOOLS

A. Any power tools used to drill, cut into, or otherwise disturb asbestos material shall be manufacturer equipped with HEPA filtered local exhaust ventilation.

2.10 POLYETHYLENE SHEETING

A. All polyethylene (plastic) sheeting used on the Project (including but not limited to sheeting used for critical and isolation barriers, fixed objects, walls, floors, ceilings, waste container) shall be at least 6 mil fire retardant sheeting.

B. Decontamination enclosure systems shall utilize at least 6 mil opaque fire retardant plastic sheeting. At least 2 layers of 6 mil reinforced fire retardant plastic sheeting shall be used for the flooring.

END OF PART 2

PART 3 EXECUTION

3.01 GENERAL REQUIREMENTS

A. Should visible emissions or water leaks be observed outside the Work Area, immediately stop Work and institute emergency procedures per Code Rule 56. Should there be elevated fiber levels outside the Work Area, immediately stop Work, institute emergency procedures per Code Rule 56, and notify all employers and occupants in adjacent areas. All costs incurred in decontaminating such non-Work Areas and the contents thereof shall be borne by the Contractor, at no additional cost to the Owner.

B. Medical approval, fit test reports, Worker Acknowledgments, and NYS DOL certificates shall be on site prior to admittance of any Contractor's employees to the asbestos Work Area.

C. The following submittals, documentation, and postings shall be maintained on-site by the Contractor during abatement activities at a location approved by the Abatement Project Monitor:
   1. Contractor license issued by New York State Department of Labor.
   2. Certification, Worker Training, Medical Surveillance, Acknowledgments:
      a. NYS DOL Asbestos Handler certification cards for each person employed in the removal, handling, or disturbance of asbestos.
      b. Evidence that Workers have received proper training required by the regulations and the medical examinations required by OSHA 29 CFR 1926.1101.
      c. Documentation that Workers have been fit tested specifically for respirators used on the Project.
      d. Worker's Acknowledgments: 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.
   3. Daily OSHA personal air monitoring results.
   4. NYS Department of Health ELAP certification for the laboratory that will be analyzing the OSHA personnel air samples.
   5. NYS Department of Environmental Conservation Waste Transporter Permit.
   6. Project documents (specifications and drawings.)
   7. Notifications and Variances. Ensure that the most up-to-date notifications and Variances are on-site.
   8. Applicable regulations.
   9. Material Safety Data Sheets of supplies/chemicals used on the Project.
   10. Approved Abatement Work Plan.
   11. List of emergency telephone numbers.
   12. Magnahelic manometer semi-annual calibration certification.
   13. Waste Disposal Log.
   14. Daily Project Log.

D. The following documentation shall be maintained on-site by the Abatement Project Monitor during abatement activities:
   1. Contractor license issued by New York State Department of Labor.
   2. Air Sample Log.
   3. Air sample results.
   4. Project Monitor Daily Log

7. A copy of ASTM Standard E1368 "Standard Practice for Visual Inspection of Asbestos Abatement Projects."

E. The Work Area must be vacated by building occupants prior to decontamination enclosure construction and Work Area preparation.

F. All demolition necessary to access asbestos containing materials for removal must be conducted within negative pressure enclosures by licensed asbestos handlers. Demolition debris may be disposed of as construction and demolition debris provided the Abatement Project Monitor determines that it is not contaminated with asbestos and there has been no disturbance of ACM within the enclosure. If the demolition debris is determined to be contaminated or ACM has been disturbed, it must be disposed of as asbestos waste.

3.02 PERSONNEL DECONTAMINATION ENCLOSURE

A. Provide personnel decontamination enclosure contiguous to the Work Area as per NYS ICR 56. The decontamination enclosure may be attached to or remote from the Work Area and not located within it unless isolation barriers are installed. If the decontamination chamber is accessible to the public it shall be fully framed and sheathed to prevent unauthorized entry.

B. Access to the Work Area will be from the clean room through an air-lock to the shower and through an air lock to the equipment room. Each airlock shall be a minimum of three feet from door to door. Additional air locks shall be provided as required by Code Rule 56 for remote decontamination enclosures.

C. The decontamination enclosure ceiling and walls shall be covered with one layer of opaque 6 mil polyethylene sheeting. Two layers of reinforced polyethylene sheeting shall be used to cover the floor.

D. The entrance to the clean room shall have a lockable door. Provide suitable lockers for storage of Worker's street clothes. Storage for respirators along with replacement filters and disposable towels shall also be provided.

E. Provide a temporary shower with individual hot and cold water supplies and faucets. Provide a sufficient supply of soap and shampoo. There shall be one shower for every six Workers. The shower room shall be constructed in such a way so that travel through the shower chamber shall be through the shower. The shower shall not be able to be bypassed.

F. Shower water shall be drained, collected and filtered through a system with at least a 5.0 micron particle size collection capability containing a series of several filters with progressively smaller pore sizes to avoid rapid clogging of the system. The filtered waste water shall then be discharged in accordance with applicable codes and the contaminated filters disposed of as asbestos waste.

G. The equipment room shall be used for the storage of tools and equipment. A walk-off pan filled with water shall be located in the Work Area outside the equipment room for Workers to clean foot coverings when leaving the Work Area. A labeled 6 mil plastic ACM waste bag for collection of contaminated clothing shall be located in this room.

H. The personal decontamination enclosure shall be cleaned and disinfected minimally at the end of each Work shift and as otherwise directed by the Asbestos Project Monitor.

3.03 WASTE DECONTAMINATION ENCLOSURE

A. Provide a waste decontamination enclosure contiguous to the Work area. The decontamination enclosure shall be attached to the Work Area and not located within it unless isolation barriers are installed. If the decontamination chamber is accessible to the public it shall be fully framed and sheathed to prevent unauthorized entry.

B. The waste decontamination enclosure system shall consist of a holding area, air lock and washroom. The airlock shall be a minimum of three feet from door to door. The entrance to the holding area shall have a lockable door.

C. The decontamination enclosure ceiling and walls shall be covered with one layer of opaque 6 mil polyethylene sheeting on walls and ceiling. Two layers of reinforced polyethylene sheeting shall be used to cover the floor.

D. Where there is only one egress from the Work Area, the holding area of the waste decontamination enclosure system may branch off from the personnel decontamination enclosure equipment room, which then serves as the waste wash room.

E. The waste wash room water shall be drained, collected, and filtered through a system with at least a 5.0 micron particle size collection capability containing a series of several filters with progressively smaller pore sizes to avoid rapid clogging of the system. The filtered waste water shall then be discharged in accordance with applicable codes and the contaminated filters disposed of as asbestos waste.

F. In small asbestos Projects where only one egress from the Work Area exists, the shower room may be used as a waste washroom. In this instance, the clean room shall not be used for waste storage, but shall be used for waste transfer to carts, which shall immediately be removed from this enclosure.

3.04 WORK AREA ENTRY AND EXIT PROCEDURES

A. Access to and from the asbestos Work Area is permitted only through the personnel decontamination enclosure unless otherwise stipulated in a Site Specific Variance.

B. Workers shall sign the entry/exit log upon every entry and exit.

C. The following procedures shall be followed when entering the Work Area:
   1. Before entering the Work Area, Workers shall proceed to the clean room, remove all street clothes, and don protective clothing, equipment, and respirators.
   2. Workers shall proceed from the clean room through the shower room and the equipment room and into the Work Area.

D. The following procedures shall be followed when exiting the Work Area:

   1. Before leaving the Work Area, gross asbestos contamination will be removed by brushing, wet cleaning and/or HEPA vacuuming.

2. In the equipment room, Workers shall remove disposable clothing, but not respirators, and shall place clothing in plastic disposal bags for disposal as contaminated debris prior to entering the shower room.
3. Workers shall shower thoroughly while wearing respirators, then wash respirator with soap and water prior to removal.
4. Upon exiting the shower, Workers shall don new disposable clothing if the Work shift is to continue or street clothes to exit area. Under no circumstances shall Workers enter public non-Work Areas in disposable protective clothing.

E. If remote decontamination enclosures are permitted by Code Rule 56 or a Site Specific Variance, workers shall wear two disposable suits for all phases of Work. Workers exiting the work area shall HEPA vacuum the outer suit, enter the airlock, remove the outer suit and then place it back into the Work Area. A clean second suit shall be donned before exiting the airlock and proceeding to the decontamination enclosure or another work area via the designated pathway required by Code Rule 56.

3.05 WORK AREA PREPARATION

A. Asbestos danger signs shall be posted at all approaches to the asbestos Work Area. Post all emergency exits as emergency exits only on the Work Area side, post with asbestos caution signs on the non-Work Area side. Provide all non-Work Area stairs and corridors accessible to the asbestos Work Area with warning tapes at the base of stairs and beginning of corridors. Warning tapes shall be in addition to caution signs.

B. Shut down and lock out the building heating, ventilating, and air conditioning systems. Electrical systems and circuits shall also be shut down unless permitted to remain active per Code Rule 56 and appropriately protected and labeled. Existing lighting sources shall not be utilized. Provide temporary electric power and lighting as specified herein.

C. All surfaces and objects within the Work Area shall be pre-cleaned using HEPA vacuuming and/or wet-wiping methods. Dry sweeping and any other methods that raise dust shall be prohibited. ACM shall not be disturbed during pre-cleaning.

D. Movable objects within the Work Area shall be HEPA vacuumed and/or wet-wiped and removed from the Work Area.

E. All non-movable equipment in the Work Area shall be completely covered with 2 layers of polyethylene sheeting, at least 6 mil in thickness, and secured in place with duct tape and/or spray adhesive.

F. Provide enclosure of the asbestos Work Area necessary to isolate it from unsealed areas of the building in accordance with the approved asbestos Work plan and as specified herein.

G. Provide critical barriers by sealing off all openings including but not limited to windows, diffusers, grills, electrical outlets and boxes, doors, floor drains, and any other penetrations of the Work Area enclosure, using 2 layers of at least 6 mil polyethylene sheeting.

H. Provide isolation barriers by installing temporary framing and sheathing at openings larger than 32 square feet forming the limits of the asbestos Work Area. Sheathing thickness must be

a minimum of 3/8 inch and all sheathing shall be caulked and the Work Area side sealed with two layers of 6 mil polyethylene sheeting.

I. Isolation barriers shall be installed at all elevator openings in the Work Area. .Elevators running through the regulated abatement work area shall be shut down or isolated as per Code Rule 56. Elevator controls shall be modified so that elevators bypass the Work Area

J. Provide two layers of 6 mil polyethylene sheeting over all floor, wall, and ceiling surfaces. Isolation barriers shall also be covered with two layers (for a total of four layers). Sheeting shall be secured with spray adhesive and then sealed with duct tape. All joints in polyethylene sheeting shall overlap 12" minimum. Carpeting left in place shall be covered with 3/8 inch plywood sheathing prior to plasticizing.

K. Unless otherwise specified for removal, the Contractor shall either protect all fiberglass insulation on piping, ductwork, tanks, etc. in the Work Area using two layers of six mil polyethylene or remove the insulation as asbestos containing waste. If the Contractor elects to remove the fiberglass insulation, he shall be responsible for reinsulation if reinsulation of removed ACM is part of the Contract or Project.

L. Frame out emergency exits. Provide double layer 6 mil polyethylene sheeting and tape seal opening. Post as emergency exits only. Within the Work Area, mark the locations and directions of emergency exits throughout the Work Area using exit signs and/or duct tape.

M. Remove all items attached to or in contact with ACM only after the Work Area enclosure is in place. HEPA vacuum and wet wipe with amended water all removed items prior to their removal from the Work Area and before the start of asbestos removal operations.

N. Suspended ceiling tiles shall only be removed after Work Area preparation is complete. If possible, non-contaminated ceiling tiles shall be HEPA vacuumed and removed from the Work Area before asbestos removals begin. Contaminated ceiling tiles shall be disposed of as asbestos waste.

3.06 NEGATIVE AIR PRESSURE FILTRATION SYSTEM

A. Provide a portable asbestos filtration system that develops a minimum pressure differential of negative 0.02 in. of water column within all full enclosure areas relative to adjacent unsealed areas and that provides a minimum of 4 air changes per hour in the Work Area during abatement and 6 air changes for non-friable flooring and/or mastic removal .

B. Such filtration systems must be made operational after critical and isolation barriers are installed but before wall, floor, and ceilings are plasticized and shall be operated 24 hours per day during the entire Project until the final cleanup is completed and satisfactory results of the final air samples are received from the laboratory.

C. The system shall include a series of pre-filters and filters to provide High Efficiency Particulate Air (HEPA) filtration of particles down to 0.3 microns at 100% efficiency and below 0.3 microns at 99.9% efficiency. Provide sufficient replacement filters to replace pre-filters every 2 hours, secondary pre-filters every 24 hours, and primary HEPA filters every 600 hours of operation.

D. A minimum of one additional filtration unit of at least the same capacity as the primary unit(s) shall be installed and fully functional to be used during primary unit (s) filter changing and in case of primary failure.

E. At no time will the unit exhaust indoors, within 15 feet of a receptor, including but not limited to windows and doors, or adversely affect the air intake of the building. Exhaust ducting shall not exceed 25' in length. Provide construction fencing at ground level exhaust termination locations per Code Rule 56.

F. Upon electric power failure or shut-down of any filtration unit, all abatement activities shall stop immediately and only resume after power is restored and all filtration units are fully operating. For shut-downs longer than one hour, all openings into the Work Area, including the decontamination enclosures, shall be sealed.

G. The Contractor shall provide a manometer to verify negative air pressure. Manometers shall be read twice daily and recorded within the Daily Project Log.

H. There shall be at least a 4-hour settling period after the Work Area is fully prepared and the negative filtration units have been started to ensure integrity of the barriers.

I. Once installed and operational, the Contractor's Supervisor shall conduct daily inspections of the Work Area to ensure the airtight integrity of the enclosure and operation of the negative air system. Findings shall be recorded within the Daily Project Log. Inspections shall also be conducted on days when no abatement activities are in progress per Code Rule 56 (i.e. weekends).

3.07 REMOVAL OF ASBESTOS CONTAINING MATERIALS

A. Asbestos-containing materials shall be removed in accordance with the Contract Documents and the approved Asbestos Work Plan. Only one type of ACM shall be abated at a time within a Work Area. Where there are multiple types of ACM requiring abatement, Code Rule 56 procedures for sequential abatement shall be followed.

B. Sufficiently wet asbestos materials with a low pressure, airless fine spray of surfactant to ensure full penetration prior to material removal. Re-wet material that does not display evidence of saturation.

C. One Worker shall continuously apply amended water while ACM is being removed.

D. Perform cutting, drilling, abrading, or any penetration or disturbance of asbestos containing material in a manner to minimize the dispersal of asbestos fibers into the air. Use equipment and methods specifically designed to limit generation of airborne asbestos particles. All power operated tools used shall be provided with HEPA equipped filtered local exhaust ventilation.

E. Upon removal of ACM from the substrate, the newly exposed surfaces shall be HEPA vacuumed and/or wet cleaned. Surfaces must be thoroughly cleaned using necessary methods and any required solvents to completely remove any adhesive, mastic, etc.

F. All removed material shall be placed into 6 mil plastic disposal bags or other suitable container upon detachment from the substrate. Cleanup of accumulations of loose debris or waste shall

be performed whenever there is enough accumulation to fill a single bag or container and minimally at the end of each workshift.

G. Large components shall be wrapped in two layers of 6 mil polyethylene sheeting. Sharp components likely to tear disposal bags shall be placed in fiber drums or boxes and then wrapped with sheeting.

H. Power or pressure washers are not permitted for asbestos removal or clean-up procedures unless approved in a Site-Specific Variance.

I. All open ends of pipe and duct insulation not scheduled for removal shall be encapsulated using lag cloth.

J. All construction and demolition debris determined by the Environmental Consultant to be contaminated with asbestos shall be handled and disposed of as asbestos waste.

K. The use of metal shovels, metal dust pans, etc. are not permitted inside the work area.

3.08 EQUIPMENT AND WASTE CONTAINER DECONTAMINATION AND REMOVAL PROCEDURES

A. External surfaces of contaminated containers and equipment shall be cleaned by wet cleaning and/or HEPA vacuuming in the Work Area before moving such items into the waste decontamination enclosure system airlock by persons assigned to this duty. The persons in the Work Area shall not enter the airlock. No gross removal operations are permitted when waste transfer is in progress.

B. The containers and equipment shall be removed from the airlock by persons stationed in the washroom during waste removal operations. The external surfaces of containers and equipment shall be cleaned a second time by wet cleaning.

C. The cleaned containers of asbestos material and equipment are to be dried of any excessive pooled or beaded liquid, placed in uncontaminated 6 mil plastic bags or sheeting, as the item's physical characteristics demand, and sealed airtight.

D. The clean re-containerized items shall be moved into the airlock that leads to the holding area. Workers in the washroom shall not enter this airlock.

E. Containers and equipment shall be moved from the airlock and into the holding area by persons dressed in clean personal protective equipment, who have entered from the holding area.

F. The cleaned containers of asbestos material and equipment shall be placed in water tight carts with doors or tops that shall be closed and secured. These carts shall be held in the holding area pending removal. The carts shall be wet cleaned and/or HEPA vacuumed at least once each day.

G. The exit from the decontamination enclosure system shall be secured to prevent unauthorized entry.

H. Where the waste removal enclosure is part of the personnel decontamination enclosure, waste removal shall not occur during shift changes or when otherwise occupied. Precautions shall be taken to prevent short circuiting and cycling of air outward through the shower and clean room.

3.09 WORK AREA DECONTAMINATION, CLEANING, AND CLEARANCE PROCEDURES

A. Following completion of gross abatement and after all accumulations of asbestos waste materials have been containerized, the following decontamination procedures shall be followed unless modified by a Site-Specific Variance.

B. First Cleaning:
1. All bagged asbestos waste and unnecessary equipment shall be decontaminated and removed from the Work Area.
2. All surfaces in the Work Area shall be wet cleaned. A wet-purpose shop vacuum may be used to pick up excess liquid, and may either be decontaminated prior to removal from the Work Area or disposed of as asbestos waste.
3. The Abatement Project Monitor shall conduct a visual inspection of the Work Area for cleanliness and completion of abatement.
4. The Contractor shall then apply a thin coat of encapsulant to all surfaces in the Work Area that were not the subject of removal. In no event shall encapsulant be applied to any surface that was the subject of removal prior to obtaining satisfactory air monitoring results. Encapsulants shall be pigmented or tinted to provide an indication for completeness of coverage. The Abatement Project Monitor shall determine adequacy of coverage.
5. After the encapsulant has been applied and the required waiting/settling and drying time has elapsed, the first layer of polyethylene sheeting shall then be removed and bagged.

C. Second Cleaning
1. All surfaces in the Work Area shall be HEPA vacuumed and then wet cleaned.
2. The Abatement Project Monitor shall conduct a second visual inspection of the Work Area for cleanliness.
3. After the required waiting/settling and drying time has elapsed, the second layer of polyethylene sheeting shall be removed and bagged

D. Third Cleaning
1. All surfaces in the Work Area shall be HEPA vacuumed and then wet cleaned.
2. The Abatement Project Monitor shall conduct a third visual inspection of the Work Area for cleanliness.
3. After the required waiting/settling and drying time has elapsed, aggressive final clearance air sampling shall then be conducted by the Environmental Consultant provided no visible asbestos debris/residue; pools of liquid, or condensation remains.
4. Upon receipt of satisfactory final clearance air sampling results, the negative air pressure equipment can then be shut down and the isolation and critical barriers removed. Following this, the decontamination enclosures shall be removed.

E. After isolation and critical barriers are removed, the Abatement Project Monitor and Contractor's Supervisor shall inspect the Work Area for cleanliness. If necessary, additional cleaning shall be performed by the Contractor as directed by the Abatement Project Monitor.

F. As a result of any visual inspection by the Asbestos Project Monitor or should air sampling results indicate high fiber levels, the Contractor will clean or reclean the affected areas at no additional expense to the Owner.

3.10 TENT ENCLOSURES

A. Tent enclosures may only be used where specifically permitted by Code Rule 56 or a Site-Specific Variance issued by the NYS Department of Labor.

B. The Contractor shall restrict access to the immediate area where tent removal procedures are taking place using barrier tape and/or construction barriers. Caution signs shall be posted.

C. Remote personnel and waste decontamination enclosures shall be constructed. Configuration shall be as required by Project size. For tent enclosures with gross abatement of friable materials, a contiguous decontamination system shall be constructed, maintained and utilized, except for minor size tent enclosure work areas where a remote decontamination enclosure is permitted by Code Rule 56.

D. The Work Area shall be precleaned. All objects and equipment that will remain in the restricted area during abatement shall be sealed with two layers of six mil polyethylene and tape.

E. The tent shall be a single use barrier constructed with a rigid frame and at least two layers of six mil polyethylene unless one layer of six mil polyethylene is otherwise permitted by Code Rule 56. Tents with twenty (20) square feet or less of floor space or no gross removal of friable ACM shall be constructed of one (1) layer of six mil polyethylene and shall include walls, ceilings and a floor (except portions of walls, floors and ceilings that are the removal surface) with double folded seams. All seams shall be sealed airtight using duct tape and/or spray adhesive.

F. The tent shall be constructed with at least one airlock for worker/waste egress.

G. A monometer shall be used for all OSHA Class I abatement.

H. Negative air shall be maintained at four (4) air changes per hour for non-friable and glovebag abatement tent enclosure work areas. Eight (8) air changes shall be maintained for friable gross removal tent enclosure work areas. In a Minor size abatement tent enclosure work area, a HEPA vacuum may be used to maintain the required air changes.

I. OSHA compliance air monitoring is required per section 1.09.

J. ACM removal shall follow procedures defined in section 3.07.

K. Waste material shall be placed in properly labeled 6 mil plastic bags or other appropriate containers. The outside of the bags or containers shall be wet wiped and/or HEPA vacuumed and shall then be placed in a second bag/container before being transported to the waste storage container. All transportation of waste bags and containers outside the Work Area shall be in watertight carts. These carts shall be held in the holding area pending removal. The carts shall be wet cleaned and/or HEPA vacuumed at least once each day.

L. Following completion of gross abatement and after all accumulations of asbestos waste materials have been containerized, the following decontamination procedures shall be followed.

1. All bagged asbestos waste and unnecessary equipment shall be decontaminated and removed from the Work Area.
2. All surfaces in the Work Area shall be wet cleaned. A wet-purpose shop vacuum may be used to pick up excess liquid, and shall be decontaminated prior to removal from the Work Area.
3. The Asbestos Project Monitor shall conduct a visual inspection of the Work Area for cleanliness and completion of abatement.
4. After the waiting/settling and drying time requirements have elapsed, aggressive final clearance air sampling shall then be conducted by the Environmental Consultant.
5. Upon receipt of satisfactory final clearance air sampling results, the tent shall be collapsed into itself, placed in suitable disposal bags, and transported to the waste decontamination enclosure. Isolation and critical barriers shall then be removed.

3.11 GLOVE BAG REMOVAL

A. Glove bag removals may only be used as specifically permitted by Code Rule 56 or a Site-Specific Variance issued by the NYS Department of Labor. Glove bags may only be used on piping.

B. In addition to conformance with applicable regulations and variances, glove bag removals are only permitted to be conducted within tent enclosures complying with these specifications.

C. The Contractor shall restrict access to the immediate area where tent/glove bag removal procedures are taking place using barrier tape and/or construction barriers. Caution signs shall be posted.

D. Remote personnel and waste decontamination enclosures shall be constructed. Configuration shall be as required by Project size.

E. Glove bag removals shall utilize commercially available glove bags of at least six mil thickness. Use shall be in accordance with the manufacturer's instructions and the following minimum requirements:
   1. The sides of the glove bag shall be cut to fit the size pipe being removed. Tools shall be inserted into the attached tool pocket.
   2. The glove bag shall be placed around the pipe and the open edges shall be folded and sealed with staples and duct tape. The glove bag shall also be sealed at the pipe to form a tight seal.
   3. Openings shall be made in the glove bag for the wetting tube and HEPA vacuum hose. The opening shall be sealed to form a tight seal.
   4. All glove bags shall be smoke tested by the Asbestos Project Monitor under negative pressure using the HEPA vacuum before removal operations commence. Glove bags that do not pass the smoke test shall be resealed and then retested.
   5. After first wetting the materials to be removed, removal may commence. ACM shall be continuously wetted. After removal of the ACM, the piping shall be scrubbed or brushed so that no visible ACM remains. Open ends of pipe insulation shall be encapsulated.
   6. After the piping is cleaned, the inside of the glove bag shall be washed down and the wetting tube removed. Using the HEPA vacuum, the glove bag shall be collapsed and then twisted and sealed with tape with the ACM at the bottom of the bag.
   7. A disposal bag shall be placed around the glove bag that is then detached from the pipe. The disposal bag is then sealed and transported to the decontamination enclosure.

F. After glove bag removals are complete, tent decontamination procedures shall be followed.

3.12 NON-FRIABLE FLOORING AND/OR MASTIC REMOVALS

A. The following procedures may only be used for the removal of non-friable flooring and/or mastic materials using manual and chemical methods. These procedures shall not apply to bead blaster use or other abrasive abatement methods.

B. The Contractor shall restrict access to the immediate area where tent removal procedures are taking place using barrier tape and/or construction barriers. Caution signs shall be posted.

C. Remote personnel and waste decontamination enclosures may be utilized and shall be constructed at a location in accordance with the approved Work Plan.

E. The Work Area shall be prepared per section 3.05, except that ceilings, walls, and floors need not be plasticized as per Section 56-7.11(e) for manual or chemical removal methods

E. Negative air shall be maintained at six (6) air changes per hour.

F. OSHA compliance air monitoring is required per section 1.09.

G. ACM removal shall follow procedures defined in section 3.07.

H. Waste material shall be placed in properly labeled 6 mil plastic bags or other appropriate containers. The outside of the bags or containers shall be wet wiped and/or HEPA vacuumed before being passed into the airlock for double- bagging. The bags or containers shall then be transported to the waste storage container. All transportation of waste bags and containers outside the Work Area shall be in watertight carts.

I. Following completion of gross abatement and after all accumulations of asbestos waste materials have been containerized, the following decontamination procedures shall be followed.
   1. All bagged asbestos waste and unnecessary equipment shall be decontaminated and removed from the Work Area.
   2. All surfaces in the Work Area shall be wet cleaned. A wet-purpose shop vacuum may be used to pick up excess liquid, and shall be decontaminated prior to removal from the Work Area.
   3. The Asbestos Project Monitor shall conduct a visual inspection of the Work Area for cleanliness and completion of abatement.
   4. The Contractor shall then apply a thin coat of encapsulant to all non-removal surfaces covered with plastic in the Work Area. In no event shall encapsulant be applied to any surface that was the subject of removal prior to obtaining satisfactory air monitoring results. Encapsulants shall be pigmented or tinted to provide an indication for completeness of coverage. The Asbestos Project Monitor shall determine adequacy of coverage.
   5. After the encapsulant has been applied and the required waiting/settling and drying time has elapsed, aggressive final clearance air sampling shall then be conducted by the Environmental Consultant.

6. Upon receipt of satisfactory final clearance air sampling results, the isolation and critical barriers shall be removed. Following this, the decontamination enclosures shall be removed.

3.13 REMOVAL OF ROOFING MATERIAL

GENERAL

The client must be notified at least 24 hours in advance of any waste removed from the containment. All applicable requirements of OSHA, EPA, and DOT shall be followed to ensure that outdoor work areas are in compliance so that workers, the general public and the environment are protected. Keep materials intact; do not disturb; wet while working with it; wrap as soon as possible with 2 layers of 6 mil plastic for disposal.

A. Roofing material shall be removed in an intact state to the extent that it is feasible.

B. Wet methods shall be used to remove roofing materials that are not intact, or that will be rendered not intact during removal, unless such wet methods are not feasible or will create safety hazards

C. Cutting machines shall be continuously misted during use, unless a competent person determines that misting substantially decreases worker safe

D. When removing built-up roofs with asbestos-containing roofing felts and an aggregate surface using a power roof cutter, all dust resulting from the cutting operation shall be collected by a HEPA dust collector, or shall be HEPA vacuumed by vacuuming along the cut line. When removing built-up roofs with asbestos-containing roofing felts and a smooth surface using a power roof cutter, the dust resulting from the cutting operation shall be collected either by a HEPA dust collector or HEPA vacuuming along the cut line, or by gently sweeping and then carefully and completely wiping up the still-wet dust and debris left along the cut line.

E. Asbestos-containing material that has been removed from a roof shall not be dropped or thrown to the ground. Unless the material is carried or passed to the ground by hand, it shall be lowered to the ground via covered, dust-tight chute, crane or hoist

F. Any ACM that is not intact shall be lowered to the ground as soon as is practicable, but in any event no later than the end of the work shift. While the material remains on the roof it shall either be kept wet, placed in an impermeable waste bag, or wrapped in plastic sheeting

G. Intact ACM shall be lowered to the ground as soon as is practicable, but in any event no later than the end of the work shift

H. Upon being lowered, unwrapped material shall be transferred to a closed receptacle in such manner so as to preclude the dispersion of dust

I. Roof level heating and ventilation air intake sources shall be isolated or the ventilation system shall be shut down. The sealing of air intake sources shall be coordinated with Client and occupant location to ensure acceptable IAQ is maintained within the facility as per ASHRAE Standard 1955.

J. Notwithstanding any other provision of this section, removal or repair of sections of intact roofing less than 25 square feet in area does not require use of wet methods or HEPA vacuuming as long as manual methods which do not render the material non-intact are used to remove the

material and no visible dust is created by the removal method used. In determining whether a job involves less than 25 square feet, the employer shall include all removal and repair work performed on the same roof on the same day.

All waste must be wrapped in two layers of 6 mil poly and lowered carefully to the ground. Roofing may be lowered by way of a dust-tight chute.

3.14 RESTORATION OF UTILITIES, FIRESTOPPING, AND FINISHES

A. After final clearance, remove locks and restore electrical and HVAC systems. All temporary power shall be disconnected, power lockouts removed and power restored. All temporary plumbing shall be removed.

B. Finishes damaged by asbestos abatement activities including, but not limited to, plaster/paint damage due to duct tape and spray adhesives, and floor tile lifted due to wet or humid conditions, shall be restored prior to final payment.
   1. Finishes unable to be restored shall be replaced under this Contract.
   2. All foam and expandable foam products and materials used to seal Work Area openings shall be completely removed upon completion of abatement activities.

C. All penetrations (including, but not limited to, pipes, ducts, etc.) through fire rated construction shall be firestopped using materials and systems tested in accordance with ASTM E814 on Projects where reinsulation is part of the required work.

END OF PART 3

PART 4 DISPOSAL OF ASBESTOS WASTE

4.01 TRANSPORTATION AND DISPOSAL SITE

A. The Contractor's Hauler and Disposal Site shall be approved by the Owner.

B. The Contractor shall give twenty-four (24) hour notification prior to removing any waste from the site. Waste shall be removed from the site only during normal working hours unless otherwise specified. No waste may be taken from the site unless the Contractor and Environmental Consultant are present and the Environmental Consultant authorizes the release of the waste as described herein.

C. All waste generated as part of the asbestos project shall be removed from the site within ten (10) calendar days after successful completion of all asbestos abatement work.

D. Upon arrival at the Project Site, the Hauler must possess and present to the Environmental Consultant a valid New York State Department of Environmental Conservation Part 364 Asbestos Hauler's Permit. The Environmental Consultant may verify the authenticity of the hauler's permit with the proper authority.

E. The Hauler, with the Contractor and the Environmental Consultant, shall inspect all material in the transport container prior to taking possession and signing the Asbestos Waste Manifests.

F. Unless specifically approved by the Owner, the Contractor shall not permit any off-site transfers of the waste or allow the waste to be transported or combined with any other off-site asbestos material. The Hauler must travel directly to the disposal site as identified on the notifications with no unauthorized stops.

4.02 WASTE STORAGE CONTAINERS

A. 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.) unless specifically permitted by a Site Specific Variance. When asbestos contaminated waste must be kept on the work site overnight or longer, it shall be double bagged and stored in accordance with Federal, State, and local laws.

B. The Environmental Consultant shall verify that the waste storage container and/or truck tags (license plates) match that listed on the New York State Department of Environmental Conservation Part 364 permit. Any container not listed on the permit shall be removed from the site immediately.

C. The container shall be plasticized and sealed with two (2) layers of 6 mil polyethylene. Once on site, it shall be kept locked at all times, except during load out. The waste container shall not be used for storage of equipment or contractor supplies.

D. While on-site, the container shall be labeled with EPA Danger signage:

DANGER
CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST
CANCER AND LUNG DISEASE HAZARD

E. The New York State Department of Environmental Conservation Asbestos Hauler's Permit number shall be stenciled on both sides and back of the container.

F. The container is not permitted to be loaded unless it is properly plasticized, has the appropriate danger signage affixed, and has the permit number appropriately stenciled on the container.

G. Before an enclosed container is removed from the Project Site for transportation to the Disposal Site, a seal will be placed on the door(s) of the container by the Environmental Consultant. The door(s) shall also be locked. The seals and locks shall be removed at the Disposal Site by the operator of the Disposal Facility and the seals shall be returned by the Disposal Facility to the Contractor.

H. If a lined and sealed open-top container is used pursuant to a Site-Specific Variance, a seal is not required.

I. The Owner may initiate random checks at the Disposal Site to ensure that the procedures outlined herein are complied with.

4.03 OWNER'S AND HAULER'S ASBESTOS WASTE MANIFESTS

A. The Hauler's Manifest shall be completed by the Contractor and verified by the Environmental Consultant that all the information and amounts are accurate and the proper signatures are in place.

C. The Manifest shall have the appropriate signatures of the Environmental Consultant, the Contractor, and the Hauler representatives prior to any waste being removed from the site.

D. Copies of the completed Hauler's Manifest shall be retained by the Environmental Consultant and the Contractor and shall remain on site for inspection.

E. Upon arrival at the Disposal Site, the Hauler's Manifest shall be signed by the Disposal Facility operator to certify receipt of ACM covered by the manifest.

F. The Disposal Facility operator shall return the original the Hauler's Manifest and the container seals to the Contractor.

G. The Contractor shall forward copies of the Hauler's Manifest and the container seals to the Environmental Consultant within 14 days of the waste container being removed from the site. Failure to do so may result in payment being withheld from the Contractor.

H. Originals of all waste disposal manifests, seals, and disposal logs shall be submitted by the Contractor to the Owner with the final close-out documentation.

END OF PART 4

END OF SECTION 02 82 00

ATTACHMENT 1
(Project Drawings
ME-ASB1, ME-ASB2, ME-ASB3, ME-ASB4 and ME-ASB5)

Certified Women-Owned Business Enterprise

Green Path Environmental, Inc

March 14, 2022

To: Mr. Rudy Villanyi
Nanuet Public Schools
103 Church Street
Nanuet, New York 10954

Re: **Expedited Limited Asbestos Survey**
A. Macarthur Barr Middle School – Phase 2 Bond Projects
143 Church Street, Nanuet, New York
GPE Project #: 1937.07.01

Dear Mr. Villanyi:

Green Path Environmental, Inc (GPE) was retained by the Nanuet Public Schools to conduct an expedited limited asbestos survey at the A. Macarthur Barr Middle School (Barr MS) regarding the Bond Projects renovation in reference to the KSQ Design Architects drawings dated January 31, 2022. The survey conducted on March 11, 2022 (due to long sampling day the laboratory received samples on March 12, 2022) included visual observation, material sampling and laboratory sample analysis of the suspect asbestos containing material (ACM). A drawing showing the asbestos containing material locations with quantities will be provided at a later date.

Based upon a visual inspection of materials determined to be impacted by the renovation project and the attached bulk sample laboratory analytical results, **following materials from that collected** (entry vestibule roof – bottom layer black tar paper/2nd layer dark brown felt paper to insulation/3rd layer brown rigid insulation/top layer rollout black asphalt roofing material/black seam tar/black roof flashing/black flashing tar to wood frame/black flashing perimeter tar/metal cap brown flashing to brick caulking, exterior sunshade -lintel black-brown waterproofing/façade brick grey mortar/window frame below lintel [aluminum frame] grey caulking/lintel textured beige paint, exterior north façade – lintel black-brown waterproofing/east entry black asphalt/basketball court black asphalt, interior security vestibule – above ceiling 6" pipe silver insulation/above ceiling 2" and 4" pipe beige insulation/above ceiling white elbow insulation on 2", 4" and 6" pipes/2'x4' ceiling tiles/frame grey caulking/window black caulking/floor terrazzo/wall by desk black cove base and associated beige glue, exterior security vestibule – frame grey caulking expansion joint/walkway grey cement, interior tech classroom and woodshop – 2'x4' ceiling tiles/above ceiling beige pipe insulation/above ceiling white elbow insulation/floor grey paint/black cove base and associated brown glue/ wall CMU grey mortar/white drywall-sheetrock/ blue cove base and associated tan glue/floor carpet yellow glue, hallway wall between tech classroom and wood shop – brown pegboard with black glue/green pegboard canvas/glaze brick grey mortar) **are identified as asbestos containing materials (greater than one percent asbestos);**

- Interior Security Vestibule; above ceiling white elbow insulation on 2", 4" and 6" pipes (all pipes) [approximately 40 Square Feet]
- Interior Tech Classroom and Woodshop; white elbow insulation [approximately 20 Square Feet]

It should be noted that there were no suspect ACM pipe insulation materials in the mechanical room. The pipe insulation is a PVC covering on fiberglass.

Per discussions with the Nanuet School District, the Barr MS **tech classroom chalkboard backing glue (approximately 16 Square Feet) and classroom exterior wrap on wire connected to ceiling lighting (quantity to be determined) are Presumed Asbestos Containing Materials (PACM).**

Representative bulk samples of all suspect materials were collected and analyzed by Polarized Light Microscopy (PLM). Bulk Sample Analysis by PLM NOB for non-friable materials adheres to NYS ELAP 198.6. The State of New York Environmental Laboratory Approval Program (ELAP) has determined that Polarized Light Microscopy is not consistently reliable in detecting asbestos in non-friable organically bound materials. Quantitative transmission electron microscopy (TEM) is currently the only method that can be used to determine if this material can be considered or treated as non-asbestos containing. Therefore, if PLM yields negative results for a non-friable material (NOB), it must be confirmed by Transmission Electron Microscopy (TEM). Bulk Sample Analysis by Transmission Electron Microscopy (TEM) NOB adheres to NYS ELAP Method 198.4.

Analysis of the bulk samples collected was performed by Metro Analytical Labs (Metro) located at 255 West 36th Street, Suite 101, New York, NY 10018.

Metro is accredited by the New York State Department of Health, Environmental Laboratory Accreditation Program (ELAP Accreditation No. 12003) for Bulk Sample Analysis by Polarized Light Microscopy (PLM) Friable adheres to EPA/600/M4-082-20 or NYS ELAP Method 198.1 and Bulk Sample Analysis by Polarized Light Microscopy (PLM) NOB by NYS ELAP Method 198.6 and Bulk Sample Analysis by Transmission Electron Microscopy (TEM) NOB adheres to NYS ELAP Method 198.4. as required.

According to the EPA regulations and NYS DOL Industrial Code Rule 56 asbestos-containing materials (ACM) must be removed prior to disturbance during renovation activities.

If you have any questions, please do not hesitate to call me at (917)-623-2411.

Sincerely,
Green Path Environmental, Inc

Scott Graber
Client Manager

Attachments:

- Laboratory Analytical Results with Chain of Custody Form (report dated March 13, 2022)
- GPE License and Certification
- Laboratory Certification

Laboratory Analytical Results with Chain of Custody Forms (Report dated March 13, 2022)

METRO ANALYTICAL LABORATORIES
255 West 36th St., Suite #101
New York, NY 10018
p: (212) 695-0165 f: (212) 695-0183

ASBESTOS ANALYSIS of BULK SAMPLE by POLARIZED LIGHT MICROSCOPY and TRANSMISSION ELECTRON MICROSCOPY

Client:	**Green Path Environmental Inc**	Contract:	**Nanuet UFSD**	**Metro Lab ID #:**	**B22030468**
Address:	79 Glover Street	Client Job #:	**1937.07.01**		
	Staten Island NY 10308	Location:	**143 Church Street**		
	P: (347) 276-2339 F: (631) 991-9143		**Barr Middle HS**	Sample Received:	03/12/2022
			Nanuet New York 10954	PLM Analysis Date:	03/13/2022
Contact:	**Alex Rubin**	Sampled By:	A.R.	TEM Analysis Date:	03/13/2022
	M:	Sampled Date:	03/11/2022	Reported By:	Janet Herminia-Santos
	E:	Turnaround Time:	24 hrs	Report Date:	03/13/2022

Summary of Analysis

LAB ID #	Client Sample #	Sample Description	Test	Fibrous Material	Non-Fibrous Material	Asbestos	Total Asbestos
1	1	Black Homogenous NOB ENTRY VESTIBULE - ROOF - TAR PAPER - BOTTOM LAYER - BLACK	NY ELAP 198.1				
			NY ELAP 198.6			Inconclusive None Detected	
			NY ELAP 198.4			None Detected	
2	2	Black Homogenous NOB ENTRY VESTIBULE - ROOF - TAR PAPER - BOTTOM LAYER - BLACK	NY ELAP 198.1				
			NY ELAP 198.6			Inconclusive None Detected	
			NY ELAP 198.4			None Detected	
3	3	Black Homogenous NOB ENTRY VESTIBULE - ROOF - FELT PAPER TO INSULATION - D. BROWN	NY ELAP 198.1				
			NY ELAP 198.6			Inconclusive None Detected	
			NY ELAP 198.4			None Detected	
4	4	Black Homogenous NOB ENTRY VESTIBULE - ROOF - FELT PAPER TO INSULATION - 2ND LAYER - D. BROWN	NY ELAP 198.1				
			NY ELAP 198.6			Inconclusive None Detected	
			NY ELAP 198.4			None Detected	
5	5	Grey Homogenous Fibrous ENTRY VESTIBULE - ROOF - BROWN - RIGID INDULATION	NY ELAP 198.1	30% Cellulose 30% Fiberglass	40% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
6	6	Grey Homogenous Fibrous ENTRY VESTIBULE - ROOF - BROWN - RIGID INDULATION - 3RD LAYER	NY ELAP 198.1	20% Cellulose 35% Fiberglass	45% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
7	7	Black Homogenous NOB ENTRY VESTIBULE - ROOF - ROLL-OUT ASPHALT ROOFING - BLACK	NY ELAP 198.1				
			NY ELAP 198.6			Inconclusive None Detected	
			NY ELAP 198.4			None Detected	
8	8	Black Homogenous NOB ENTRY VESTIBULE - ROOF - ROLL-OUT ASPHALT ROOFING - TOP LAYER - BLACK	NY ELAP 198.1				
			NY ELAP 198.6			Inconclusive None Detected	
			NY ELAP 198.4			None Detected	
9	9	Black Homogenous NOB ENTRY VESTIBULE - ROOF - SEAM TAR	NY ELAP 198.1				
			NY ELAP 198.6			Inconclusive None Detected	
			NY ELAP 198.4			None Detected	
10	10	Black Homogenous NOB ENTRY VESTIBULE - ROOF - SEAM TAR	NY ELAP 198.1				
			NY ELAP 198.6			Inconclusive None Detected	
			NY ELAP 198.4			None Detected	

Comments

Equipment: PLM SCOPE Nikon Optiphot-2
TEM SCOPE #1 - Hitachi H-600

Zlatan Dimitrijevic
Laboratory Director

Reda Abdelmalak
PLM Analyst

Michael Issa
TEM Analyst

NYS ELAP ID # 12003

NVLAP Lab Code 500081-0

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Summary of Analysis

LAB ID #	Client Sample #	Sample Description	Test	Fibrous Material	Non-Fibrous Material	Asbestos		Total Asbestos
11	11	Black Homogenous NOB ENTRY VESTIBULE - ROOF - ROOF FLASHING - BLACK	NY ELAP 198.1					
			NY ELAP 198.6			Inconclusive	None Detected	
			NY ELAP 198.4				None Detected	
12	12	Black Homogenous NOB ENTRY VESTIBULE - ROOF - ROOF FLASHING - BLACK	NY ELAP 198.1					
			NY ELAP 198.6			Inconclusive	None Detected	
			NY ELAP 198.4				None Detected	
13	13	Black Homogenous NOB ENTRY VESTIBULE - ROOF - FLASHING TAR TO WOOD FRAME - BLACK	NY ELAP 198.1					
			NY ELAP 198.6			Inconclusive	None Detected	
			NY ELAP 198.4				None Detected	
14	14	Black Homogenous NOB ENTRY VESTIBULE - ROOF - FLASHING TAR TO WOOD FRAME - BLACK	NY ELAP 198.1					
			NY ELAP 198.6			Inconclusive	None Detected	
			NY ELAP 198.4				None Detected	
15	15	Black Homogenous NOB ENTRY VESTIBULE - ROOF - FLASHING PERIMETER TAR - BLACK	NY ELAP 198.1					
			NY ELAP 198.6			Inconclusive	None Detected	
			NY ELAP 198.4				None Detected	
16	16	Black Homogenous NOB ENTRY VESTIBULE - ROOF - FLASHING PERIMETER TAR - BLACK	NY ELAP 198.1					
			NY ELAP 198.6			Inconclusive	None Detected	
			NY ELAP 198.4				None Detected	
17	17	Black Homogenous NOB ENTRY VESTIBULE - ROOF - METAL FLASHING TO BRICK CAULKING - BROWN	NY ELAP 198.1					
			NY ELAP 198.6			Inconclusive	None Detected	
			NY ELAP 198.4				None Detected	
18	18	Black Homogenous NOB ENTRY VESTIBULE - ROOF - METAL FLASHING TO BRICK CAULKING - BROWN	NY ELAP 198.1					
			NY ELAP 198.6			Inconclusive	None Detected	
			NY ELAP 198.4				None Detected	
19	19	Black / Brown Homogenous NOB EXTERIOR - SUNSHADE GARTER - WATERPROOFING - BLACK / BROWN	NY ELAP 198.1					
			NY ELAP 198.6			Inconclusive	None Detected	
			NY ELAP 198.4				None Detected	
20	20	Black / Brown Homogenous NOB EXTERIOR - SUNSHADE GARTER - WATERPROOFING - BLACK / BROWN	NY ELAP 198.1					
			NY ELAP 198.6			Inconclusive	None Detected	
			NY ELAP 198.4				None Detected	

Comments

Equipment: PLM SCOPE Nikon Optiphot-2
TEM SCOPE #1 - Hitachi H-600

Zlatan Dimitrijevic
Laboratory Director

Reda Abdelmalak
PLM Analyst

Michael Issa
TEM Analyst

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Summary of Analysis

LAB ID #	Client Sample #	Sample Description	Test	Fibrous Material	Non-Fibrous Material	Asbestos	Total Asbestos
21	21	Grey Homogenous Granular EXTERIOR - FAÇADE - BRICK MORTAR - GREY	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
22	22	Grey Homogenous Granular EXTERIOR - FAÇADE - BRICK MORTAR - GREY	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
23	23	Grey Homogenous NOB EXTERIOR - WINDOW FRAME / BELOW GARTER (ALUMINUM FRAME) - CAULKING - GREY	NY ELAP 198.1				
			NY ELAP 198.6			Inconclusive	None Detected
			NY ELAP 198.4				None Detected
24	24	Grey Homogenous NOB EXTERIOR - WINDOW FRAME / BELOW GARTER (ALUMINUM FRAME) - CAULKING - GREY	NY ELAP 198.1				
			NY ELAP 198.6			Inconclusive	None Detected
			NY ELAP 198.4				None Detected
25	25	Brown Homogenous NOB EXTERIOR - SUNSHADE GARTER - TEXTURE PAINT - BEIGE	NY ELAP 198.1				
			NY ELAP 198.6			Inconclusive	None Detected
			NY ELAP 198.4				None Detected
26	26	Brown Homogenous NOB EXTERIOR - SUNSHADE GARTER - TEXTURE PAINT - BEIGE	NY ELAP 198.1				
			NY ELAP 198.6			Inconclusive	None Detected
			NY ELAP 198.4				None Detected
27	27	Black / Brown Homogenous NOB EXTERIOR - NORTH FAÇADE - L. WATER PROOFING - BLACK / BROWN	NY ELAP 198.1				
			NY ELAP 198.6			Inconclusive	None Detected
			NY ELAP 198.4				None Detected
28	28	Black / Brown Homogenous NOB EXTERIOR - NORTH FAÇADE - L. WATER PROOFING - BLACK / BROWN	NY ELAP 198.1				
			NY ELAP 198.6			Inconclusive	None Detected
			NY ELAP 198.4				None Detected
29	29	Black Homogenous NOB EXTERIOR - EAST ENTRY - ASPHALT - BLACK	NY ELAP 198.1				
			NY ELAP 198.6			Inconclusive	None Detected
			NY ELAP 198.4				None Detected
30	30	Black Homogenous NOB EXTERIOR - EAST ENTRY - ASPHALT - BLACK	NY ELAP 198.1				
			NY ELAP 198.6			Inconclusive	None Detected
			NY ELAP 198.4				None Detected

Comments

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Summary of Analysis

LAB ID #	Client Sample #	Sample Description	Test	Fibrous Material	Non-Fibrous Material	Asbestos	Total Asbestos
31	31	Black Homogenous NOB EXTERIOR - BASKETBALL COURT - ASPHALT - BLACK	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4			Inconclusive None Detected None Detected	
32	32	Black Homogenous NOB EXTERIOR - BASKETBALL COURT - ASPHALT - BLACK	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4			Inconclusive None Detected None Detected	
33	33	Beige Homogenous Fibrous INTERIOR - SECURITY VESTIBULE - ABOVE CEILING - PIPE INSULATION ON 6" PIPE - SILVER	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4	30% Cellulose 50% Fiberglass	20% Non-Fibrous	None Detected	
34	34	Beige Homogenous Fibrous INTERIOR - SECURITY VESTIBULE - ABOVE CEILING - PIPE INSULATION ON 6" PIPE - SILVER	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4	25% Cellulose 45% Fiberglass	30% Non-Fibrous	None Detected	
35	35	Beige Homogenous Fibrous INTERIOR - SECURITY VESTIBULE - ABOVE CEILING - PIPE INSULATION ON 6" PIPE - SILVER	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4	40% Cellulose 20% Fiberglass	40% Non-Fibrous	None Detected	
36	36	Beige Homogenous Fibrous INTERIOR - SECURITY VESTIBULE - ABOVE CEILING - PIPE INSULATION ON 4" & 6" PIPE - BEIGE	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4	10% Cellulose 50% Fiberglass	40% Non-Fibrous	None Detected	
37	37	Beige Homogenous Fibrous INTERIOR - SECURITY VESTIBULE - ABOVE CEILING - PIPE INSULATION ON 4" & 6" PIPE - BEIGE	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4	10% Cellulose 70% Fiberglass	20% Non-Fibrous	None Detected	
38	38	Beige Homogenous Fibrous INTERIOR - SECURITY VESTIBULE - ABOVE CEILING - PIPE INSULATION ON 4" & 6" PIPE - BEIGE	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4	15% Cellulose 75% Fiberglass	10% Non-Fibrous	None Detected	
39	39	Beige Homogenous Fibrous INTERIOR - SECURITY VESTIBULE - ABOVE CEILING - ELBOW TO ALL SIZE PIPE INSULATION - WHITE	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4	5% Cellulose	89% Non-Fibrous	5.7% Chrysotile	5.7%
40	40	INTERIOR - SECURITY VESTIBULE - ABOVE CEILING - ELBOW TO ALL SIZE PIPE	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4			Positive Stop	

Comments

Equipment: PLM SCOPE Nikon Optiphot-2
TEM SCOPE #1 - Hitachi H-600

Zlatan Dimitrijevic
Laboratory Director

Reda Abdelmalak
PLM Analyst

Michael Issa
TEM Analyst

NYS ELAP ID # 12003

NVLAP Lab Code 500081-0

METRO ANALYTICAL LABORATORIES
255 West 36th St., Suite #101
New York, NY 10018
p: (212) 695-0165 f: (212) 695-0183

ASBESTOS ANALYSIS of BULK SAMPLE by POLARIZED LIGHT MICROSCOPY and TRANSMISSION ELECTRON MICROSCOPY

Client:	**Green Path Environmental Inc**	Contract:	**Nanuet UFSD**	**Metro Lab ID #:**	**B22030468**
Address:	79 Glover Street	Client Job #:	**1937.07.01**		
	Staten Island NY 10308	Location:	**143 Church Street**		
	P: (347) 276-2339 F: (631) 991-9143		**Barr Middle HS**	Sample Received:	03/12/2022
			Nanuet New York 10954	PLM Analysis Date:	03/13/2022
Contact:	**Alex Rubin**	Sampled By:	A.R.	TEM Analysis Date:	03/13/2022
	M:	Sampled Date:	03/11/2022	Reported By:	Janet Herminia-Santos
	E:	Turnaround Time:	24 hrs	Report Date:	03/13/2022

Summary of Analysis

LAB ID #	Client Sample #	Sample Description	Test	Fibrous Material	Non-Fibrous Material	Asbestos	Total Asbestos
41	41	INTERIOR - SECURITY VESTIBULE - ABOVE CEILING - ELBOW TO ALL SIZE PIPE	NY ELAP 198.1			Positive Stop	
			NY ELAP 198.6				
			NY ELAP 198.4				
42	42	Grey Homogenous NOB INTERIOR - SECURITY VESTIBULE - 2 x 4 CEILING TILE - BEIGE	NY ELAP 198.1				
			NY ELAP 198.6			Inconclusive None Detected	
			NY ELAP 198.4			None Detected	
43	43	Grey Homogenous NOB INTERIOR - SECURITY VESTIBULE - 2 x 4 CEILING TILE - BEIGE	NY ELAP 198.1				
			NY ELAP 198.6			Inconclusive None Detected	
			NY ELAP 198.4			None Detected	
44	44	Grey Homogenous NOB INTERIOR - SECURITY VESTIBULE - FRAME CAULKING - GREY	NY ELAP 198.1				
			NY ELAP 198.6			Inconclusive None Detected	
			NY ELAP 198.4			None Detected	
45	45	Grey Homogenous NOB INTERIOR - SECURITY VESTIBULE - FRAME CAULKING - GREY	NY ELAP 198.1				
			NY ELAP 198.6			Inconclusive None Detected	
			NY ELAP 198.4			None Detected	
46	46	Black Homogenous NOB INTERIOR - SECURITY VESTIBULE - WINDOW CAULKING - BLACK	NY ELAP 198.1				
			NY ELAP 198.6			Inconclusive None Detected	
			NY ELAP 198.4			None Detected	
47	47	Black Homogenous NOB INTERIOR - SECURITY VESTIBULE - WINDOW CAULKING - BLACK	NY ELAP 198.1				
			NY ELAP 198.6			Inconclusive None Detected	
			NY ELAP 198.4			None Detected	
48	48	Grey Homogenous Granular INTERIOR - SECURITY VESTIBULE - FLOOR - TERRAZZO - GREY	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
49	49	Grey Homogenous Granular INTERIOR - SECURITY VESTIBULE - FLOOR - TERRAZZO - GREY	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
50	50	Beige Homogenous NOB INTERIOR - SECURITY VESTIBULE - WALL BY DESK - COVEBASE GLUE - BEIGE	NY ELAP 198.1				
			NY ELAP 198.6			Inconclusive None Detected	
			NY ELAP 198.4			None Detected	

Comments

Equipment: PLM SCOPE Nikon Optiphot-2
TEM SCOPE #1 - Hitachi H-600

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Client:	**Green Path Environmental Inc**	Contract:	**Nanuet UFSD**	**Metro Lab ID #:**	**B22030468**
Address:	79 Glover Street	Client Job #:	**1937.07.01**		
	Staten Island NY 10308	Location:	**143 Church Street**		
	P: (347) 276-2339 F: (631) 991-9143		**Barr Middle HS**	Sample Received:	03/12/2022
			Nanuet New York 10954	PLM Analysis Date:	03/13/2022
Contact:	**Alex Rubin**	Sampled By:	A.R.	TEM Analysis Date:	03/13/2022
	M:	Sampled Date:	03/11/2022	Reported By:	Janet Herminia-Santos
	E:	Turnaround Time:	24 hrs	Report Date:	03/13/2022

Summary of Analysis

LAB ID #	Client Sample #	Sample Description	Test	Fibrous Material	Non-Fibrous Material	Asbestos		Total Asbestos
51	51	Beige Homogenous NOB INTERIOR - SECURITY VESTIBULE - BY WALL - COVEBASE GLUE - BEIGE	NY ELAP 198.1					
			NY ELAP 198.6			**Inconclusive**	**None Detected**	
			NY ELAP 198.4				**None Detected**	
52	52	Black Homogenous NOB INTERIOR - SECURITY VESTIBULE - BY DESK - COVEBASE - BLACK	NY ELAP 198.1					
			NY ELAP 198.6			**Inconclusive**	**None Detected**	
			NY ELAP 198.4				**None Detected**	
53	53	Black Homogenous NOB INTERIOR - SECURITY VESTIBULE - BY WALL - COVEBASE - BLACK	NY ELAP 198.1					
			NY ELAP 198.6			**Inconclusive**	**None Detected**	
			NY ELAP 198.4				**None Detected**	
54	54	Grey Homogenous NOB EXTERIOR - SECURITY VESTIBULE - FRAME CAULKING - GREY	NY ELAP 198.1					
			NY ELAP 198.6			**Inconclusive**	**None Detected**	
			NY ELAP 198.4				**None Detected**	
55	55	Grey Homogenous NOB EXTERIOR - SECURITY VESTIBULE - EXPANSION JOINT - GREY	NY ELAP 198.1					
			NY ELAP 198.6			**Inconclusive**	**None Detected**	
			NY ELAP 198.4				**None Detected**	
56	56	Grey Homogenous Granular EXTERIOR - SECURITY VESTIBULE - WALK WAY CEMENT - GREY	NY ELAP 198.1		100% Non-Fibrous		**None Detected**	
			NY ELAP 198.6					
			NY ELAP 198.4					
57	57	Grey Homogenous Granular EXTERIOR - SECURITY VESTIBULE - WALK WAY CEMENT - GREY	NY ELAP 198.1		100% Non-Fibrous		**None Detected**	
			NY ELAP 198.6					
			NY ELAP 198.4					
58	58	Grey Homogenous NOB INTERIOR - TECH CLASSROOM & WOOD SHOP - CEILING 2 x 4 TILE - BEIGE	NY ELAP 198.1					
			NY ELAP 198.6			**Inconclusive**	**None Detected**	
			NY ELAP 198.4				**None Detected**	
59	59	Grey Homogenous NOB INTERIOR - TECH CLASSROOM & WOOD SHOP - CEILING 2 x 4 TILE - BEIGE	NY ELAP 198.1					
			NY ELAP 198.6			**Inconclusive**	**None Detected**	
			NY ELAP 198.4				**None Detected**	
60	60	Beige Homogenous Fibrous INTERIOR - TECH CLASSROOM & WOOD SHOP - ABOVE CEILING PIPE INSULATION - BEIGE	NY ELAP 198.1	90% Cellulose	10% Non-Fibrous		**None Detected**	
			NY ELAP 198.6					
			NY ELAP 198.4					

Comments

Equipment: PLM SCOPE Nikon Optiphot-2
TEM SCOPE #1 - Hitachi H-600

Zlatan Dimitrijevic
Laboratory Director

Reda Abdelmalak
PLM Analyst

Michael Issa
TEM Analyst

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NVLAP Lab Code 500081-0

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ASBESTOS ANALYSIS of BULK SAMPLE by POLARIZED LIGHT MICROSCOPY and TRANSMISSION ELECTRON MICROSCOPY

Client:	**Green Path Environmental Inc**	Contract:	**Nanuet UFSD**	**Metro Lab ID #:**	**B22030468**
Address:	79 Glover Street	Client Job #:	**1937.07.01**		
	Staten Island NY 10308	Location:	**143 Church Street**		
	P: (347) 276-2339 F: (631) 991-9143		**Barr Middle HS**	Sample Received:	03/12/2022
			Nanuet New York 10954	PLM Analysis Date:	03/13/2022
Contact:	**Alex Rubin**	Sampled By:	A.R.	TEM Analysis Date:	03/13/2022
	M:	Sampled Date:	03/11/2022	Reported By:	Janet Herminia-Santos
	E:	Turnaround Time:	24 hrs	Report Date:	03/13/2022

Summary of Analysis

LAB ID #	Client Sample #	Sample Description	Test	Fibrous Material	Non-Fibrous Material	Asbestos	Total Asbestos
61	61	Beige Homogenous Fibrous INTERIOR - TECH CLASSROOM & WOOD SHOP - ABOVE CEILING PIPE INSULATION - BEIGE	NY ELAP 198.1	90% Cellulose	10% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
62	62	Beige Homogenous Fibrous INTERIOR - TECH CLASSROOM & WOOD SHOP - ABOVE CEILING PIPE INSULATION - BEIGE	NY ELAP 198.1	95% Cellulose	5% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
63	63	Grey Homogenous Fibrous INTERIOR - TECH CLASSROOM & WOOD SHOP - ABOVE CEILING - ELBOW INSULATION - WHITE	NY ELAP 198.1	3% Cellulose	91% Non-Fibrous	5.8% Chrysotile	5.8%
			NY ELAP 198.6				
			NY ELAP 198.4				
64	64	INTERIOR - TECH CLASSROOM & WOOD SHOP - ABOVE CEILING - ELBOW INSULATION - WHITE	NY ELAP 198.1			Positive Stop	
			NY ELAP 198.6				
			NY ELAP 198.4				
65	65	INTERIOR - TECH CLASSROOM & WOOD SHOP - ABOVE CEILING - ELBOW INSULATION - WHITE	NY ELAP 198.1			Positive Stop	
			NY ELAP 198.6				
			NY ELAP 198.4				
66	66	Grey Homogenous NOB INTERIOR - TECH CLASSROOM & WOOD SHOP - FLOOR PAINT - GREY	NY ELAP 198.1				
			NY ELAP 198.6			Inconclusive	None Detected
			NY ELAP 198.4				None Detected
67	67	Grey Homogenous NOB INTERIOR - TECH CLASSROOM & WOOD SHOP - FLOOR PAINT - GREY	NY ELAP 198.1				
			NY ELAP 198.6			Inconclusive	None Detected
			NY ELAP 198.4				None Detected
68	68	Brown Homogenous NOB INTERIOR - TECH CLASSROOM & WOOD SHOP - COVEBASE GLUE TO BLACK COVE BASE - BROWN	NY ELAP 198.1				
			NY ELAP 198.6			Inconclusive	None Detected
			NY ELAP 198.4				None Detected
69	69	Brown Homogenous NOB INTERIOR - TECH CLASSROOM & WOOD SHOP - COVEBASE GLUE TO BLACK COVE	NY ELAP 198.1				
			NY ELAP 198.6			Inconclusive	None Detected
			NY ELAP 198.4				None Detected
70	70	Black Homogenous NOB INTERIOR - TECH CLASSROOM & WOOD SHOP - COVEBASE - BLACK	NY ELAP 198.1				
			NY ELAP 198.6			Inconclusive	None Detected
			NY ELAP 198.4				None Detected

Comments

Equipment: PLM SCOPE Nikon Optiphot-2
TEM SCOPE #1 - Hitachi H-600

Zlatan Dimitrijevic
Laboratory Director

Reda Abdelmalak
PLM Analyst

Michael Issa
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NYS ELAP ID # 12003

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ASBESTOS ANALYSIS of BULK SAMPLE by POLARIZED LIGHT MICROSCOPY and TRANSMISSION ELECTRON MICROSCOPY

Client:	**Green Path Environmental Inc**	Contract:	**Nanuet UFSD**	**Metro Lab ID #:**	**B22030468**
Address:	79 Glover Street	Client Job #:	**1937.07.01**		
	Staten Island NY 10308	Location:	**143 Church Street**		
	P: (347) 276-2339 F: (631) 991-9143		**Barr Middle HS**		
			Nanuet New York 10954	Sample Received:	03/12/2022
Contact:	**Alex Rubin**	Sampled By:	A.R.	PLM Analysis Date:	03/13/2022
	M:	Sampled Date:	03/11/2022	TEM Analysis Date:	03/13/2022
	E:	Turnaround Time:	24 hrs	Reported By:	Janet Herminia-Santos
				Report Date:	03/13/2022

Summary of Analysis

LAB ID #	Client Sample #	Sample Description	Test	Fibrous Material	Non-Fibrous Material	Asbestos	Total Asbestos
71	71	Black Homogenous NOB INTERIOR - TECH CLASSROOM & WOOD SHOP - COVEBASE - BLACK	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4			**Inconclusive** **None Detected** **None Detected**	
72	72	Grey Homogenous Granular INTERIOR - TECH CLASSROOM & WOOD SHOP - WALL CMU MORTAR - GREY	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4		100% Non-Fibrous	**None Detected**	
73	73	Grey Homogenous Granular INTERIOR - TECH CLASSROOM & WOOD SHOP - WALL CMU MORTAR - GREY	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4		100% Non-Fibrous	**None Detected**	
74	74	Brown / Grey Inhomogenous Fibrous INTERIOR - TECH CLASSROOM & WOOD SHOP - DRYWALL (SHEETROCK) - WHITE	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4	45% Cellulose	55% Gypsum	**None Detected**	
75	75	Brown / Grey Inhomogenous Fibrous INTERIOR - TECH CLASSROOM & WOOD SHOP - DRYWALL (SHEETROCK) - WHITE	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4	60% Cellulose	40% Gypsum	**None Detected**	
76	76	Tan Homogenous NOB INTERIOR - TECH CLASSROOM & WOOD SHOP - COVEBASE GLUE TO BLUE COVEBASE - TAN	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4			**Inconclusive** **None Detected** **None Detected**	
77	77	Tan Homogenous NOB INTERIOR - TECH CLASSROOM & WOOD SHOP - COVEBASE GLUE TO BLUE COVEBASE - TAN	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4			**Inconclusive** **None Detected** **None Detected**	
78	78	Blue Homogenous NOB INTERIOR - TECH CLASSROOM & WOOD SHOP - COVEBASE - BLUE	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4			**Inconclusive** **None Detected** **None Detected**	
79	79	Blue Homogenous NOB INTERIOR - TECH CLASSROOM & WOOD SHOP - COVEBASE - BLUE	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4			**Inconclusive** **None Detected** **None Detected**	
80	80	Yellow Homogenous NOB INTERIOR - TECH CLASSROOM & WOOD SHOP - FLOOR CARPET GLUE - YELLOW	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4			**Inconclusive** **None Detected** **None Detected**	

Comments

Equipment: PLM SCOPE Nikon Optiphot-2
TEM SCOPE #1 - Hitachi H-600

Zlatan Dimitrijevic
Laboratory Director

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	Staten Island NY 10308	Location:	**143 Church Street**		
	P: (347) 276-2339 F: (631) 991-9143		**Barr Middle HS**	Sample Received:	03/12/2022
			Nanuet New York 10954	PLM Analysis Date:	03/13/2022
Contact:	**Alex Rubin**	Sampled By:	A.R.	TEM Analysis Date:	03/13/2022
	M:	Sampled Date:	03/11/2022	Reported By:	Janet Herminia-Santos
	E:	Turnaround Time:	24 hrs	Report Date:	03/13/2022

Summary of Analysis

LAB ID #	Client Sample #	Sample Description	Test	Fibrous Material	Non-Fibrous Material	Asbestos		Total Asbestos
81	81	Yellow Homogenous NOB INTERIOR - TECH CLASSROOM & WOOD SHOP - FLOOR CARPET GLUE - YELLOW	NY ELAP 198.1					
			NY ELAP 198.6			Inconclusive	None Detected	
			NY ELAP 198.4				None Detected	
82	82	Green Homogenous NOB INTERIOR - HLWY WALL - BTW TECH CLASS / WOOD SHOP - PEGBOARD CANVAS - GREEN	NY ELAP 198.1					
			NY ELAP 198.6			Inconclusive	None Detected	
			NY ELAP 198.4				None Detected	
83	83	Green Homogenous NOB INTERIOR - HLWY WALL - BTW TECH CLASS / WOOD SHOP - PEGBOARD CANVAS - GREEN	NY ELAP 198.1					
			NY ELAP 198.6			Inconclusive	None Detected	
			NY ELAP 198.4				None Detected	
84	84	Brown Homogenous NOB INTERIOR - HLWY WALL - BTW TECH CLASS / WOOD SHOP - PEGBOARD - BROWN	NY ELAP 198.1					
			NY ELAP 198.6			Inconclusive	None Detected	
			NY ELAP 198.4				None Detected	
85	85	Brown Homogenous NOB INTERIOR - HLWY WALL - BTW TECH CLASS / WOOD SHOP - PEGBOARD - BROWN	NY ELAP 198.1					
			NY ELAP 198.6			Inconclusive	None Detected	
			NY ELAP 198.4				None Detected	
86	86	Black Homogenous NOB INTERIOR - HLWY WALL - BTW TECH CLASS / WOOD SHOP - GLUE TO PEGBOARD - BLACK	NY ELAP 198.1					
			NY ELAP 198.6			Inconclusive	None Detected	
			NY ELAP 198.4				None Detected	
87	87	Black Homogenous NOB INTERIOR - HLWY WALL - BTW TECH CLASS / WOOD SHOP - GLUE TO PEGBOARD - BLACK	NY ELAP 198.1					
			NY ELAP 198.6			Inconclusive	None Detected	
			NY ELAP 198.4				None Detected	
88	88	Grey Homogenous Granular INTERIOR - HLWAY WALL - BTW TECH CLASS / WOOD SHOP - GLAZE BRICK MORTAR - GREY	NY ELAP 198.1		100% Non-Fibrous		None Detected	
			NY ELAP 198.6					
			NY ELAP 198.4					
89	89	Grey Homogenous Granular INTERIOR - HLWAY WALL - BTW TECH CLASS / WOOD SHOP - GLAZE BRICK MORTAR - GREY	NY ELAP 198.1		100% Non-Fibrous		None Detected	
			NY ELAP 198.6					
			NY ELAP 198.4					

Comments

Equipment: PLM SCOPE Nikon Optiphot-2
TEM SCOPE #1 - Hitachi H-600

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Report Notes

General Notes and Disclaimers

- The samples analyzed in this report were not collected by this laboratory - they were received from the client, or an agent of the client, in good condition, unless otherwise noted.
- All results are calculated based on client-provided samples and / or measurements and fall within the acceptable Quality Control limits, unless otherwise noted.
- The report shall not be reproduced, except in full, without the written approval of the laboratory.
- This report relates only to the samples tested. It may not be used by the client to claim project endorsement by NVLAP, NYS ELAP, or any other government agency.
- All samples will be properly disposed of after 60 days.
- Quality Control data (including 95% confidence limits, laboratory / analysis accuracy and precision) is available upon request.

Notes Regarding Asbestos Testing

- Air Sample Analysis by Phase Contrast Microscopy (PCM) adheres to Method NIOSH-7400. Results < 7 fibers / mm^2 are statistically insignificant.
- Percentages are calculated using the EPA equivalent Stratified Point-Count Method.
- Bulk Sample Analysis by Polarized Light Microscopy (PLM) Friable adheres to EPA/600/M4-082-20 or NYS ELAP 198.1.
- Bulk Sample Analysis by Polarized Light Microscopy (PLM) NOB adheres to NYS ELAP 198.6. This method does not remove vermiculite and may underestimate the level of asbestos present in a sample containing greater than 10% vermiculite.
- All inhomogeneous layers of the bulk samples were analyzed separately.
- Analytical results are sometimes based on the residue percentage(s) provided by the client along with the filters. Trace denotes asbestos detected at < 1%. Smiliarly, samples below quantitation limit (RL) are reported with a less than sign (<).
- Polarized Light Microscopy is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Quantitative TEM is currently the only method that can be used to determine if this material can be considered or treated as non-asbestos containing.
- Bulk Sample Analysis by Transmission Electron Microscopy (TEM) NOB adheres to NYS ELAP Method 198.4.
- Air Sample Analysis by Transmission Electron Microscopy (TEM) adheres to Method EPA CFR Part 763 Final Rule (AHERA).
- Air Sample Analysis by Transmission Electron Microscopy (TEM) Worksheets are available upon request.

B220304 68

Green Path
Environmental, Inc

BULK SAMPLE DATA AND CHAIN OF CUSTODY FORM

79 Glover Street, Suite 1, Staten Island, NY 10308
T. (347) 276-2339 • F. (646) 774-0354

Please e-mail results to: info@gpe.nyc and office@gpe.nyc

Client name: Nanuet UFSD	LAB ID No.:	Date: 3/11/22 Time: 16:00 - 22:00
Project address: 143 Church St, Nanuet, NY 10954 - Barr Middle HS	Green Path Project # 1937.07.01 PO #:	Inspector/investigator name: Alexander Rubin
Sampling Areas: Various	Analysis Requested: TAT ☐ Rush ☐ 12 Hr ☒ 24 Hr ☐ 48 Hr ☐ 72 Hr ☐ Other	Comments: Stop at first positive in the each homogeneous group

H.A.	SAMPLE ID	SAMPLE LOCATION	SAMPLE DESCRIPTION	COLOR	Q/TY SQ FT	Q/TY LN. FT	MATERIAL CONDITION
1	1	Entry Vestibule Roof	- Tar paper - Bottom Layer	Black	1,560		Good
	2						
2	3		- Felt paper to Insulation - 2nd Layer	D. Brown			
	4						
3	5		- Brown Rigid Insulation - 3rd Layer	Brown			
	6						
4	7		- Roll-out asphalt roofing Top Layer	Black			
	8						
5	9		- Seam Tar	Black	540		
	10						
6	11		- Roof Flashing	Black	344		
	12						
7	13		- Flashing Tar to wood Frame	Black			
	14						
8	15		- Flashing Perimeter Tar	Black	240		
	16						

☒ PLM ☒ NOB PLM ☒ NOB TEM [ ] TEM DUST WIPE - ASTM D6480-05 [ ] OTHER Specify:

Client Manager: Scott Graber - 917-623-2411

Chain Of Custody

Relinquished by: (Full Name & Signature)	Date & Time	Method of Submittal	Received by: (Full Name & Signature)	Date & Time
1. A. Rubin			Kasting John	3/12/22 3:15P

Lab Information

Analyzed by: (Full Name)	Signature	Date	Analyzed by: (Full Name)	Signature	Date
1.			2.		

B2203046 8

Green Path
Environmental, Inc

BULK SAMPLE DATA AND CHAIN OF CUSTODY FORM

79 Glover Street, Suite 1, Staten Island, NY 10308
T. (347) 276-2339 • F. (646) 774-0354

Please e-mail results to: info@gpe.nyc and office@gpe.nyc

Client name: Nanuet UFSD	LAB ID No.:	Date: 3/11/22 Time: 1600-2200
Project address: 143 Church St, Nanuet, NY 10954 - Barr Middle HS	Green Path Project # 1937.07.01 PO #:	Inspector/investigator name: Alexander Rubin
Sampling Areas: Various	Analysis Requested: TAT ☐ Rush ☐ 12 Hr ☒ 24 Hr ☐ 48 Hr ☐ 72 Hr ☐ Other	Comments: Stop at first positive in the each homogeneous group

H.A.	SAMPLE ID	SAMPLE LOCATION	SAMPLE DESCRIPTION	COLOR	Q/TY SQ FT	Q/TY LN. FT	MATERIAL CONDITION
9	17	Entry Vestibule Roof	- Metal Cap Flashing to Brick	Brown	6		Damaged
	18		Caulking	↓	↓		↓
10	19	Exterior - Sunshade Lintel	- Waterproofing	Black/Brown	1,200		Good
	20			↓	↓		↓
11	21		- Façade	- Brick Mortar	Gray	3,000	
	22				↓		
12	23		- Window Frame/Below Lintel	- Caulking	Grey	320	
	24		(Aluminum Frame)		↓	↓	↓
13	25		- Sunshade Under	- Texture Paint	Beige	280	Damaged
	26		↓	↓	↓	↓	↓
14	27	Exterior - North Facade	- Lintel	Waterproofing	Black/Brown	600	Good
	28			↓	↓		↓
15	29		- East Entry	- Asphalt	Black	680	Damaged
	30			↓	↓		↓
16	31		- Basketball Court	- Asphalt	Black	4000	
	32			↓	↓		↓

☒ PLM ☒ NOB PLM ☒ NOB TEM [ ] TEM DUST WIPE - ASTM D6480-05 [ ] OTHER Specify:

Client Manager: Scott Graber - 917-623-2411

Chain Of Custody					
Relinquished by: (Full Name & Signature) A. Rubin	Date & Time	Method of Submittal	Received by: (Full Name & Signature)		Date & Time
1.			Kristina John		3/12/22 315P
Lab Information					
Analyzed by: (Full Name)	Signature	Date	Analyzed by: (Full Name)	Signature	Date
1.			2.		

B2203046B

Green Path
Environmental, Inc

BULK SAMPLE DATA AND CHAIN OF CUSTODY FORM

79 Glover Street, Suite 1, Staten Island, NY 10308
T. (347) 276-2339 • F. (646) 774-0354

Please e-mail results to: info@gpe.nyc and office@gpe.nyc

Client name: Nanuet UFSD	LAB ID No.:	Date: 3/11/22 Time: 16:00 - 22:00
Project address: 143 Church St, Nanuet, NY 10954 - Barr Middle HS	Green Path Project # 1937.07.01 PO #:	Inspector/investigator name: Alexander Rubin
Sampling Areas: Various	Analysis Requested: TAT ☐ Rush ☐ 12 Hr ☒ 24 Hr ☐ 48 Hr ☐ 72 Hr ☐ Other	Comments: Stop at first positive in the each homogeneous group

H.A.	SAMPLE ID	SAMPLE LOCATION	SAMPLE DESCRIPTION	COLOR	Q/TY SQ FT	Q/TY LN. FT	MATERIAL CONDITION
17	33	Interior-Security Vestibule	-Above ceiling- PIPE insulation	Silver		220	Good
	34		on 6" pipe	↓		↓	↓
	35			↓		↓	
18	36		- PIPE insulation	Beige		400	
	37		on 4" & 2" pipe	↓		↓	
	38			↓		↓	
19	39		- Elbow TO	white	40		
	40		All size PIPE insulation	white	↓		
	41			white	↓		↓
20	42		- 2x4 ceiling tile	Beige	1,388		Good
	43		↓	↓	↓		↓
21	44		- [redacted] frame ceiling	Grey	80		Damaged
	45		↓	↓	↓		↓
22	46		- window caulking	Black	120		
	47	↓ ↓	↓	↓	↓		↓

☒ PLM ☒ NOB PLM ☒ NOB TEM ☐ TEM DUST WIPE - ASTM D6480-05 ☐ OTHER Specify:

Client Manager: Scott Graber - 917-623-2411

Chain Of Custody					
Relinquished by: (Full Name & Signature)	Date & Time	Method of Submittal	Received by: (Full Name & Signature)		Date & Time
1. A. Rubin			Krishna John		3/12/22 315P
Lab Information					
Analyzed by: (Full Name)	**Signature**	**Date**	**Analyzed by: (Full Name)**	**Signature**	**Date**
1.			2.		

B2203468

Green Path
Environmental, Inc

BULK SAMPLE DATA AND CHAIN OF CUSTODY FORM

79 Glover Street, Suite 1, Staten Island, NY 10308
T. (347) 276-2339 • F. (646) 774-0354

Please e-mail results to: info@gpe.nyc and office@gpe.nyc

Client name: Nanuet UFSD	LAB ID No.:	Date: 3/11/22 Time: 16:00 - 22:00
Project address: 143 Church St, Nanuet, NY 10954 - Barr Middle HS	Green Path Project # 1937.07.01 PO #:	Inspector/investigator name: Alexander Rubin
Sampling Areas: Various	Analysis Requested: TAT ☐ Rush ☐ 12 Hr ☒ 24 Hr ☐ 48 Hr ☐ 72 Hr ☐ Other	Comments: Stop at first positive in the each homogeneous group

H.A.	SAMPLE ID	SAMPLE LOCATION	SAMPLE DESCRIPTION	COLOR	Q/TY SQ FT	Q/TY LN. FT	MATERIAL CONDITION
23	48	Interior-Security Vestibule -	Floor-Terrazzo	Gray	1,388		Good
	49						
24	50		-wall by desk-coveBase glue	Beige	6		Damaged
	51		wall				
25	52		Desk-coveBase	Beige			
	53		wall				
26	54	Exterior-Security Vestibule	-Frame caulking/	Gray	8		Damaged
	55		Expension Joint				
27	56		-walkway cement	Gray	10		Good
	57						
28	58	Interior-Tech Classroom	-Ceiling 2x4 Tile	Beige	3,600		Damaged
	59	& wood Shop					
29	60		-Above ceiling Pipe insulation	Beige		40	Good
	61						
	62						

☒ PLM ☒ NOB PLM ☒ NOB TEM [ ] TEM DUST WIPE - ASTM D6480-05 [ ] OTHER Specify:

Client Manager: Scott Graber - 917-623-2411

Chain Of Custody				
Relinquished by: (Full Name & Signature) A. Rubin	Date & Time	Method of Submittal	Received by: (Full Name & Signature)	Date & Time
1.			Kristina John	3/12/22 3:15P

Lab Information					
Analyzed by: (Full Name)	Signature	Date	Analyzed by: (Full Name)	Signature	Date
1.			2.		

B2203046B

Green Path
Environmental, Inc

BULK SAMPLE DATA AND CHAIN OF CUSTODY FORM

79 Glover Street, Suite 1, Staten Island, NY 10308
T. (347) 276-2339 • F. (646) 774-0354

Please e-mail results to: info@gpe.nyc and office@gpe.nyc

Client name: Nanuet UFSD	LAB ID No.:	Date: 3/11/22 Time: 16:00 - 22:00
Project address: 143 Church St, Nanuet, NY 10954 - Barr Middle HS	Green Path Project # 1937.07.01 PO #:	Inspector/investigator name: Alexander Rubin
Sampling Areas: Various	Analysis Requested: TAT ☐ Rush ☐ 12 Hr ☒ 24 Hr ☐ 48 Hr ☐ 72 Hr ☐ Other	Comments: Stop at first positive in the each homogeneous group

H.A.	SAMPLE ID	SAMPLE LOCATION	SAMPLE DESCRIPTION	COLOR	Q/TY SQ FT	Q/TY LN. FT	MATERIAL CONDITION
30	63	Interior - Tech Classroom	- Above ceiling - Elbow Insulation	white	20		Good
	64	& wood Shop		↓	↓		↓
	65			↓	↓		↓
31	66		- Floor Paint	Gray	3,600		↓
	67			↓	↓		↓
32	68		- Cove Base glue to	Brown	140		↓
	69		Black Cove Base	↓	↓		↓
33	70		- Cove Base	Black	80		↓
	71		↓	↓	↓		↓
34	72		- wall skim mortar	Gray	3,000		↓
	73		↓	↓	↓		↓
35	74		- Drywall (Sheetrock)	white	120		↓
	75		↓	↓	↓		↓
36	76		- Cove Base glue to Blue	Tan	60		↓
	77	↓	Cove Base		↓		↓

☒ PLM ☒ NOB PLM ☒ NOB TEM ☐ TEM DUST WIPE - ASTM D6480-05 ☐ OTHER Specify:

Client Manager: Scott Graber - 917-623-2411

Chain Of Custody

Relinquished by: (Full Name & Signature)	Date & Time	Method of Submittal	Received by: (Full Name & Signature)	Date & Time
1. A. Rubin			Kristina John	3/12/22 3:15P

Lab Information

Analyzed by: (Full Name)	Signature	Date	Analyzed by: (Full Name)	Signature	Date
1.			2.		

B22D30468

Green Path
Environmental, Inc

BULK SAMPLE DATA AND CHAIN OF CUSTODY FORM

79 Glover Street, Suite 1, Staten Island, NY 10308
T. (347) 276-2339 • F. (646) 774-0354

Please e-mail results to: info@gpe.nyc and office@gpe.nyc

Client name: Nanuet UFSD	LAB ID No.:	Date: 3/11/22 Time: 16:00-22:00
Project address: 143 Church St, Nanuet, NY 10954 - Barr Middle HS	Green Path Project # 1937.07.01 PO #:	Inspector/investigator name: Alexander Rubin
Sampling Areas: Various	Analysis Requested: TAT ☐ Rush ☐ 12 Hr ☒ 24 Hr ☐ 48 Hr ☐ 72 Hr ☐ Other	Comments: Stop at first positive in the each homogeneous group

H.A.	SAMPLE ID	SAMPLE LOCATION	SAMPLE DESCRIPTION	COLOR	Q/TY SQ FT	Q/TY LN. FT	MATERIAL CONDITION
37	78	Interior - Tech Classroom & Wood Shop	- Cove Base	Blue	60		Good
	79			↓	↓		↓
38	80		- Floor Carpet glue	Yellow	1,800		
	81			↓			
39	82	- Hallway wall between Tech Class/Wood Shop	- Pegboard canvas	Green	32		
	83			↓			
40	84		- Pegboard	Brown			
	85		↓	↓			
41	86		- Glue to pegboard	Black			
	87		↓	↓	↓		
42	88		- Glaze brick mortar	Gray	40		
	89	↓ ↓	↓	↓	↓		↓

☒ PLM ☒ NOB PLM ☒ NOB TEM ☐ TEM DUST WIPE - ASTM D6480-05 ☐ OTHER Specify:

Client Manager: Scott Graber - 917-623-2411

Chain Of Custody				
Relinquished by: (Full Name & Signature) A. Rubin	Date & Time	Method of Submittal	Received by: (Full Name & Signature)	Date & Time
1.			Kristiana John	3/12/22 3:15 P

Lab Information					
Analyzed by: (Full Name)	Signature	Date	Analyzed by: (Full Name)	Signature	Date
1.			2.		

GPE License and Certification

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

Green Path Environmental, Inc.
Suite 1
79 Glover Street

Staten Island, NY 10308

FILE NUMBER: 13-72113
LICENSE NUMBER: 72113
LICENSE CLASS: RESTRICTED
DATE OF ISSUE: 06/18/2021
EXPIRATION DATE: 06/30/2022

Duly Authorized Representative – Julia Rubin:

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.

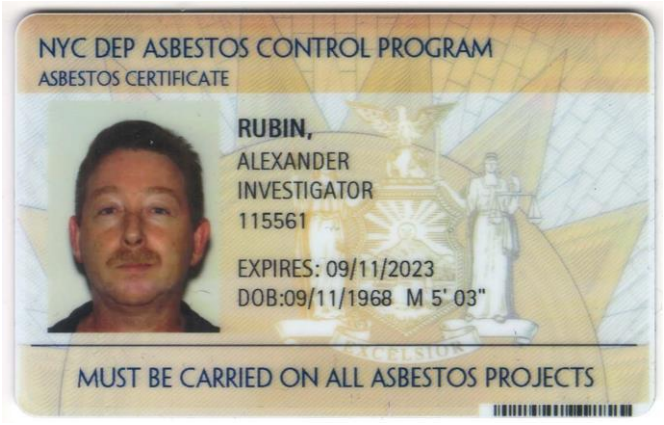
Amy Phillips, Director
For the Commissioner of Labor

SH 432 (8/12)

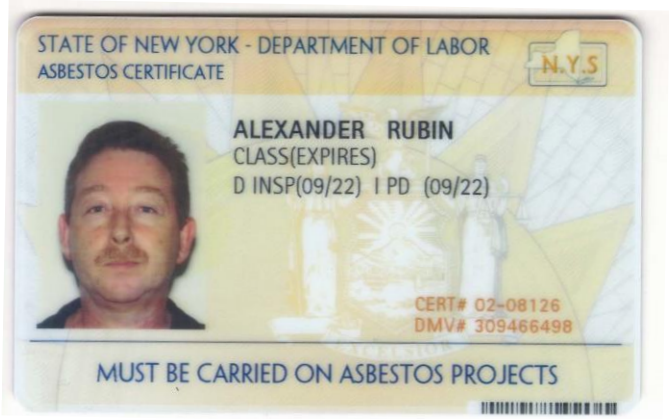
Green Path
Environmental, Inc

Alexander Rubin

NYC DEP Certified Asbestos Investigator



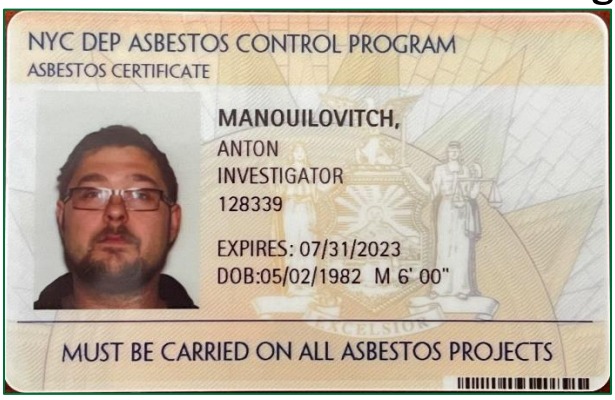
NYS DOL Certified Asbestos Inspector



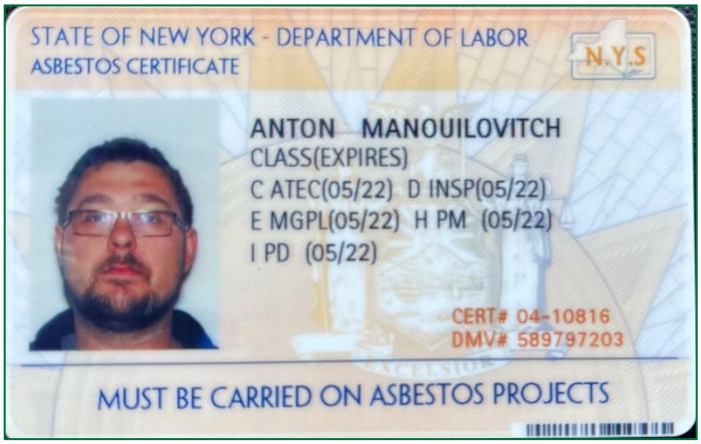
Green Path
Environmental, Inc

ANTON MANOUILOVITCH

NYC DEP Certified Asbestos Investigator



NYS DOL Certified Asbestos Inspector/Project Design Management Planner
Project Monitor/Air Sampling Technician



Laboratory Certification

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2022
Issued April 01, 2021

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. ZLATAN DIMITRIJEVIC
METRO ANALYTICAL LABORATORIES, LLC.
255 WEST 36TH STREET SUITE 101
NEW YORK, NY 10018-0022

NY Lab Id No: 12003

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
Lead in Dust Wipes	EPA 7000B
Lead in Paint	EPA 7000B

Sample Preparation Methods

EPA 3050B

NEW YORK STATE OF OPPORTUNITY. Department of Health

Serial No.: 63263

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.

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2022
Issued April 01, 2021

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Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. ZLATAN DIMITRIJEVIC
METRO ANALYTICAL LABORATORIES, LLC.
255 WEST 36TH STREET SUITE 101
NEW YORK, NY 10018-0022

NY Lab Id No: 12003

is hereby APPROVED as an Environmental Laboratory for the category
ENVIRONMENTAL ANALYSES AIR AND EMISSIONS
All approved subcategories and/or analytes are listed below:

Metals I	
Lead, Total	NIOSH 7082
Miscellaneous	
Asbestos	40 CFR 763 APX A No. III
Fibers	NIOSH 7400 A RULES

NEW YORK STATE OF OPPORTUNITY | Department of Health

Serial No.: 63264

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Green Path Environmental, Inc

Certified Women-Owned Business Enterprise

March 14, 2022

To: Mr. Rudy Villanyi
Nanuet Public Schools
103 Church Street, Nanuet, New York 10954

Re: **Expedited Limited Asbestos Survey**
Nanuet High School – Phase 2 and Elevator Addition
103 Church Street, Nanuet, New York
GPE Project #: 1937.07.01

Dear Mr. Villanyi:

Green Path Environmental, Inc (GPE) was retained by the Nanuet Public Schools to conduct an expedited limited asbestos survey at the Nanuet High School regarding the Phase 2 and elevator addition project renovation in reference to the KSQ Design Architects drawings dated January 31, 2022. The survey conducted on March 6 and 12, 2022 included visual observation, material sampling and laboratory sample analysis of the suspect asbestos containing material (ACM). A drawing showing the asbestos containing material locations with quantities will be provided at a later date.

Based upon a visual inspection of materials determined to be impacted by the renovation project and the attached bulk sample laboratory analytical results, the **following materials from that collected** (exterior storefront - frame beige caulking/window black caulking/above window grey transite panel, exterior front wall brick grey mortar/wall waterproofing black tar paper behind brick, exterior facade - railing brick brown mortar/brown brick grey mortar/orange brick beige mortar, exterior rear courtyard - wall waterproofing black tar paper behind brick/black asphalt for new ADA ramp, exterior east wing [area elevator wall] - wall waterproofing black tar paper behind brick/wall foundation waterproofing black tar paper/wall foundation waterproofing black tar cement, east wing roof - bottom layer beige screed/2nd layer foam brown paper/3rd layer black tar paper/4th layer brown rigid paper/top layer hot black tar, east wing roof dunnage - pitch pocket black tar/patch black tar, exterior east wing window frame black caulking, interior east wing - foyer window frame black caulking/ceiling plaster/floor terrazzo/wall CMU grey mortar/ceiling 2'X4' beige ceiling tile/walls drywall above window/wall ceramic tile glue and grout, east wing interior foyer [1st and 2nd floor] - radiator grey pipe insulation/radiator waterproofing black tar paper behind metal cover, interior store front - wall ceramic tile yellow glue/wall ceramic tile grey grout/wall white caulking to metal frame and ceramic tile/wall plaster/ceiling white drywall/ceiling white joint compound, 2nd Floor science wing – above ceiling silver-beige pipe insulation/2'x 4' white-yellow ceiling tile [type I]/2'x 4' beige-grey ceiling tile [type II]/ 2'x 4' white-grey ceiling tile [type III]/wall CMU grey mortar/floor black mastic to all 12"x12" VAT/12"x12" blue, grey floor tiles/wall brown cove base and associated brown [old] or beige [new] glues/light brown wallboard and white joint compound/black table top material/black caulking and black grout connected to table top) **are identified as asbestos containing materials (greater than one percent asbestos);**

- Exterior Storefront (Exterior Security Vestibule); frame beige caulking (horizontal and vertical) [approximately 10 Square Feet]

- Exterior Storefront (Exterior Security Vestibule); above window soffit grey transite panel. (Nanuet may want to remove all panels)
[approximately 60 Square Feet]
- Exterior Front Facade; wall waterproofing black tar paper behind brick
[approximately 300 Square Feet]
- Exterior Rear Courtyard; wall waterproofing black tar paper behind brick
[approximately 100 Square Feet]
- Exterior East Wing; wall waterproofing black tar paper behind brick
[approximately 300 Square Feet]
- Exterior East Wing; wall foundation waterproofing black tar on cement
[approximately 240 Square Feet]
- Exterior East Wing; window frame black caulking
[approximately 8 Square Feet]
- Interior East Wing Foyer (1st and 2nd floor); radiator grey pipe insulation between flooring
[approximately 4 Linear Feet]
- Interior East Wing Foyer (1st and 2nd floor); radiator waterproofing black tar paper behind metal cover [approximately 26 Square Feet]
- Interior Storefront; white caulking to metal frame and ceramic tile (horizontal and vertical) [approximately 1 Square Foot]

Per discussions with the Nanuet School District, the High School science wing - **Classrooms 230, 231, 232, 233, 234 and 235 chalkboard/whiteboard (approximately 56 Square Feet of chalkboard-whiteboard and 28 Square feet of associated whiteboard glue) and exterior wrap on wire connected to ceiling lighting (quantity to be determined) are Presumed Asbestos Containing Materials (PACM).**

It should be noted that the east wing interior foyer ceiling plaster, interior storefront wall plaster and east wing roof bottom layer beige screed laboratory results are currently inconclusive and laboratory analysis must go to Vermiculite analytical method 198.8 for further verification. The laboratory analytical results will be provided in 1 week.

Also, the interior storefront (interior security vestibule) ceiling is aluminum planks attached to metal framing, science wing classroom exhaust hoods and classroom cabinets did not have suspect ACM materials.

Representative bulk samples of all suspect materials were collected and analyzed by Polarized Light Microscopy (PLM). Bulk Sample Analysis by PLM NOB for non-friable materials adheres to NYS ELAP 198.6. The State of New York Environmental Laboratory Approval Program (ELAP) has determined that Polarized Light Microscopy is not consistently reliable in detecting asbestos in non-friable organically bound materials. Quantitative transmission electron microscopy (TEM) is currently the only method that can be used to determine if this material can be considered or treated as non-asbestos containing. Therefore, if PLM yields negative results for a non-friable material (NOB), it must be confirmed by Transmission Electron Microscopy (TEM). Bulk Sample Analysis by Transmission Electron Microscopy (TEM) NOB adheres to NYS ELAP Method 198.4.

Analysis of the bulk samples collected was performed by Metro Analytical Labs (Metro) located at 255 West 36th Street, Suite 101, New York, NY 10018.

Metro is accredited by the New York State Department of Health, Environmental Laboratory Accreditation Program (ELAP Accreditation No. 12003) for Bulk Sample Analysis by Polarized Light Microscopy (PLM) Friable adheres to EPA/600/M4-082-20 or NYS ELAP Method 198.1 and Bulk Sample Analysis by Polarized Light Microscopy (PLM) NOB by NYS ELAP Method 198.6 and Bulk Sample Analysis by Transmission Electron Microscopy (TEM) NOB adheres to NYS ELAP Method 198.4. as required.

According to the EPA regulations and NYS DOL Industrial Code Rule 56 asbestos-containing materials (ACM) must be removed prior to disturbance during renovation activities.

If you have any questions, please do not hesitate to call me at (917)-623-2411.

Sincerely,
Green Path Environmental, Inc

Scott Graber
Client Manager

Attachments:

- Laboratory Analytical Results with Chain of Custody Form (reports dated March 7 and 13, 2022)
- GPE License and Certification
- Laboratory Certification

Laboratory Analytical Results with Chain of Custody Forms (Reports dated March 7 and 13, 2022)

METRO ANALYTICAL LABORATORIES
255 West 36th St., Suite #101
New York, NY 10018
p: (212) 695-0165 f: (212) 695-0183

ASBESTOS ANALYSIS of BULK SAMPLE by POLARIZED LIGHT MICROSCOPY and TRANSMISSION ELECTRON MICROSCOPY

Client:	**Green Path Environmental Inc**	Contract:	**Nanuet UFSD**	**Metro Lab ID #:**	**B22030206**
Address:	79 Glover Street	Client Job #:	**1937.07.01**		
	Staten Island NY 10308	Location:	**50 Blauvelt Road**		
	P: (347) 276-2339 F: (631) 991-9143		**Miller ES - Various**	Sample Received:	03/06/2022
			Nanuet	PLM Analysis Date:	03/07/2022
Contact:	**Alex Rubin**	Sampled By:	A.R.	TEM Analysis Date:	03/07/2022
	M:	Sampled Date:	03/05/2022	Reported By:	Turiana Moreira
	E:	Turnaround Time:	24 hrs	Report Date:	03/08/2022

Summary of Analysis

LAB ID #	Client Sample #	Sample Description	Test	Fibrous Material	Non-Fibrous Material	Asbestos	Total Asbestos
1	1	White Homogenous Granular BOYS RESTROOM - C124 - CEILING PLASTER - TOP LAYER	NY ELAP 198.1	5% Cellulose	92.13% Non-Fibrous	2.87% Chrysotile	2.9%
			NY ELAP 198.6				
			NY ELAP 198.4				
2	2	BOYS RESTROOM - C124 - CEILING PLASTER - TOP LAYER	NY ELAP 198.1			Positive Stop	Not Analyzed
			NY ELAP 198.6				
			NY ELAP 198.4				
3	3	BOYS RESTROOM - C124 - CEILING PLASTER - TOP LAYER	NY ELAP 198.1			Positive Stop	Not Analyzed
			NY ELAP 198.6				
			NY ELAP 198.4				
4	4	White Homogenous Granular BOYS RESTROOM - C124 - CEILING PLASTER - MIDDLE LAYER	NY ELAP 198.1	4% Cellulose	92.59% Non-Fibrous	3.41% Chrysotile	3.4%
			NY ELAP 198.6				
			NY ELAP 198.4				
5	5	BOYS RESTROOM - C124 - CEILING PLASTER - MIDDLE LAYER	NY ELAP 198.1			Positive Stop	Not Analyzed
			NY ELAP 198.6				
			NY ELAP 198.4				
6	6	BOYS RESTROOM - C124 - CEILING PLASTER - MIDDLE LAYER	NY ELAP 198.1			Positive Stop	Not Analyzed
			NY ELAP 198.6				
			NY ELAP 198.4				
7	7	Brown Homogenous Granular BOYS RESTROOM - C124 - CEILING PLASTER - BOTTOM LAYER	NY ELAP 198.1	5% Cellulose	75% Non-Fibrous 20% Vermiculite	Analysis Halted	
			NY ELAP 198.6				
			NY ELAP 198.4				
8	8	Brown Homogenous Granular BOYS RESTROOM - C124 - CEILING PLASTER - BOTTOM LAYER	NY ELAP 198.1	7% Cellulose	78% Non-Fibrous 15% Vermiculite	Analysis Halted	
			NY ELAP 198.6				
			NY ELAP 198.4				
9	9	Brown Homogenous Granular BOYS RESTROOM - C124 - CEILING PLASTER - BOTTOM LAYER	NY ELAP 198.1	4% Cellulose	71% Non-Fibrous 25% Vermiculite	Analysis Halted	
			NY ELAP 198.6				
			NY ELAP 198.4				
10	10	White Homogenous Granular BOYS RESTROOM - C124 - UPPER WALL PLASTER - TOP LAYER	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				

Comments: Samples7,8,9,13,14,15,41,42,43,69,70,71,93,94,95,96,97 & 98 analysis was terminated due to the presence of vermiculite. Results are inconclusive and must go for 198.8 method for further verification.

Equipment: PLM SCOPE Nikon Optiphot-2
TEM SCOPE #1 - Hitachi H-600

Zlatan Dimitrijevic
Laboratory Director

Sameh Youssef
PLM Analyst

Zlatan Dimitrijevic
TEM Analyst

NYS ELAP ID # 12003

NVLAP Lab Code 500081-0

METRO ANALYTICAL LABORATORIES
255 West 36th St., Suite #101
New York, NY 10018
p: (212) 695-0165 f: (212) 695-0183

ASBESTOS ANALYSIS of BULK SAMPLE by POLARIZED LIGHT MICROSCOPY and TRANSMISSION ELECTRON MICROSCOPY

Client:	**Green Path Environmental Inc**	Contract:	**Nanuet UFSD**	**Metro Lab ID #:**	**B22030206**
Address:	79 Glover Street	Client Job #:	**1937.07.01**		
	Staten Island NY 10308	Location:	**50 Blauvelt Road**		
	P: (347) 276-2339 F: (631) 991-9143		**Miller ES - Various**	Sample Received:	03/06/2022
			Nanuet	PLM Analysis Date:	03/07/2022
Contact:	**Alex Rubin**	Sampled By:	A.R.	TEM Analysis Date:	03/07/2022
	M:	Sampled Date:	03/05/2022	Reported By:	Turiana Moreira
	E:	Turnaround Time:	24 hrs	Report Date:	03/08/2022

Summary of Analysis

LAB ID #	Client Sample #	Sample Description	Test	Fibrous Material	Non-Fibrous Material	Asbestos	Total Asbestos
11	11	White Homogenous Granular BOYS RESTROOM - C124 - UPPER WALL PLASTER - TOP LAYER	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
12	12	White Homogenous Granular BOYS RESTROOM - C124 - UPPER WALL PLASTER - TOP LAYER	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
13	13	Brown Homogenous Granular BOYS RESTROOM - C124 - UPPER WALL PLASTER - BOTTOM LAYER	NY ELAP 198.1	3% Cellulose	87% Non-Fibrous 10% Vermiculite	Analysis Halted	
			NY ELAP 198.6				
			NY ELAP 198.4				
14	14	Brown Homogenous Granular BOYS RESTROOM - C124 - UPPER WALL PLASTER - BOTTOM LAYER	NY ELAP 198.1	2% Cellulose	78% Non-Fibrous 20% Vermiculite	Analysis Halted	
			NY ELAP 198.6				
			NY ELAP 198.4				
15	15	Brown Homogenous Granular BOYS RESTROOM - C124 - UPPER WALL PLASTER - BOTTOM LAYER	NY ELAP 198.1	4% Cellulose	86% Non-Fibrous 10% Vermiculite	Analysis Halted	
			NY ELAP 198.6				
			NY ELAP 198.4				
16	16	White Homogenous Granular BOYS RESTROOM - C124 - LOWER WALL - C.T. GROUT	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
17	17	White Homogenous Granular BOYS RESTROOM - C124 - LOWER WALL - C.T. GROUT	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
18	18	White Homogenous Granular BOYS RESTROOM - C124 - LOWER WALL - C.T. GROUT	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
19	19	Grey Homogenous Granular BOYS RESTROOM - C124 - LOWER WALL - C.T. THINSET	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
20	20	Grey Homogenous Granular BOYS RESTROOM - C124 - LOWER WALL - C.T. THINSET	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				

Comments: Samples7,8,9,13,14,15,41,42,43,69,70,71,93,94,95,96,97 & 98 analysis was terminated due to the presence of vermiculite. Results are inconclusive and must go for 198.8 method for further verification.

Equipment: PLM SCOPE Nikon Optiphot-2
TEM SCOPE #1 - Hitachi H-600

Zlatan Dimitrijevic
Laboratory Director

Sameh Youssef
PLM Analyst

Zlatan Dimitrijevic
TEM Analyst

NYS ELAP ID # 12003

NVLAP Lab Code 500081-0

METRO ANALYTICAL LABORATORIES
255 West 36th St., Suite #101
New York, NY 10018
p: (212) 695-0165 f: (212) 695-0183

ASBESTOS ANALYSIS of BULK SAMPLE by POLARIZED LIGHT MICROSCOPY and TRANSMISSION ELECTRON MICROSCOPY

Client:	**Green Path Environmental Inc**	Contract:	**Nanuet UFSD**	**Metro Lab ID #:**	**B22030206**
Address:	79 Glover Street	Client Job #:	**1937.07.01**		
	Staten Island NY 10308	Location:	**50 Blauvelt Road**		
	P: (347) 276-2339 F: (631) 991-9143		**Miller ES - Various**	Sample Received:	03/06/2022
			Nanuet	PLM Analysis Date:	03/07/2022
Contact:	**Alex Rubin**	Sampled By:	A.R.	TEM Analysis Date:	03/07/2022
	M:	Sampled Date:	03/05/2022	Reported By:	Turiana Moreira
	E:	Turnaround Time:	24 hrs	Report Date:	03/08/2022

Summary of Analysis

LAB ID #	Client Sample #	Sample Description	Test	Fibrous Material	Non-Fibrous Material	Asbestos	Total Asbestos
21	21	Grey Homogenous Granular BOYS RESTROOM - C124 - LOWER WALL - C.T. THINSET	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
22	22	Grey Homogenous Granular BOYS RESTROOM - C124 - LOWER WALL - MORTAR	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
23	23	Grey Homogenous Granular BOYS RESTROOM - C124 - LOWER WALL - MORTAR	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
24	24	Grey Homogenous Granular BOYS RESTROOM - C124 - LOWER WALL - MORTAR	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
25	25	Black Homogenous NOB BOYS RESTROOM - C124 - WET WALLS - PIPE INSULATION OUTER COAT - TAR PAPER	NY ELAP 198.1				
			NY ELAP 198.6			1.8% Chrysotile	1.8%
			NY ELAP 198.4			Not Analyzed	
26	26	Black Homogenous NOB BOYS RESTROOM - C124 - WET WALLS - PIPE INSULATION OUTER COAT - TAR PAPER	NY ELAP 198.1				
			NY ELAP 198.6			Positive Stop Not Analyzed	
			NY ELAP 198.4			Not Analyzed	
27	27	Black Homogenous NOB BOYS RESTROOM - C124 - WET WALLS - PIPE INSULATION OUTER COAT - TAR PAPER	NY ELAP 198.1				
			NY ELAP 198.6			Positive Stop Not Analyzed	
			NY ELAP 198.4			Not Analyzed	
28	28	Brown Homogenous Fibrous BOYS RESTROOM - C124 - WET WALLS - PIPE INSULATION INNER COAT - PAPER	NY ELAP 198.1	95% Cellulose	3.3% Non-Fibrous	1.70% Chrysotile	1.7%
			NY ELAP 198.6				
			NY ELAP 198.4				
29	29	BOYS RESTROOM - C124 - WET WALLS - PIPE INSULATION INNER COAT - PAPER	NY ELAP 198.1			Positive Stop Not Analyzed	
			NY ELAP 198.6				
			NY ELAP 198.4				
30	30	BOYS RESTROOM - C124 - WET WALLS - PIPE INSULATION INNER COAT - PAPER	NY ELAP 198.1			Positive Stop Not Analyzed	
			NY ELAP 198.6				
			NY ELAP 198.4				

Comments: Samples7,8,9,13,14,15,41,42,43,69,70,71,93,94,95,96,97 & 98 analysis was terminated due to the presence of vermiculite. Results are inconclusive and must go for 198.8 method for further verification.

Equipment: PLM SCOPE Nikon Optiphot-2
TEM SCOPE #1 - Hitachi H-600

Zlatan Dimitrijevic
Laboratory Director

Sameh Youssef
PLM Analyst

Zlatan Dimitrijevic
TEM Analyst

NYS ELAP ID # 12003

NVLAP Lab Code 500081-0

METRO ANALYTICAL LABORATORIES
255 West 36th St., Suite #101
New York, NY 10018
p: (212) 695-0165 f: (212) 695-0183

ASBESTOS ANALYSIS of BULK SAMPLE by POLARIZED LIGHT MICROSCOPY and TRANSMISSION ELECTRON MICROSCOPY

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	Staten Island NY 10308	Location:	**50 Blauvelt Road**		
	P: (347) 276-2339 F: (631) 991-9143		**Miller ES - Various**	Sample Received:	03/06/2022
			Nanuet	PLM Analysis Date:	03/07/2022
Contact:	**Alex Rubin**	Sampled By:	A.R.	TEM Analysis Date:	03/07/2022
	M:	Sampled Date:	03/05/2022	Reported By:	Turiana Moreira
	E:	Turnaround Time:	24 hrs	Report Date:	03/08/2022

Summary of Analysis

LAB ID #	Client Sample #	Sample Description	Test	Fibrous Material	Non-Fibrous Material	Asbestos	Total Asbestos
31	31	Grey Homogenous Granular BOYS RESTROOM - C124 - FLOOR - SOFT FILLER MORTAR	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
32	32	Grey Homogenous Granular BOYS RESTROOM - C124 - FLOOR - SOFT FILLER MORTAR	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
33	33	Grey Homogenous Granular BOYS RESTROOM - C124 - FLOOR - C.T. THINSET / GROUT	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
34	34	Grey Homogenous Granular BOYS RESTROOM - C124 - FLOOR - C.T. THINSET / GROUT	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
35	35	White Homogenous Granular GIRLS RESTROOM - C126 - CEILING PLASTER - TOP LAYER	NY ELAP 198.1	1% Cellulose	97.15% Non-Fibrous	1.85% Chrysotile	1.9%
			NY ELAP 198.6				
			NY ELAP 198.4				
36	36	GIRLS RESTROOM - C126 - CEILING PLASTER - TOP LAYER	NY ELAP 198.1			Positive Stop Not Analyzed	
			NY ELAP 198.6				
			NY ELAP 198.4				
37	37	GIRLS RESTROOM - C126 - CEILING PLASTER - TOP LAYER	NY ELAP 198.1			Positive Stop Not Analyzed	
			NY ELAP 198.6				
			NY ELAP 198.4				
38	38	White Homogenous Granular GIRLS RESTROOM - C126 - CEILING PLASTER - MIDDLE LAYER	NY ELAP 198.1	3% Cellulose	94.46% Non-Fibrous	2.54% Chrysotile	2.5%
			NY ELAP 198.6				
			NY ELAP 198.4				
39	39	GIRLS RESTROOM - C126 - CEILING PLASTER - MIDDLE LAYER	NY ELAP 198.1			Positive Stop Not Analyzed	
			NY ELAP 198.6				
			NY ELAP 198.4				
40	40	GIRLS RESTROOM - C126 - CEILING PLASTER - MIDDLE LAYER	NY ELAP 198.1			Positive Stop Not Analyzed	
			NY ELAP 198.6				
			NY ELAP 198.4				

Comments: Samples7,8,9,13,14,15,41,42,43,69,70,71,93,94,95,96,97 & 98 analysis was terminated due to the presence of vermiculite. Results are inconclusive and must go for 198.8 method for further verification.

Equipment: PLM SCOPE Nikon Optiphot-2
TEM SCOPE #1 - Hitachi H-600

Zlatan Dimitrijevic
Laboratory Director

Sameh Youssef
PLM Analyst

Zlatan Dimitrijevic
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NYS ELAP ID # 12003

NVLAP Lab Code 500081-0

METRO ANALYTICAL LABORATORIES
255 West 36th St., Suite #101
New York, NY 10018
p: (212) 695-0165 f: (212) 695-0183

ASBESTOS ANALYSIS of BULK SAMPLE by POLARIZED LIGHT MICROSCOPY and TRANSMISSION ELECTRON MICROSCOPY

Client:	**Green Path Environmental Inc**	Contract:	**Nanuet UFSD**	**Metro Lab ID #:**	**B22030206**
Address:	79 Glover Street	Client Job #:	**1937.07.01**		
	Staten Island NY 10308	Location:	**50 Blauvelt Road**		
	P: (347) 276-2339 F: (631) 991-9143		**Miller ES - Various**	Sample Received:	03/06/2022
			Nanuet	PLM Analysis Date:	03/07/2022
Contact:	**Alex Rubin**	Sampled By:	A.R.	TEM Analysis Date:	03/07/2022
	M:	Sampled Date:	03/05/2022	Reported By:	Turiana Moreira
	E:	Turnaround Time:	24 hrs	Report Date:	03/08/2022

Summary of Analysis

LAB ID #	Client Sample #	Sample Description	Test	Fibrous Material	Non-Fibrous Material	Asbestos	Total Asbestos
41	41	Brown Homogenous Granular GIRLS RESTROOM - C126 - CEILING PLASTER - BOTTOM LAYER	NY ELAP 198.1		85% Non-Fibrous 15% Vermiculite	**Analysis Halted**	
			NY ELAP 198.6				
			NY ELAP 198.4				
42	42	Brown Homogenous Granular GIRLS RESTROOM - C126 - CEILING PLASTER - BOTTOM LAYER	NY ELAP 198.1		75% Non-Fibrous 25% Vermiculite	**Analysis Halted**	
			NY ELAP 198.6				
			NY ELAP 198.4				
43	43	Brown Homogenous Granular GIRLS RESTROOM - C126 - CEILING PLASTER - BOTTOM LAYER	NY ELAP 198.1		90% Non-Fibrous 10% Vermiculite	**Analysis Halted**	
			NY ELAP 198.6				
			NY ELAP 198.4				
44	44	White Homogenous Granular GIRLS RESTROOM - C126 - UPPER WALLS PLASTER - TOP LAYER	NY ELAP 198.1		100% Non-Fibrous	**None Detected**	
			NY ELAP 198.6				
			NY ELAP 198.4				
45	45	White Homogenous Granular GIRLS RESTROOM - C126 - UPPER WALLS PLASTER - TOP LAYER	NY ELAP 198.1		100% Non-Fibrous	**None Detected**	
			NY ELAP 198.6				
			NY ELAP 198.4				
46	46	White Homogenous Granular GIRLS RESTROOM - C126 - UPPER WALLS PLASTER - TOP LAYER	NY ELAP 198.1		100% Non-Fibrous	**None Detected**	
			NY ELAP 198.6				
			NY ELAP 198.4				
47	47	Brown Homogenous Granular GIRLS RESTROOM - C126 - UPPER WALLS PLASTER - BOTTOM LAYER	NY ELAP 198.1		100% Non-Fibrous	**None Detected**	
			NY ELAP 198.6				
			NY ELAP 198.4				
48	48	Brown Homogenous Granular GIRLS RESTROOM - C126 - UPPER WALLS PLASTER - BOTTOM LAYER	NY ELAP 198.1		100% Non-Fibrous	**None Detected**	
			NY ELAP 198.6				
			NY ELAP 198.4				
49	49	Brown Homogenous Granular GIRLS RESTROOM - C126 - UPPER WALLS PLASTER - BOTTOM LAYER	NY ELAP 198.1		100% Non-Fibrous	**None Detected**	
			NY ELAP 198.6				
			NY ELAP 198.4				
50	50	Beige Homogenous Granular GIRLS RESTROOM - C126 - LOWER WALLS - C.T. GROUT	NY ELAP 198.1		100% Non-Fibrous	**None Detected**	
			NY ELAP 198.6				
			NY ELAP 198.4				

Comments: Samples7,8,9,13,14,15,41,42,43,69,70,71,93,94,95,96,97 & 98 analysis was terminated due to the presence of vermiculite. Results are inconclusive and must go for 198.8 method for further verification.

Equipment: PLM SCOPE Nikon Optiphot-2
TEM SCOPE #1 - Hitachi H-600

Zlatan Dimitrijevic
Laboratory Director

Sameh Youssef
PLM Analyst

Zlatan Dimitrijevic
TEM Analyst

NYS ELAP ID # 12003

NVLAP Lab Code 500081-0

METRO ANALYTICAL LABORATORIES
255 West 36th St., Suite #101
New York, NY 10018
p: (212) 695-0165 f: (212) 695-0183

ASBESTOS ANALYSIS of BULK SAMPLE by POLARIZED LIGHT MICROSCOPY and TRANSMISSION ELECTRON MICROSCOPY

Client:	**Green Path Environmental Inc**	Contract:	**Nanuet UFSD**	**Metro Lab ID #:**	**B22030206**
Address:	79 Glover Street	Client Job #:	**1937.07.01**		
	Staten Island NY 10308	Location:	**50 Blauvelt Road**		
	P: (347) 276-2339 F: (631) 991-9143		**Miller ES - Various**	Sample Received:	03/06/2022
			Nanuet	PLM Analysis Date:	03/07/2022
Contact:	**Alex Rubin**	Sampled By:	A.R.	TEM Analysis Date:	03/07/2022
	M:	Sampled Date:	03/05/2022	Reported By:	Turiana Moreira
	E:	Turnaround Time:	24 hrs	Report Date:	03/08/2022

Summary of Analysis

LAB ID #	Client Sample #	Sample Description	Test	Fibrous Material	Non-Fibrous Material	Asbestos	Total Asbestos
51	51	Beige Homogenous Granular GIRLS RESTROOM - C126 - LOWER WALLS - C.T. GROUT	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
52	52	White Homogenous Granular GIRLS RESTROOM - C126 - LOWER WALLS - C.T. GROUT	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
53	53	Grey Homogenous Granular GIRLS RESTROOM - C126 - LOWER WALLS - C.T. THINSET	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
54	54	Grey Homogenous Granular GIRLS RESTROOM - C126 - LOWER WALLS - C.T. THINSET	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
55	55	Grey Homogenous Granular GIRLS RESTROOM - C126 - LOWER WALLS - C.T. THINSET	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
56	56	Grey Homogenous Granular GIRLS RESTROOM - C126 - LOWER WALLS - MORTAR	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
57	57	Grey Homogenous Granular GIRLS RESTROOM - C126 - LOWER WALLS - MORTAR	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
58	58	Grey Homogenous Granular GIRLS RESTROOM - C126 - LOWER WALLS - MORTAR	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
59	59	Black Homogenous NOB GIRLS RESTROOM - C126 - WET WALLS PIPE INSULATION OUTER COAT - TAR PAPER	NY ELAP 198.1				
			NY ELAP 198.6			2.2% Chrysotile	2.2%
			NY ELAP 198.4			Not Analyzed	
60	60	Black Homogenous NOB GIRLS RESTROOM - C126 - WET WALLS PIPE INSULATION OUTER COAT - TAR PAPER	NY ELAP 198.1				
			NY ELAP 198.6			Positive Stop Not Analyzed	
			NY ELAP 198.4			Not Analyzed	

Comments: Samples7,8,9,13,14,15,41,42,43,69,70,71,93,94,95,96,97 & 98 analysis was terminated due to the presence of vermiculite. Results are inconclusive and must go for 198.8 method for further verification.

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New York, NY 10018
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	M:	Sampled Date:	03/05/2022	Reported By:	Turiana Moreira
	E:	Turnaround Time:	24 hrs	Report Date:	03/08/2022

Summary of Analysis

LAB ID #	Client Sample #	Sample Description	Test	Fibrous Material	Non-Fibrous Material	Asbestos	Total Asbestos
61	61	Black Homogenous NOB GIRLS RESTROOM - C126 - WET WALLS PIPE INSULATION OUTER COAT - TAR PAPER	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4			**Positive Stop** **Not Analyzed** **Not Analyzed**	
62	62	Brown Homogenous Fibrous GIRLS RESTROOM - C126 - WET WALLS PIPE INSULATION INNER COAT - PAPER	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4	95% Cellulose	2.72% Non-Fibrous	**2.28% Chrysotile**	**2.3%**
63	63	GIRLS RESTROOM - C126 - WET WALLS PIPE INSULATION INNER COAT - PAPER	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4			**Positive Stop** **Not Analyzed**	
64	64	GIRLS RESTROOM - C126 - WET WALLS PIPE INSULATION INNER COAT - PAPER	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4			**Positive Stop** **Not Analyzed**	
65	65	Grey Homogenous Granular GIRLS RESTROOM - C126 - FLOOR - C.T. THINSET / GROUT	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4		100% Non-Fibrous	**None Detected**	
66	66	Grey Homogenous Granular GIRLS RESTROOM - C126 - FLOOR - C.T. THINSET / GROUT	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4		100% Non-Fibrous	**None Detected**	
67	67	Grey Homogenous Granular GIRLS RESTROOM - C126 - SOFT FILLER MORTAR	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4		100% Non-Fibrous	**None Detected**	
68	68	Grey Homogenous Granular GIRLS RESTROOM - C126 - SOFT FILLER MORTAR	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4		100% Non-Fibrous	**None Detected**	
69	69	White Homogenous Granular KINDERGARTEN RESTROOMS C132/C133 - CEILING PLASTER - TOP LAYER	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4		93% Non-Fibrous 7% Vermiculite	**Analysis Halted**	
70	70	White Homogenous Granular KINDERGARTEN RESTROOMS C132/C133 - CEILING PLASTER - TOP LAYER	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4		91% Non-Fibrous 9% Vermiculite	**Analysis Halted**	

Comments: Samples7,8,9,13,14,15,41,42,43,69,70,71,93,94,95,96,97 & 98 analysis was terminated due to the presence of vermiculite. Results are inconclusive and must go for 198.8 method for further verification.

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			Nanuet	PLM Analysis Date:	03/07/2022
Contact:	**Alex Rubin**	Sampled By:	A.R.	TEM Analysis Date:	03/07/2022
	M:	Sampled Date:	03/05/2022	Reported By:	Turiana Moreira
	E:	Turnaround Time:	24 hrs	Report Date:	03/08/2022

Summary of Analysis

LAB ID #	Client Sample #	Sample Description	Test	Fibrous Material	Non-Fibrous Material	Asbestos	Total Asbestos
71	71	White Homogenous Granular KINDERGARTEN RESTROOMS C132/C133 - CEILING PLASTER - TOP LAYER	NY ELAP 198.1		92% Non-Fibrous 8% Vermiculite	**Analysis Halted**	
			NY ELAP 198.6				
			NY ELAP 198.4				
72	72	Grey Homogenous Granular KINDERGARTEN RESTROOMS C132/C133 - CEILING PLASTER - BOTTOM LAYER	NY ELAP 198.1	2% Cellulose	96.32% Non-Fibrous	**1.68% Chrysotile**	**1.7%**
			NY ELAP 198.6				
			NY ELAP 198.4				
73	73	KINDERGARTEN RESTROOMS C132/C133 - CEILING PLASTER - BOTTOM LAYER	NY ELAP 198.1			**Positive Stop** **Not Analyzed**	
			NY ELAP 198.6				
			NY ELAP 198.4				
74	74	KINDERGARTEN RESTROOMS C132/C133 - CEILING PLASTER - BOTTOM LAYER	NY ELAP 198.1			**Positive Stop** **Not Analyzed**	
			NY ELAP 198.6				
			NY ELAP 198.4				
75	75	White Homogenous NOB KINDERGARTEN RESTROOMS C132/C133 - DOOR FRAME - CAULKING	NY ELAP 198.1				
			NY ELAP 198.6			**Inconclusive** **None Detected**	
			NY ELAP 198.4			**None Detected**	
76	76	White Homogenous NOB KINDERGARTEN RESTROOMS C132/C133 - DOOR FRAME - CAULKING	NY ELAP 198.1				
			NY ELAP 198.6			**Inconclusive** **None Detected**	
			NY ELAP 198.4			**None Detected**	
77	77	Brown Homogenous NOB KINDERGARTEN RESTROOMS C132/C133 - WALL PANELS GLUE	NY ELAP 198.1				
			NY ELAP 198.6			**Inconclusive** **None Detected**	
			NY ELAP 198.4			**None Detected**	
78	78	Brown Homogenous NOB KINDERGARTEN RESTROOMS C132/C133 - WALL PANELS GLUE	NY ELAP 198.1				
			NY ELAP 198.6			**Inconclusive** **None Detected**	
			NY ELAP 198.4			**None Detected**	
79	79	Grey Homogenous Granular KINDERGARTEN RESTROOMS C132/C133 - WALL PLASTER - BOTTOM LAYER	NY ELAP 198.1		100% Non-Fibrous	**None Detected**	
			NY ELAP 198.6				
			NY ELAP 198.4				
80	80	Grey Homogenous Granular KINDERGARTEN RESTROOMS C132/C133 - WALL PLASTER - BOTTOM LAYER	NY ELAP 198.1		100% Non-Fibrous	**None Detected**	
			NY ELAP 198.6				
			NY ELAP 198.4				

Comments: Samples7,8,9,13,14,15,41,42,43,69,70,71,93,94,95,96,97 & 98 analysis was terminated due to the presence of vermiculite. Results are inconclusive and must go for 198.8 method for further verification.

Equipment: PLM SCOPE Nikon Optiphot-2
TEM SCOPE #1 - Hitachi H-600

Zlatan Dimitrijevic
Laboratory Director

Sameh Youssef
PLM Analyst

Zlatan Dimitrijevic
TEM Analyst

NYS ELAP ID # 12003

NVLAP Lab Code 500081-0

METRO ANALYTICAL LABORATORIES
255 West 36th St., Suite #101
New York, NY 10018
p: (212) 695-0165 f: (212) 695-0183

ASBESTOS ANALYSIS of BULK SAMPLE by POLARIZED LIGHT MICROSCOPY and TRANSMISSION ELECTRON MICROSCOPY

Client:	**Green Path Environmental Inc**	Contract:	**Nanuet UFSD**	**Metro Lab ID #:**	**B22030206**
Address:	79 Glover Street	Client Job #:	**1937.07.01**		
	Staten Island NY 10308	Location:	**50 Blauvelt Road**		
	P: (347) 276-2339 F: (631) 991-9143		**Miller ES - Various**	Sample Received:	03/06/2022
			Nanuet	PLM Analysis Date:	03/07/2022
Contact:	**Alex Rubin**	Sampled By:	A.R.	TEM Analysis Date:	03/07/2022
	M:	Sampled Date:	03/05/2022	Reported By:	Turiana Moreira
	E:	Turnaround Time:	24 hrs	Report Date:	03/08/2022

Summary of Analysis

LAB ID #	Client Sample #	Sample Description	Test	Fibrous Material	Non-Fibrous Material	Asbestos	Total Asbestos
81	81	Grey Homogenous Granular KINDERGARTEN RESTROOMS C132/C133 - WALL PLASTER - BOTTOM LAYER	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
82	82	Grey Homogenous Granular KINDERGARTEN RESTROOMS C132/C133 - WALL PLASTER - TOP LAYER	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
83	83	White Homogenous Granular KINDERGARTEN RESTROOMS C132/C133 - WALL PLASTER - TOP LAYER	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
84	84	White Homogenous Granular KINDERGARTEN RESTROOMS C132/C133 - WALL PLASTER - TOP LAYER	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
85	85	Black Homogenous NOB KINDERGARTEN RESTROOMS C132/C133 - BEHIND C.T. COVEBASE - TAR PAPER	NY ELAP 198.1				
			NY ELAP 198.6			Inconclusive	None Detected
			NY ELAP 198.4				None Detected
86	86	Black Homogenous NOB KINDERGARTEN RESTROOMS C132/C133 - BEHIND C.T. COVEBASE - TAR PAPER	NY ELAP 198.1				
			NY ELAP 198.6			Inconclusive	None Detected
			NY ELAP 198.4				None Detected
87	87	White Homogenous NOB KINDERGARTEN RESTROOMS C132/C133 - BEHIND C.T. COVEBASE - GLUE	NY ELAP 198.1				
			NY ELAP 198.6			Inconclusive	None Detected
			NY ELAP 198.4				None Detected
88	88	White Homogenous NOB KINDERGARTEN RESTROOMS C132/C133 - BEHIND C.T. COVEBASE - GLUE	NY ELAP 198.1				
			NY ELAP 198.6			Inconclusive	None Detected
			NY ELAP 198.4				None Detected
89	89	Beige Homogenous Granular KINDERGARTEN RESTROOMS C132/C133 - FLOOR & COVE BASE C.T. GROUT	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
90	90	Beige Homogenous Granular KINDERGARTEN RESTROOMS C132/C133 - FLOOR & COVE BASE C.T. GROUT	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				

Comments: Samples7,8,9,13,14,15,41,42,43,69,70,71,93,94,95,96,97 & 98 analysis was terminated due to the presence of vermiculite. Results are inconclusive and must go for 198.8 method for further verification.

Equipment: PLM SCOPE Nikon Optiphot-2
TEM SCOPE #1 - Hitachi H-600

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Sameh Youssef
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NVLAP Lab Code 500081-0

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New York, NY 10018
p: (212) 695-0165 f: (212) 695-0183

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	Staten Island NY 10308	Location:	**50 Blauvelt Road**		
	P: (347) 276-2339 F: (631) 991-9143		**Miller ES - Various**	Sample Received:	03/06/2022
			Nanuet	PLM Analysis Date:	03/07/2022
Contact:	**Alex Rubin**	Sampled By:	A.R.	TEM Analysis Date:	03/07/2022
	M:	Sampled Date:	03/05/2022	Reported By:	Turiana Moreira
	E:	Turnaround Time:	24 hrs	Report Date:	03/08/2022

Summary of Analysis

LAB ID #	Client Sample #	Sample Description	Test	Fibrous Material	Non-Fibrous Material	Asbestos	Total Asbestos
91	91	Brown / Grey Homogenous NOB KINDERGARTEN RESTROOMS C132/C133 - FLOOR - THINSET W/ GLUE TO C.T.	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4			 2.5% Chrysotile Not Analyzed	2.5%
92	92	Brown / Grey Homogenous NOB KINDERGARTEN RESTROOMS C132/C133 - FLOOR - THINSET W/ GLUE TO C.T.	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4			 Positive Stop Not Analyzed Not Analyzed	
93	93	Brown Homogenous Granular KINDERGARTEN RESTROOMS C132/C133 - UPPER CEILING PLASTER - BOTTOM LAYER	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4		70% Non-Fibrous 30% Vermiculite	Analysis Halted	
94	94	Brown Homogenous Granular KINDERGARTEN RESTROOMS C132/C133 - UPPER CEILING PLASTER - BOTTOM LAYER	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4		80% Non-Fibrous 20% Vermiculite	Analysis Halted	
95	95	Brown Homogenous Granular KINDERGARTEN RESTROOMS C132/C133 - UPPER CEILING PLASTER - BOTTOM LAYER	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4		75% Non-Fibrous 25% Vermiculite	Analysis Halted	
96	96	White Homogenous Granular KINDERGARTEN RESTROOMS C132/C133 - UPPER CEILING PLASTER - TOP LAYER	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4		70% Non-Fibrous 30% Vermiculite	Analysis Halted	
97	97	White Homogenous Granular KINDERGARTEN RESTROOMS C132/C133 - UPPER CEILING PLASTER - TOP LAYER	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4		85% Non-Fibrous 15% Vermiculite	Analysis Halted	
98	98	White Homogenous Granular KINDERGARTEN RESTROOMS C132/C133 - UPPER CEILING PLASTER - TOP LAYER	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4		80% Non-Fibrous 20% Vermiculite	Analysis Halted	
99	99	Yellow / Brown Homogenous NOB KINDERGARTEN RESTROOMS C132/C133 - WALL PEDBOARD W/ GLUE	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4			 2.5% Chrysotile Not Analyzed	2.5%
100	100	Yellow / Brown Homogenous NOB KINDERGARTEN RESTROOMS C132/C133 - WALL PEDBOARD W/ GLUE	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4			 Positive Stop Not Analyzed Not Analyzed	

Comments: Samples7,8,9,13,14,15,41,42,43,69,70,71,93,94,95,96,97 & 98 analysis was terminated due to the presence of vermiculite. Results are inconclusive and must go for 198.8 method for further verification.

Equipment: PLM SCOPE Nikon Optiphot-2
TEM SCOPE #1 - Hitachi H-600

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Sameh Youssef
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New York, NY 10018
p: (212) 695-0165 f: (212) 695-0183

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	Staten Island NY 10308	Location:	**50 Blauvelt Road**		
	P: (347) 276-2339 F: (631) 991-9143		**Miller ES - Various**	Sample Received:	03/06/2022
			Nanuet	PLM Analysis Date:	03/07/2022
Contact:	**Alex Rubin**	Sampled By:	A.R.	TEM Analysis Date:	03/07/2022
	M:	Sampled Date:	03/05/2022	Reported By:	Turiana Moreira
	E:	Turnaround Time:	24 hrs	Report Date:	03/08/2022

Summary of Analysis

LAB ID #	Client Sample #	Sample Description	Test	Fibrous Material	Non-Fibrous Material	Asbestos	Total Asbestos
101	101	Brown Homogenous NOB KINDERGARTEN RESTROOMS C132/C133 - GLUE BEHIND PEDBOARD	NY ELAP 198.1				
			NY ELAP 198.6			Inconclusive	None Detected
			NY ELAP 198.4				None Detected
102	102	Brown Homogenous NOB KINDERGARTEN RESTROOMS C132/C133 - GLUE BEHIND PEDBOARD	NY ELAP 198.1				
			NY ELAP 198.6			Inconclusive	None Detected
			NY ELAP 198.4				None Detected
103	103	Grey Homogenous Fibrous KINDERGARTEN RESTROOMS C132/C133 - WET WALL PIPE INSULATION	NY ELAP 198.1	40% Fiberglass	60% Non-Fibrous		None Detected
			NY ELAP 198.6				
			NY ELAP 198.4				
104	104	Grey Homogenous Fibrous KINDERGARTEN RESTROOMS C132/C133 - WET WALL PIPE INSULATION	NY ELAP 198.1	25% Fiberglass	75% Non-Fibrous		None Detected
			NY ELAP 198.6				
			NY ELAP 198.4				
105	105	Grey Homogenous Fibrous KINDERGARTEN RESTROOMS C132/C133 - WET WALL PIPE INSULATION	NY ELAP 198.1	25% Fiberglass	75% Non-Fibrous		None Detected
			NY ELAP 198.6				
			NY ELAP 198.4				
106	106	White Homogenous Granular RESTROOMS C128/C129 + C134/C135 - CEILING PLASTER MATERIAL	NY ELAP 198.1		100% Non-Fibrous		None Detected
			NY ELAP 198.6				
			NY ELAP 198.4				
107	107	White Homogenous Granular RESTROOMS C128/C129 + C134/C135 - CEILING PLASTER MATERIAL	NY ELAP 198.1		100% Non-Fibrous		None Detected
			NY ELAP 198.6				
			NY ELAP 198.4				
108	108	White Homogenous Granular RESTROOMS C128/C129 + C134/C135 - CEILING PLASTER MATERIAL	NY ELAP 198.1		100% Non-Fibrous		None Detected
			NY ELAP 198.6				
			NY ELAP 198.4				
109	109	Grey Homogenous Granular RESTROOMS C128/C129 - UPPER WALL PLASTER - BOTTOM LAYER	NY ELAP 198.1		100% Non-Fibrous		None Detected
			NY ELAP 198.6				
			NY ELAP 198.4				
110	110	Grey Homogenous Granular RESTROOMS C128/C129 - UPPER WALL PLASTER - BOTTOM LAYER	NY ELAP 198.1		100% Non-Fibrous		None Detected
			NY ELAP 198.6				
			NY ELAP 198.4				

Comments: Samples7,8,9,13,14,15,41,42,43,69,70,71,93,94,95,96,97 & 98 analysis was terminated due to the presence of vermiculite. Results are inconclusive and must go for 198.8 method for further verification.

Equipment: PLM SCOPE Nikon Optiphot-2
TEM SCOPE #1 - Hitachi H-600

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Sameh Youssef
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TEM Analyst

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NVLAP Lab Code 500081-0

METRO ANALYTICAL LABORATORIES
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New York, NY 10018
p: (212) 695-0165 f: (212) 695-0183

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Client:	**Green Path Environmental Inc**	Contract:	**Nanuet UFSD**	**Metro Lab ID #:**	**B22030206**
Address:	79 Glover Street	Client Job #:	**1937.07.01**		
	Staten Island NY 10308	Location:	**50 Blauvelt Road**		
	P: (347) 276-2339 F: (631) 991-9143		**Miller ES - Various**	Sample Received:	03/06/2022
			Nanuet	PLM Analysis Date:	03/07/2022
Contact:	**Alex Rubin**	Sampled By:	A.R.	TEM Analysis Date:	03/07/2022
	M:	Sampled Date:	03/05/2022	Reported By:	Turiana Moreira
	E:	Turnaround Time:	24 hrs	Report Date:	03/08/2022

Summary of Analysis

LAB ID #	Client Sample #	Sample Description	Test	Fibrous Material	Non-Fibrous Material	Asbestos	Total Asbestos
111	111	Grey Homogenous Granular RESTROOMS C128/C129 - UPPER WALL PLASTER - BOTTOM LAYER	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
112	112	White Homogenous Granular RESTROOMS C128/C129 - UPPER WALL PLASTER - BOTTOM LAYER	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
113	113	White Homogenous Granular RESTROOMS C128/C129 - UPPER WALL PLASTER - BOTTOM LAYER	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
114	114	White Homogenous Granular RESTROOMS C128/C129 - UPPER WALL PLASTER - BOTTOM LAYER	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
115	115	Grey Homogenous Granular RESTROOMS C134/C135 - WALL - CMU BLOCK	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
116	116	Grey Homogenous Granular RESTROOMS C134/C135 - WALL - CMU BLOCK	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
117	117	Tan Homogenous Granular RESTROOMS C134/C135 + C128/C129 - WALL C.T. GROUT	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
118	118	Tan Homogenous Granular RESTROOMS C134/C135 + C128/C129 - WALL C.T. GROUT	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
119	119	Tan Homogenous Granular RESTROOMS C134/C135 + C128/C129 - WALL C.T. GROUT	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
120	120	Grey Homogenous Granular RESTROOMS C134/C135 + C128/C129 - WALL C.T. THINSET MORTAR	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				

Comments: Samples7,8,9,13,14,15,41,42,43,69,70,71,93,94,95,96,97 & 98 analysis was terminated due to the presence of vermiculite. Results are inconclusive and must go for 198.8 method for further verification.

Equipment: PLM SCOPE Nikon Optiphot-2
TEM SCOPE #1 - Hitachi H-600

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Contact:	**Alex Rubin**	Sampled By:	A.R.	TEM Analysis Date:	03/07/2022
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	E:	Turnaround Time:	24 hrs	Report Date:	03/08/2022

Summary of Analysis

LAB ID #	Client Sample #	Sample Description	Test	Fibrous Material	Non-Fibrous Material	Asbestos	Total Asbestos
121	121	Grey Homogenous Granular RESTROOMS C134/C135 + C128/C129 - WALL C.T. THINSET MORTAR	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4		100% Non-Fibrous	None Detected	
122	122	Grey Homogenous Granular RESTROOMS C134/C135 + C128/C129 - WALL C.T. THINSET MORTAR	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4		100% Non-Fibrous	None Detected	
123	123	Grey Homogenous Granular RESTROOMS C134/C135 + C128/C129 - WALL C.T. MORTAR	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4		100% Non-Fibrous	None Detected	
124	124	Grey Homogenous Granular RESTROOMS C134/C135 + C128/C129 - WALL C.T. MORTAR	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4		100% Non-Fibrous	None Detected	
125	125	Grey Homogenous Granular RESTROOMS C134/C135 + C128/C129 - WALL C.T. MORTAR	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4		100% Non-Fibrous	None Detected	
126	126	Black Homogenous NOB RESTROOMS C134/C135 + C128/C129 - WET WALL PIPE INSUL OUTER LYR - TAR PAPER	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4			Inconclusive None Detected None Detected	
127	127	Black Homogenous NOB RESTROOMS C134/C135 + C128/C129 - WET WALL PIPE INSUL OUTER LYR - TAR PAPER	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4			Inconclusive None Detected 1.6% Chrysotile	1.6%
128	128	Black Homogenous NOB RESTROOMS C134/C135 + C128/C129 - WET WALL PIPE INSUL OUTER LYR - TAR PAPER	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4			Inconclusive None Detected Positive Stop Not Analyzed	
129	129	Brown Homogenous Fibrous RESTROOMS C134/C135 + C128/C129 - WET WALL PIPE INSUL INNER LAYER - PAPER	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4	100% Cellulose		None Detected	
130	130	Brown Homogenous Fibrous RESTROOMS C134/C135 + C128/C129 - WET WALL PIPE INSUL INNER LAYER - PAPER	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4	100% Cellulose		None Detected	

Comments: Samples7,8,9,13,14,15,41,42,43,69,70,71,93,94,95,96,97 & 98 analysis was terminated due to the presence of vermiculite. Results are inconclusive and must go for 198.8 method for further verification.

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	P: (347) 276-2339 F: (631) 991-9143		**Miller ES - Various**	Sample Received:	03/06/2022
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Contact:	**Alex Rubin**	Sampled By:	A.R.	TEM Analysis Date:	03/07/2022
	M:	Sampled Date:	03/05/2022	Reported By:	Turiana Moreira
	E:	Turnaround Time:	24 hrs	Report Date:	03/08/2022

Summary of Analysis

LAB ID #	Client Sample #	Sample Description	Test	Fibrous Material	Non-Fibrous Material	Asbestos	Total Asbestos
131	131	Brown Homogenous Fibrous RESTROOMS C134/C135 + C128/C129 - WET WALL PIPE INSUL INNER LAYER - PAPER	NY ELAP 198.1	100% Cellulose		None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
132	132	Black Homogenous NOB RESTROOMS C134/C135 - IN-WALL RADIATOR PIPE INSULATION OUTER LAYER - TAR PAPER	NY ELAP 198.1				3.0%
			NY ELAP 198.6			3.0% Chrysotile	
			NY ELAP 198.4			Not Analyzed	
133	133	Black Homogenous NOB RESTROOMS C134/C135 - IN-WALL RADIATOR PIPE INSULATION OUTER LAYER - TAR PAPER	NY ELAP 198.1				
			NY ELAP 198.6			Positive Stop Not Analyzed	
			NY ELAP 198.4			Not Analyzed	
134	134	Black Homogenous NOB RESTROOMS C134/C135 - IN-WALL RADIATOR PIPE INSULATION OUTER LAYER - TAR PAPER	NY ELAP 198.1				
			NY ELAP 198.6			Positive Stop Not Analyzed	
			NY ELAP 198.4			Not Analyzed	
135	135	Beige Homogenous Fibrous RESTROOMS C134/C135 - IN-WALL RADIATOR PIPE INSULATION INNER LAYER - AIRCELL	NY ELAP 198.1	85% Cellulose	1.67% Non-Fibrous	13.33% Chrysotile	13.3%
			NY ELAP 198.6				
			NY ELAP 198.4				
136	136	RESTROOMS C134/C135 - IN-WALL RADIATOR PIPE INSULATION INNER LAYER - AIRCELL	NY ELAP 198.1			Positive Stop Not Analyzed	
			NY ELAP 198.6				
			NY ELAP 198.4				
137	137	RESTROOMS C134/C135 - IN-WALL RADIATOR PIPE INSULATION INNER LAYER - AIRCELL	NY ELAP 198.1			Positive Stop Not Analyzed	
			NY ELAP 198.6				
			NY ELAP 198.4				
138	138	Grey Homogenous Fibrous RESTROOMS C128/C129 - WET WALL ELBOW INSULATION	NY ELAP 198.1	30% Cellulose	64.67% Non-Fibrous	5.33% Chrysotile	5.3%
			NY ELAP 198.6				
			NY ELAP 198.4				
139	139	RESTROOMS C128/C129 - WET WALL ELBOW INSULATION	NY ELAP 198.1			Positive Stop Not Analyzed	
			NY ELAP 198.6				
			NY ELAP 198.4				
140	140	RESTROOMS C128/C129 - WET WALL ELBOW INSULATION	NY ELAP 198.1			Positive Stop Not Analyzed	
			NY ELAP 198.6				
			NY ELAP 198.4				

Comments: Samples7,8,9,13,14,15,41,42,43,69,70,71,93,94,95,96,97 & 98 analysis was terminated due to the presence of vermiculite. Results are inconclusive and must go for 198.8 method for further verification.

Equipment: PLM SCOPE Nikon Optiphot-2
TEM SCOPE #1 - Hitachi H-600

Zlatan Dimitrijevic
Laboratory Director

Sameh Youssef
PLM Analyst

Zlatan Dimitrijevic
TEM Analyst

NYS ELAP ID # 12003

NVLAP Lab Code 500081-0

METRO ANALYTICAL LABORATORIES
255 West 36th St., Suite #101
New York, NY 10018
p: (212) 695-0165 f: (212) 695-0183

ASBESTOS ANALYSIS of BULK SAMPLE by POLARIZED LIGHT MICROSCOPY and TRANSMISSION ELECTRON MICROSCOPY

Client:	**Green Path Environmental Inc**	Contract:	**Nanuet UFSD**	**Metro Lab ID #:**	**B22030206**
Address:	79 Glover Street	Client Job #:	**1937.07.01**		
	Staten Island NY 10308	Location:	**50 Blauvelt Road**		
	P: (347) 276-2339 F: (631) 991-9143		**Miller ES - Various**	Sample Received:	03/06/2022
			Nanuet	PLM Analysis Date:	03/07/2022
Contact:	**Alex Rubin**	Sampled By:	A.R.	TEM Analysis Date:	03/07/2022
	M:	Sampled Date:	03/05/2022	Reported By:	Turiana Moreira
	E:	Turnaround Time:	24 hrs	Report Date:	03/08/2022

Summary of Analysis

LAB ID #	Client Sample #	Sample Description	Test	Fibrous Material	Non-Fibrous Material	Asbestos	Total Asbestos
141	141	Grey Homogenous Granular RESTROOMS C128/C129/C134/C135 - FLOOR - C.T. GROUT	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
142	142	Grey Homogenous Granular RESTROOMS C128/C129/C134/C135 - FLOOR - C.T. GROUT	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
143	143	Grey Homogenous Granular RESTROOMS C128/C129/C134/C135 - FLOOR - C.T. THINSET MORTAR	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
144	144	Grey Homogenous Granular RESTROOMS C128/C129/C134/C135 - FLOOR - C.T. THINSET MORTAR	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
145	145	Grey Homogenous Granular THROUGHOUT SCHOOL HALLWAY - FLOOR - TERRAZZO	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
146	146	Grey Homogenous Granular THROUGHOUT SCHOOL HALLWAY - FLOOR - TERRAZZO	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				

Comments: Samples7,8,9,13,14,15,41,42,43,69,70,71,93,94,95,96,97 & 98 analysis was terminated due to the presence of vermiculite. Results are inconclusive and must go for 198.8 method for further verification.

Equipment: PLM SCOPE Nikon Optiphot-2
TEM SCOPE #1 - Hitachi H-600

Zlatan Dimitrijevic
Laboratory Director

Sameh Youssef
PLM Analyst

Zlatan Dimitrijevic
TEM Analyst

NYS ELAP ID # 12003

NVLAP Lab Code 500081-0

METRO ANALYTICAL LABORATORIES
255 West 36th St., Suite #101
New York, NY 10018
p: (212) 695-0165 f: (212) 695-0183

Report Notes

General Notes and Disclaimers

- The samples analyzed in this report were not collected by this laboratory - they were received from the client, or an agent of the client, in good condition, unless otherwise noted.
- All results are calculated based on client-provided samples and / or measurements and fall within the acceptable Quality Control limits, unless otherwise noted.
- The report shall not be reproduced, except in full, without the written approval of the laboratory.
- This report relates only to the samples tested. It may not be used by the client to claim project endorsement by NVLAP, NYS ELAP, or any other government agency.
- All samples will be properly disposed of after 60 days.
- Quality Control data (including 95% confidence limits, laboratory / analysis accuracy and precision) is available upon request.

Notes Regarding Asbestos Testing

- Air Sample Analysis by Phase Contrast Microscopy (PCM) adheres to Method NIOSH-7400. Results < 7 fibers / mm^2 are statistically insignificant.
- Percentages are calculated using the EPA equivalent Stratified Point-Count Method.
- Bulk Sample Analysis by Polarized Light Microscopy (PLM) Friable adheres to EPA/600/M4-082-20 or NYS ELAP 198.1.
- Bulk Sample Analysis by Polarized Light Microscopy (PLM) NOB adheres to NYS ELAP 198.6. This method does not remove vermiculite and may underestimate the level of asbestos present in a sample containing greater than 10% vermiculite.
- All inhomogeneous layers of the bulk samples were analyzed separately.
- Analytical results are sometimes based on the residue percentage(s) provided by the client along with the filters. Trace denotes asbestos detected at < 1%. Smiliarly, samples below quantitation limit (RL) are reported with a less than sign (<).
- Polarized Light Microscopy is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Quantitative TEM is currently the only method that can be used to determine if this material can be considered or treated as non-asbestos containing.
- Bulk Sample Analysis by Transmission Electron Microscopy (TEM) NOB adheres to NYS ELAP Method 198.4.
- Air Sample Analysis by Transmission Electron Microscopy (TEM) adheres to Method EPA CFR Part 763 Final Rule (AHERA).
- Air Sample Analysis by Transmission Electron Microscopy (TEM) Worksheets are available upon request.

Green Path
Environmental, Inc

BULK SAMPLE DATA AND CHAIN OF CUSTODY FORM

79 Glover Street, Suite 1, Staten Island, NY 10308
T. (347) 276-2839 • F. (646) 774-0354

Please e-mail results to: info@gpe.nyc and office@gpe.nyc

Client name: Nanuet UFSD	**LAB ID No.:** B22030206	**Date:** 3/5/22 **Time:** 9:15AM-5:00pm
Project address: 50 Blauvelt Rd, Nanuet - Miller ES	**Green Path Project #** 1937.07.01 **PO #:**	**Inspector/investigator name:** Alexander Rubin
Sampling Areas: Various	**Analysis Requested:** TAT ☐ Rush ☐ 12 Hr ☒ 24 Hr ☐ 48 Hr ☐ 72 Hr ☐ Other	**Comments:** Stop at first positive in the each homogeneous group

H.A.	SAMPLE ID	SAMPLE LOCATION	SAMPLE DESCRIPTION	COLOR	Q/TY SQ FT	Q/TY LN. FT	MATERIAL CONDITION
1	1	Boys Restroom - C124	Ceiling Plaster - Top Layer	white	253		Damaged
	2						
	3						
2	4		- Middle Layer	white			
	5						
	6						
3	7		- Bottom Layer	Brown			
	8						
	9						
4	10		Upper Wall Plaster - Top Layer	white	240		
	11						
	12						
5	13		- Bottom Layer	Brown			
	14						
	15						
		4	4			4	

☒ PLM ☒ NOB PLM ☒ NOB TEM [ ] TEM DUST WIPE - ASTM D6480-05 [ ] OTHER Specify:

Client Manager: Scott Graber - 917-623-2411

Chain Of Custody

Relinquished by: (Full Name & Signature)	Date & Time	Method of Submittal	Received by: (Full Name & Signature)	Date & Time
1. A. Rubin				3/6 3:44pm

Lab Information

Analyzed by: (Full Name)	Signature	Date	Analyzed by: (Full Name)	Signature	Date
1.			2.		

Green Path
Environmental, Inc

BULK SAMPLE DATA AND CHAIN OF CUSTODY FORM

79 Glover Street, Suite 1, Staten Island, NY 10308
T. (347) 276-2339 • F. (646) 774-0354

Please e-mail results to: info@gpe.nyc and office@gpe.nyc

Client name: Nanuet UFSD	**LAB ID No.:** B22030206	**Date:** 3/5/22 **Time:** 9:15AM-5pm
Project address: 50 Blauvelt Rd, Nanuet - Miller ES	**Green Path Project #** 1937.07.01 **PO #:**	**Inspector/investigator name:** Alexander Rubin
Sampling Areas: Various	**Analysis Requested:** TAT ☐ Rush ☐ 12 Hr ☒ 24 Hr ☐ 48 Hr ☐ 72 Hr ☐ Other	**Comments:** Stop at first positive in the each homogeneous group

H.A.	SAMPLE ID	SAMPLE LOCATION	SAMPLE DESCRIPTION	COLOR	Q/TY SQ FT	Q/TY LN. FT	MATERIAL CONDITION
6	16	Boys Restroom - C124	Lower walls - C.T. grout	white	360		Damaged
	17						
	18						
7	19		- C.T. thinset	Grey			
	20						
	21						
8	22		- mortar	D. Gray			
	23						
	24						
9	25		wet walls pipe insulation	Black		160	
	26		outer coat - TAR PAPER				
	27						
10	28		wet walls pipe insulation	Brown			
	29		inner coat - PAPER				
	30						
		"	"				"

☒ PLM ☒ NOB PLM ☒ NOB TEM ☐ TEM DUST WIPE - ASTM D6480-05 ☐ OTHER Specify:

Client Manager: Scott Graber - 917-623-2411

Chain Of Custody

Relinquished by: (Full Name & Signature)	Date & Time	Method of Submittal	Received by: (Full Name & Signature)	Date & Time
1. A. Rubin				3/6/22 3:44pm

Lab Information

Analyzed by: (Full Name)	Signature	Date	Analyzed by: (Full Name)	Signature	Date
1.			2.		

Green Path
Environmental, Inc

BULK SAMPLE DATA AND CHAIN OF CUSTODY FORM

79 Glover Street, Suite 1, Staten Island, NY 10308
T. (347) 276-2339 • F. (646) 774-0354

Please e-mail results to: info@gpe.nyc and office@gpe.nyc

Client name: Nanuet UFSD	**LAB ID No.:** B22030206	**Date:** 3/5/22 **Time:** 9:15AM - 5:00pm
Project address: 50 Blauvelt Rd, Nanuet - Miller ES	**Green Path Project #** 1937.07.01 **PO #:**	**Inspector/investigator name:** Alexander Rubin
Sampling Areas: Various	**Analysis Requested:** TAT ☐ Rush ☐ 12 Hr ☒ 24 Hr ☐ 48 Hr ☐ 72 Hr ☐ Other	**Comments:** Stop at first positive in the each homogeneous group

H.A.	SAMPLE ID	SAMPLE LOCATION	SAMPLE DESCRIPTION	COLOR	Q/TY SQ FT	Q/TY LN. FT	MATERIAL CONDITION
11	31	Boys Restroom - C124	FLOOR - Soft Filler Mortar	Brown	253		Damaged
	32						
12	33		- C.T. Thinset/Grout	Gray			
	34						
13	35	GIRLS Restroom - C126	Ceiling Plaster - Top Layer	white	208		Damaged
	36						
	37						
14	38		- Middle Layer	white			
	39						
	40						
15	41		- Bottom Layer	Brown			
	42						
	43						
16	44		Copper walls Plaster - Top Layer	white	240		
	45						
	46						

☒ PLM ☒ NOB PLM ☒ NOB TEM ☐ TEM DUST WIPE - ASTM D6480-05 ☐ OTHER Specify:

Client Manager: Scott Graber - 917-623-2411

Chain Of Custody

Relinquished by: (Full Name & Signature)	Date & Time	Method of Submittal	Received by: (Full Name & Signature)	Date & Time
1. A. Rubin				3/6/22 8:24PM

Lab Information

Analyzed by: (Full Name)	Signature	Date	Analyzed by: (Full Name)	Signature	Date
1.			2.		

Green Path
Environmental, Inc

BULK SAMPLE DATA AND CHAIN OF CUSTODY FORM

79 Glover Street, Suite 1, Staten Island, NY 10308
T. (347) 276-2339 • F. (646) 774-0354

Please e-mail results to: info@gpe.nyc and office@gpe.nyc

Client name: Nanuet UFSD	LAB ID No.: B2203020 6	Date: 3/5/22 Time: 9:15AM - 5:00pm
Project address: 50 Blauvelt Rd, Nanuet - Miller ES	Green Path Project # 1937.07.01 PO #:	Inspector/investigator name: Alexander Rubin
Sampling Areas: Various	Analysis Requested: TAT ☐ Rush ☐ 12 Hr ☒ 24 Hr ☐ 48 Hr ☐ 72 Hr ☐ Other	Comments: Stop at first positive in the each homogeneous group

H.A.	SAMPLE ID	SAMPLE LOCATION	SAMPLE DESCRIPTION	COLOR	Q/TY SQ FT	Q/TY LN. FT	MATERIAL CONDITION
17	47	GR/S Restroom - C 126	Upper walls Plaster-Bottom Layer	Brown	240		Damaged
	48						
	49						
18	50		Lower walls - C.T. grout	white	420		
	51						
	52						
19	53		- C.T. thinset	Gray			
	54						
	55						
20	56		- mortar	D. Gray			
	57						
	58						
21	59		wet walls pipe insulation	Black		160	
	60		outer coat - TAR PAPER				
	61						
	~~62~~	4	4			4	

☒ PLM ☒ NOB PLM ☒ NOB TEM ☐ TEM DUST WIPE - ASTM D6480-05 ☐ OTHER Specify:

Client Manager: Scott Graber - 917-623-2411

Chain Of Custody

Relinquished by: (Full Name & Signature)	Date & Time	Method of Submittal	Received by: (Full Name & Signature)	Date & Time
1. A. Rubin			Janet	3/6/22 8:24pm

Lab Information

Analyzed by: (Full Name)	Signature	Date	Analyzed by: (Full Name)	Signature	Date
1.			2.		

Green Path
Environmental, Inc

BULK SAMPLE DATA AND CHAIN OF CUSTODY FORM

79 Glover Street, Suite 1, Staten Island, NY 10308
T. (347) 276-2339 • F. (646) 774-0354

Please e-mail results to: info@gpe.nyc and office@gpe.nyc

Client name: Nanuet UFSD	**LAB ID No:** B22030206	**Date:** 3/5/22 **Time:** 9:15AM - 5:00pm
Project address: 50 Blauvelt Rd, Nanuet - Miller ES	**Green Path Project #** 1937.07.01 **PO #:**	**Inspector/investigator name:** Alexander Rubin
Sampling Areas: Various	**Analysis Requested:** TAT ☐ Rush ☐ 12 Hr ☒ 24 Hr ☐ 48 Hr ☐ 72 Hr ☐ Other	**Comments:** Stop at first positive in the each homogeneous group

H.A.	SAMPLE ID	SAMPLE LOCATION	SAMPLE DESCRIPTION	COLOR	Q/TY SQ FT	Q/TY LN. FT	MATERIAL CONDITION
22	62	Girls Restroom - C126	Wet Walls - Pipe Insulation	Brown		160	Damaged
	63	↓	Inner coat - Paper	↓		↓	↓
	64	↓	↓	↓		↓	↓
23	65	↓	Floor - C.T. Thinset/Grout	Gray	208	↓	↓
	66	↓	↓	↓	↓	↓	↓
24	67	↓	- Soft Filler Mortar	Brown	↓	↓	↓
	68	↓	↓	↓	↓	↓	↓
25	69	Kindergarten Restrooms C132/C133	Ceiling Plaster - Top Layer	white	48	↓	↓
	70	↓	↓	↓	↓	↓	↓
	71	↓	↓	↓	↓	↓	↓
26	72	↓	- Bottom Layer	Brown	↓	↓	↓
	73	↓	↓	↓	↓	↓	↓
	74	↓	↓	↓	↓	↓	↓
27	75	↓	Door Frame - Ceiling	white	1	↓	↓
	76	↓	↓	↓	↓	↓	↓

☒ PLM ☒ NOB PLM ☒ NOB TEM ☐ TEM DUST WIPE - ASTM D6480-05 ☐ OTHER Specify:

Client Manager: Scott Graber - 917-623-2411

Chain Of Custody

Relinquished by: (Full Name & Signature)	Date & Time	Method of Submittal	Received by: (Full Name & Signature)	Date & Time
1. A. Rubin			Janet	3/6/22 8:44 am

Lab Information

Analyzed by: (Full Name)	Signature	Date	Analyzed by: (Full Name)	Signature	Date
1.			2.		

Green Path
Environmental, Inc

BULK SAMPLE DATA AND CHAIN OF CUSTODY FORM

79 Glover Street, Suite 1, Staten Island, NY 10308
T. (347) 276-2339 • F. (646) 774-0354

Please e-mail results to: info@gpe.nyc and office@gpe.nyc

Client name: Nanuet UFSD	LAB ID No.: B220302206	Date: 3/5/22 Time: 9:15AM-5:00pm
Project address: 50 Blauvelt Rd, Nanuet - Miller ES	Green Path Project # 1937.07.01 PO #:	Inspector/investigator name: Alexander Rubin
Sampling Areas: Various	Analysis Requested: TAT ☐ Rush ☐ 12 Hr ☒ 24 Hr ☐ 48 Hr ☐ 72 Hr ☐ Other	Comments: Stop at first positive in the each homogeneous group

H.A.	SAMPLE ID	SAMPLE LOCATION	SAMPLE DESCRIPTION	COLOR	Q/TY SQ FT	Q/TY LN. FT	MATERIAL CONDITION
28	77	Kindergarten Restroom's C132/C133	wall paint's glue	Brown	120		Damaged
	78			↓	↓		
29	79		wall Plaster-Bottom layer	Gray	240		
	80						
	81						
30	82		-Top layer	white			
	83						
	84						
31	85		Behind C.T. Cove Base-Tar Paper	Black	8		
	86						
32	87		-Glue	white	8		
	88						
33	89		Floor & Cove Base C.T. grout	Brown	48		
	90						
34	91		Floor - Thinset w/glue	Gray/Brown	48		
	92		To C.T.				

☒ PLM ☒ NOB PLM ☒ NOB TEM ☐ TEM DUST WIPE - ASTM D6480-05 ☐ OTHER Specify:

Client Manager: Scott Graber - 917-623-2411

Chain Of Custody				
Relinquished by: (Full Name & Signature) A. Rubin	Date & Time	Method of Submittal	Received by: (Full Name & Signature)	Date & Time
1.				3/6/22 8:44pm

Lab Information

Analyzed by: (Full Name)	Signature	Date	Analyzed by: (Full Name)	Signature	Date
1.			2.		

Green Path
Environmental, Inc

BULK SAMPLE DATA AND CHAIN OF CUSTODY FORM

79 Glover Street, Suite 1, Staten Island, NY 10308
T. (347) 276-2339 • F. (646) 774-0354

Please e-mail results to: info@gpe.nyc and office@gpe.nyc

Client name: Nanuet UFSD	**LAB ID No.:** B22030206	**Date:** 3/6/22 **Time:** 9:30AM – 1pm
Project address: 50 Blauvelt Rd, Nanuet - Miller ES	**Green Path Project #** 1937.07.01 **PO #:**	**Inspector/investigator name:** Alexander Rubin
Sampling Areas: Various	**Analysis Requested:** TAT ☐ Rush ☐ 12 Hr ☒ 24 Hr ☐ 48 Hr ☐ 72 Hr ☐ Other	**Comments:** Stop at first positive in the each homogeneous group

H.A.	SAMPLE ID	SAMPLE LOCATION	SAMPLE DESCRIPTION	COLOR	Q/TY SQ FT	Q/TY LN. FT	MATERIAL CONDITION
35	93	Kindergarten Restrooms C132/C133	Upper Ceiling Plaster-Bottom Layer	Brown	40		Damaged
	94						
	95						
36	96		= Top layer	white			
	97						
	98						
37	99		Wall pegboard w/glue L	Brown	60		Good
	100						
38	101		Glue Behind Pegboard	Brown			
	102						
39	103		Wet wall pipe insulation	white		10	Damaged
	104						
	105						
40	106	Restrooms C128/C129+ C134/C135	Ceiling Plaster Material	white	554		Damaged
	107						
	108						

☒ PLM ☒ NOB PLM ☒ NOB TEM ☐ TEM DUST WIPE - ASTM D6480-05 [ ] OTHER Specify:

Client Manager: Scott Graber - 917-623-2411

Chain Of Custody

Relinquished by: (Full Name & Signature)	Date & Time	Method of Submittal	Received by: (Full Name & Signature)	Date & Time
1. A. Rubin				3/6/22 8:44pm

Lab Information

Analyzed by: (Full Name)	Signature	Date	Analyzed by: (Full Name)	Signature	Date
1.			2.		

Green Path
Environmental, Inc

BULK SAMPLE DATA AND CHAIN OF CUSTODY FORM

79 Glover Street, Suite 1, Staten Island, NY 10308
T. (347) 276-2339 • F. (646) 774-0354

Please e-mail results to: info@gpe.nyc and office@gpe.nyc

Client name: Nanuet UFSD	**LAB ID No.:** B2203026	**Date:** 3/6/22 **Time:** 9:30AM - 1pm
Project address: 50 Blauvelt Rd, Nanuet - Miller ES	**Green Path Project #** 1937.07.01 **PO #:**	**Inspector/investigator name:** Alexander Rubin
Sampling Areas: Various	**Analysis Requested:** TAT ☐ Rush ☐ 12 Hr ☒ 24 Hr ☐ 48 Hr ☐ 72 Hr ☐ Other	**Comments:** Stop at first positive in the each homogeneous group

H.A.	SAMPLE ID	SAMPLE LOCATION	SAMPLE DESCRIPTION	COLOR	Q/TY SQ FT	Q/TY LN. FT	MATERIAL CONDITION
41	109	Restrooms C128/C129 +	Upper wall Plaster - Bottom Layer	Gray	400		Damaged
	110	~~C134/C135~~ DD					
	111						
42	112			white			
	113						
	114						
43	115	Restrooms C134/C135	CU All - CMU Block	Gray	520		Good
	116						
44	117	Restrooms C134/C135 +	Wall C.T. grout	white	984		Damaged
	118	C128/C129					
	119						
45	120		C.T. Thinset mortar	white			
	121						
	122						
46	123		C.T. mortar	Gray			
	124						

☒ PLM ☒ NOB PLM ☒ NOB TEM ☐ TEM DUST WIPE - ASTM D6480-05 ☐ OTHER Specify:

Client Manager: Scott Graber - 917-623-2411

Chain Of Custody

Relinquished by: (Full Name & Signature)	Date & Time	Method of Submittal	Received by: (Full Name & Signature)	Date & Time
1. A. Rubin				3/6/22 3:44pm

Lab Information

Analyzed by: (Full Name)	Signature	Date	Analyzed by: (Full Name)	Signature	Date
1.			2.		

METRO ANALYTICAL LABORATORIES
255 West 36th St., Suite #101
New York, NY 10018
p: (212) 695-0165 f: (212) 695-0183

ASBESTOS ANALYSIS of BULK SAMPLE by POLARIZED LIGHT MICROSCOPY and TRANSMISSION ELECTRON MICROSCOPY

Client:	**Green Path Environmental Inc**	Contract:	**Nanuet UFSD**	**Metro Lab ID #:**	**B22030467**
Address:	79 Glover Street	Client Job #:			
	Staten Island NY 10308	Location:	**103 Church Street**		
	P: (347) 276-2339 F: (631) 991-9143		**Nanuet HS**	Sample Received:	03/12/2022
			Nanuet New York 10954	PLM Analysis Date:	03/13/2022
Contact:	**Alex Rubin**	Sampled By:	A.R.	TEM Analysis Date:	03/13/2022
	M:	Sampled Date:	03/12/2022	Reported By:	Janet Herminia-Santos
	E:	Turnaround Time:	24 hrs	Report Date:	03/13/2022

Summary of Analysis

LAB ID #	Client Sample #	Sample Description	Test	Fibrous Material	Non-Fibrous Material	Asbestos	Total Asbestos
1	1	Brown Homogenous Fibrous 2ND FL. - SCIENCE WING ABOVE CEILING - PIPE INSULATION - SILVER / BEIGE	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4	35% Cellulose 20% Fiberglass	45% Non-Fibrous	None Detected	
2	2	Brown Homogenous Fibrous 2ND FL. - SCIENCE WING ABOVE CEILING - PIPE INSULATION - SILVER / BEIGE	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4	30% Cellulose 25% Fiberglass	45% Non-Fibrous	None Detected	
3	3	Brown Homogenous Fibrous 2ND FL. - SCIENCE WING ABOVE CEILING - PIPE INSULATION - SILVER / BEIGE	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4	30% Cellulose 20% Fiberglass	50% Non-Fibrous	None Detected	
4	4	Yellow Homogenous NOB 2ND FL. - SCIENCE WING - 2 x 4 CEILING TILE (TYPE I) - WHITE / YELLOW	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4			 Inconclusive None Detected	
5	5	Yellow Homogenous NOB 2ND FL. - SCIENCE WING - 2 x 4 CEILING TILE (TYPE I) - WHITE / YELLOW	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4			 Inconclusive None Detected	
6	6	Grey Homogenous NOB 2ND FL. - SCIENCE WING - 2 x 4 FISSURING CEILING TILE (TYPE II) - BEIGE / GREY	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4			 Inconclusive None Detected	
7	7	Grey Homogenous NOB 2ND FL. - SCIENCE WING - 2 x 4 FISSURING CEILING TILE (TYPE II) - BEIGE / GREY	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4			 Inconclusive None Detected	
8	8	Grey Homogenous NOB 2ND FL. - SCIENCE WING - 2 x 4 FLAT CEILING TILE (TYPE III) - WHITE / GREY	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4			 Inconclusive None Detected	
9	9	Grey Homogenous NOB 2ND FL. - SCIENCE WING - 2 x 4 FLAT CEILING TILE (TYPE III) - WHITE / GREY	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4			 Inconclusive None Detected	
10	10	Grey Homogenous Granular 2ND FL. - SCIENCE WING - WALL - CMU MORTAR - GREY	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4		100% Non-Fibrous	None Detected	

Comments

Equipment: PLM SCOPE Nikon Optiphot-2
TEM SCOPE #2 - Hitachi H-7000

Zlatan Dimitrijevic
Laboratory Director

Reda Abdelmalak
PLM Analyst

Atef Guirguis
TEM Analyst

NYS ELAP ID # 12003

NVLAP Lab Code 500081-0

METRO ANALYTICAL LABORATORIES
255 West 36th St., Suite #101
New York, NY 10018
p: (212) 695-0165 f: (212) 695-0183

ASBESTOS ANALYSIS of BULK SAMPLE by POLARIZED LIGHT MICROSCOPY and TRANSMISSION ELECTRON MICROSCOPY

Client:	**Green Path Environmental Inc**	Contract:	**Nanuet UFSD**	**Metro Lab ID #:**	**B22030467**
Address:	79 Glover Street	Client Job #:			
	Staten Island NY 10308	Location:	**103 Church Street**		
	P: (347) 276-2339 F: (631) 991-9143		**Nanuet HS**	Sample Received:	03/12/2022
			Nanuet New York 10954	PLM Analysis Date:	03/13/2022
Contact:	**Alex Rubin**	Sampled By:	A.R.	TEM Analysis Date:	03/13/2022
	M:	Sampled Date:	03/12/2022	Reported By:	Janet Herminia-Santos
	E:	Turnaround Time:	24 hrs	Report Date:	03/13/2022

Summary of Analysis

LAB ID #	Client Sample #	Sample Description	Test	Fibrous Material	Non-Fibrous Material	Asbestos	Total Asbestos
11	11	Grey Homogenous Granular 2ND FL. - SCIENCE WING - WALL - CMU MORTAR - GREY	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
12	12	Black Homogenous NOB 2ND FL. - SCIENCE WING - FLOOR - MASTIC TO ALL 12 x 12 VAT - BLACK	NY ELAP 198.1				
			NY ELAP 198.6			Inconclusive	None Detected
			NY ELAP 198.4				None Detected
13	13	Black Homogenous NOB 2ND FL. - SCIENCE WING - FLOOR - MASTIC TO ALL 12 x 12 VAT - BLACK	NY ELAP 198.1				
			NY ELAP 198.6			Inconclusive	None Detected
			NY ELAP 198.4				None Detected
14	14	Grey Homogenous NOB 2ND FL. - SCIENCE WING - FLOOR - 12 x 12 FLOOR TILE - BLUE	NY ELAP 198.1				
			NY ELAP 198.6			Inconclusive	None Detected
			NY ELAP 198.4				None Detected
15	15	Grey Homogenous NOB 2ND FL. - SCIENCE WING - FLOOR - 12 x 12 FLOOR TILE - BLUE	NY ELAP 198.1				
			NY ELAP 198.6			Inconclusive	None Detected
			NY ELAP 198.4				None Detected
16	16	Grey Homogenous NOB 2ND FL. - SCIENCE WING - FLOOR - 12 x 12 FLOOR TILE - GREY	NY ELAP 198.1				
			NY ELAP 198.6			Inconclusive	None Detected
			NY ELAP 198.4				None Detected
17	17	Grey Homogenous NOB 2ND FL. - SCIENCE WING - FLOOR - 12 x 12 FLOOR TILE - GREY	NY ELAP 198.1				
			NY ELAP 198.6			Inconclusive	None Detected
			NY ELAP 198.4				None Detected
18	18	Grey Homogenous NOB 2ND FL. - SCIENCE WING - WALL - COVE BASE OLD GLUE - BROWN	NY ELAP 198.1				
			NY ELAP 198.6			Inconclusive	None Detected
			NY ELAP 198.4				None Detected
19	19	Grey Homogenous NOB 2ND FL. - SCIENCE WING - WALL - COVE BASE OLD GLUE - BROWN	NY ELAP 198.1				
			NY ELAP 198.6			Inconclusive	None Detected
			NY ELAP 198.4				None Detected
20	20	Beige Homogenous NOB 2ND FL. - SCIENCE WING - WALL - COVE BASE OVER GLUE - BEIGE	NY ELAP 198.1				
			NY ELAP 198.6			Inconclusive	None Detected
			NY ELAP 198.4				None Detected

Comments

Equipment: PLM SCOPE Nikon Optiphot-2
TEM SCOPE #2 - Hitachi H-7000

Zlatan Dimitrijevic
Laboratory Director

Reda Abdelmalak
PLM Analyst

Atef Guirguis
TEM Analyst

NYS ELAP ID # 12003

NVLAP Lab Code 500081-0

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ASBESTOS ANALYSIS of BULK SAMPLE by POLARIZED LIGHT MICROSCOPY and TRANSMISSION ELECTRON MICROSCOPY

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Address:	79 Glover Street	Client Job #:			
	Staten Island NY 10308	Location:	**103 Church Street**		
	P: (347) 276-2339 F: (631) 991-9143		**Nanuet HS**	Sample Received:	03/12/2022
			Nanuet **New York** **10954**	PLM Analysis Date:	03/13/2022
Contact:	**Alex Rubin**	Sampled By:	A.R.	TEM Analysis Date:	03/13/2022
	M:	Sampled Date:	03/12/2022	Reported By:	Janet Herminia-Santos
	E:	Turnaround Time:	24 hrs	Report Date:	03/13/2022

Summary of Analysis

LAB ID #	Client Sample #	Sample Description	Test	Fibrous Material	Non-Fibrous Material	Asbestos	Total Asbestos
21	21	Beige Homogenous NOB 2ND FL. - SCIENCE WING - COVE BASE OVER GLUE - BEIGE	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4			**Inconclusive** **None Detected** **None Detected**	
22	22	Brown Homogenous NOB 2ND FL. - SCIENCE WING - COVE BASE - BROWN	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4			**Inconclusive** **None Detected** **None Detected**	
23	23	Brown Homogenous NOB 2ND FL. - SCIENCE WING - COVE BASE - BROWN	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4			**Inconclusive** **None Detected** **None Detected**	
24	24	White Homogenous Granular 2ND FL. - SCIENCE WING - JOINT COMPOUND - WHITE	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4		100% Non-Fibrous	**None Detected**	
25	25	White Homogenous Granular 2ND FL. - SCIENCE WING - JOINT COMPOUND - WHITE	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4		100% Non-Fibrous	**None Detected**	
26	26	Grey Homogenous NOB 2ND FL. - SCIENCE WING - WALLBOARD - L. BROWN	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4			**Inconclusive** **None Detected** **None Detected**	
27	27	Grey Homogenous NOB 2ND FL. - SCIENCE WING - WALLBOARD - L. BROWN	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4			**Inconclusive** **None Detected** **None Detected**	
28	28	Black Homogenous Granular 2ND FL. - SCIENCE WING - TABLE TOP MATERIAL - BLACK	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4		100% Non-Fibrous	**None Detected**	
29	29	Black Homogenous Granular 2ND FL. SCIENCE WING - TABLE TOP MATERIAL - BLACK	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4		100% Non-Fibrous	**None Detected**	
30	30	Black Homogenous NOB 2ND FL. - SCIENCE WING - CAULKING TO TABLE TOP - BLACK	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4			**Inconclusive** **None Detected** **None Detected**	

Comments

Equipment: PLM SCOPE Nikon Optiphot-2
TEM SCOPE #2 - Hitachi H-7000

Zlatan Dimitrijevic
Laboratory Director

Reda Abdelmalak
PLM Analyst

Atef Guirguis
TEM Analyst

NYS ELAP ID # 12003

NVLAP Lab Code 500081-0

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ASBESTOS ANALYSIS of BULK SAMPLE by POLARIZED LIGHT MICROSCOPY and TRANSMISSION ELECTRON MICROSCOPY

Client:	**Green Path Environmental Inc**	Contract:	**Nanuet UFSD**	**Metro Lab ID #:**	**B22030467**
Address:	79 Glover Street	Client Job #:			
	Staten Island NY 10308	Location:	**103 Church Street**		
	P: (347) 276-2339 F: (631) 991-9143		**Nanuet HS**	Sample Received:	03/12/2022
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Contact:	**Alex Rubin**	Sampled By:	A.R.	TEM Analysis Date:	03/13/2022
	M:	Sampled Date:	03/12/2022	Reported By:	Janet Herminia-Santos
	E:	Turnaround Time:	24 hrs	Report Date:	03/13/2022

Summary of Analysis

LAB ID #	Client Sample #	Sample Description	Test	Fibrous Material	Non-Fibrous Material	Asbestos	Total Asbestos
31	31	Black Homogenous NOB 2ND FL. - SCIENCE WING - CAULKING TO TABLE TOP - BLACK	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4			**Inconclusive** **None Detected** **None Detected**	
32	32	Black Homogenous Granular 2ND FL. - SCIENCE WING - GROUT TO TABLE TOP MATERIAL - BLACK	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4		100% Non-Fibrous	**None Detected**	
33	33	Black Homogenous Granular 2ND FL. - SCIENCE WING - GROUT TO TABLE TOP MATERIAL - BLACK	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4		100% Non-Fibrous	**None Detected**	

Comments

Equipment: PLM SCOPE Nikon Optiphot-2
TEM SCOPE #2 - Hitachi H-7000

Zlatan Dimitrijevic
Laboratory Director

Reda Abdelmalak
PLM Analyst

Atef Guirguis
TEM Analyst

NYS ELAP ID # 12003

NVLAP Lab Code 500081-0

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New York, NY 10018
p: (212) 695-0165 f: (212) 695-0183

Report Notes

General Notes and Disclaimers

- The samples analyzed in this report were not collected by this laboratory - they were received from the client, or an agent of the client, in good condition, unless otherwise noted.
- All results are calculated based on client-provided samples and / or measurements and fall within the acceptable Quality Control limits, unless otherwise noted.
- The report shall not be reproduced, except in full, without the written approval of the laboratory.
- This report relates only to the samples tested. It may not be used by the client to claim project endorsement by NVLAP, NYS ELAP, or any other government agency.
- All samples will be properly disposed of after 60 days.
- Quality Control data (including 95% confidence limits, laboratory / analysis accuracy and precision) is available upon request.

Notes Regarding Asbestos Testing

- Air Sample Analysis by Phase Contrast Microscopy (PCM) adheres to Method NIOSH-7400. Results < 7 fibers / mm^2 are statistically insignificant.
- Percentages are calculated using the EPA equivalent Stratified Point-Count Method.
- Bulk Sample Analysis by Polarized Light Microscopy (PLM) Friable adheres to EPA/600/M4-082-20 or NYS ELAP 198.1.
- Bulk Sample Analysis by Polarized Light Microscopy (PLM) NOB adheres to NYS ELAP 198.6. This method does not remove vermiculite and may underestimate the level of asbestos present in a sample containing greater than 10% vermiculite.
- All inhomogeneous layers of the bulk samples were analyzed separately.
- Analytical results are sometimes based on the residue percentage(s) provided by the client along with the filters. Trace denotes asbestos detected at < 1%. Smiliarly, samples below quantitation limit (RL) are reported with a less than sign (<).
- Polarized Light Microscopy is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Quantitative TEM is currently the only method that can be used to determine if this material can be considered or treated as non-asbestos containing.
- Bulk Sample Analysis by Transmission Electron Microscopy (TEM) NOB adheres to NYS ELAP Method 198.4.
- Air Sample Analysis by Transmission Electron Microscopy (TEM) adheres to Method EPA CFR Part 763 Final Rule (AHERA).
- Air Sample Analysis by Transmission Electron Microscopy (TEM) Worksheets are available upon request.

B2203467

Green Path
Environmental, Inc

BULK SAMPLE DATA AND CHAIN OF CUSTODY FORM

79 Glover Street, Suite 1, Staten Island, NY 10308
T. (347) 276-2339 • F. (646) 774-0354

Please e-mail results to: info@gpe.nyc and office@gpe.nyc

Client name: Nanuet UFSD	**LAB ID No.:**	**Date:** 3/12/22 **Time:** 10:30 - 15:00
Project address: 103 Church St, Nanuet, NY 10954 - Nanuet HS	**Green Path Project #** 1937.07.01 **PO #:**	**Inspector/investigator name:** Alexander Rubin
Sampling Areas: Various	**Analysis Requested:** TAT ☐ Rush ☐ 12 Hr ☒ 24 Hr ☐ 48 Hr ☐ 72 Hr ☐ Other	**Comments:** Stop at first positive in the each homogeneous group

H.A.	SAMPLE ID	SAMPLE LOCATION	SAMPLE DESCRIPTION	COLOR	Q/TY SQ FT	Q/TY LN. FT	MATERIAL CONDITION
1	1	2ND FL - Science Wing	- Above Ceiling - Pipe Insulation	Silver/Beige		424	Good
	2						
	3						
2	4		- 2x4 Ceiling Tile (Type I)	White/Yellow	8,200		
	5						
3	6		- 2x4 Fissured Ceiling Tile (Type II)	Beige/Gray	2,400		
	7						
4	8		- 2x4 Flat Ceiling Tile (Type III)	White/Gray	1,200		
	9						
5	10		- Wall - Cmu Mortar	Gray	8,000		
	11						
6	12		- Floor - Mastic to all 9x9 VAT	Black	6,800		
	13						
7	14		- 12x12 Floor Tile	Blue	1,700		
	15						

☒ PLM ☒ NOB PLM ☒ NOB TEM [ ] TEM DUST WIPE - ASTM D6480-05 [ ] OTHER Specify:

Client Manager: Scott Graber - 917-623-2411

Chain Of Custody

Relinquished by: (Full Name & Signature)	Date & Time	Method of Submittal	Received by: (Full Name & Signature)	Date & Time
1. A. Rubin			Kristina John	3/12/22 3:15P

Lab Information

Analyzed by: (Full Name)	Signature	Date	Analyzed by: (Full Name)	Signature	Date
1.			2.		

B2203046 7

Green Path
Environmental, Inc

BULK SAMPLE DATA AND CHAIN OF CUSTODY FORM

79 Glover Street, Suite 1, Staten Island, NY 10308
T. (347) 276-2339 • F. (646) 774-0354

Please e-mail results to: info@gpe.nyc and office@gpe.nyc

Client name: Nanuet UFSD	**LAB ID No.:**	**Date:** 3/12/22 **Time:** 10:30 - 15:00
Project address: 103 Church St, Nanuet, NY 10954 - Nanuet HS	**Green Path Project #** 1937.07.01 **PO #:**	**Inspector/investigator name:** Alexander Rubin
Sampling Areas: Various	**Analysis Requested:** TAT ☐ Rush ☐ 12 Hr ☒ 24 Hr ☐ 48 Hr ☐ 72 Hr ☐ Other	**Comments:** Stop at first positive in the each homogeneous group

H.A.	SAMPLE ID	SAMPLE LOCATION	SAMPLE DESCRIPTION	COLOR	Q/TY SQ FT	Q/TY LN. FT	MATERIAL CONDITION
8	16	2nd FL - Science Wing	- Floor - 12x12 Floor Tile	Gray	5,100		Good
	17						
9	18		- Wall - Cove Base old Glue	Brown	360		
	19						
10	20		- Cove Base new Glue	Beige			
	21						
11	22		- Cove Base	Brown			
	23						
12	24		- Joint Compound	white	600		
	25						
13	26		- Wall Board	L. Brown			
	27						
14	28		- Table Top material	Black	1,200		
	29						
15	30		- Caulking to Table Top	Black	40		
	31						

☒ PLM ☒ NOB PLM ☒ NOB TEM [ ] TEM DUST WIPE - ASTM D6480-05 [ ] OTHER Specify:

Client Manager: Scott Graber - 917-623-2411

Chain Of Custody

Relinquished by: (Full Name & Signature)	Date & Time	Method of Submittal	Received by: (Full Name & Signature)	Date & Time
1. A. Rubin			Krishna John	3/12/22 315P

Lab Information

Analyzed by: (Full Name)	Signature	Date	Analyzed by: (Full Name)	Signature	Date
1.			2.		

B2203046?

Green Path
Environmental, Inc

BULK SAMPLE DATA AND CHAIN OF CUSTODY FORM

79 Glover Street, Suite 1, Staten Island, NY 10308
T. (347) 276-2339 • F. (646) 774-0354

Please e-mail results to: info@gpe.nyc and office@gpe.nyc

Client name: Nanuet UFSD	**LAB ID No.:**	**Date:** 3/12/22 **Time:** 10:30 – 15:00
Project address: 103 Church St, Nanuet, NY 10954 - Nanuet HS	**Green Path Project #** 1937.07.01 **PO #:**	**Inspector/investigator name:** Alexander Rubin
Sampling Areas: Various	**Analysis Requested:** TAT ☐ Rush ☐ 12 Hr ☒ 24 Hr ☐ 48 Hr ☐ 72 Hr ☐ Other	**Comments:** Stop at first positive in the each homogeneous group

H.A.	SAMPLE ID	SAMPLE LOCATION	SAMPLE DESCRIPTION	COLOR	Q/TY SQ FT	Q/TY LN. FT	MATERIAL CONDITION
16	32	2ND FL - SCIENCE WING	GROUT TO TABLE TOP MATERIAL	BLACK	60		GOOD
	33	↓	↓		↓		↓
~~17~~	~~34~~						

☒ PLM ☒ NOB PLM ☒ NOB TEM [ ] TEM DUST WIPE - ASTM D6480-05 [ ] OTHER Specify:

Client Manager: Scott Graber - 917-623-2411

Chain Of Custody

Relinquished by: (Full Name & Signature)	Date & Time	Method of Submittal	Received by: (Full Name & Signature)	Date & Time
1. A. Rubin			Kristina John	3/12/22 3:15P

Lab Information

Analyzed by: (Full Name)	Signature	Date	Analyzed by: (Full Name)	Signature	Date
1.			2.		

GPE License and Certification

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

Green Path Environmental, Inc.
Suite 1
79 Glover Street

Staten Island, NY 10308

FILE NUMBER: 13-72113
LICENSE NUMBER: 72113
LICENSE CLASS: RESTRICTED
DATE OF ISSUE: 06/18/2021
EXPIRATION DATE: 06/30/2022

Duly Authorized Representative – Julia Rubin:

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.

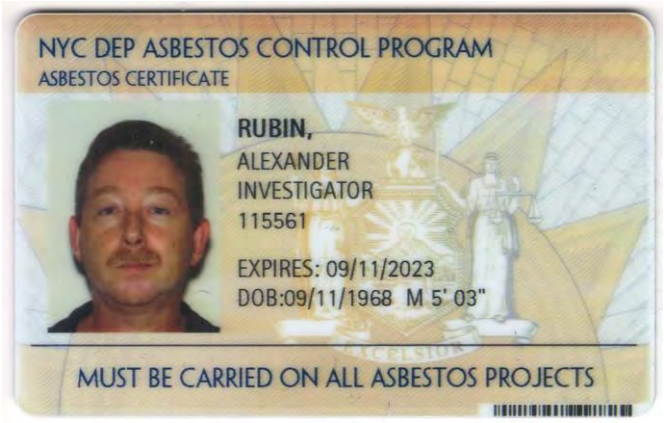
Amy Phillips, Director
For the Commissioner of Labor

SH 432 (8/12)

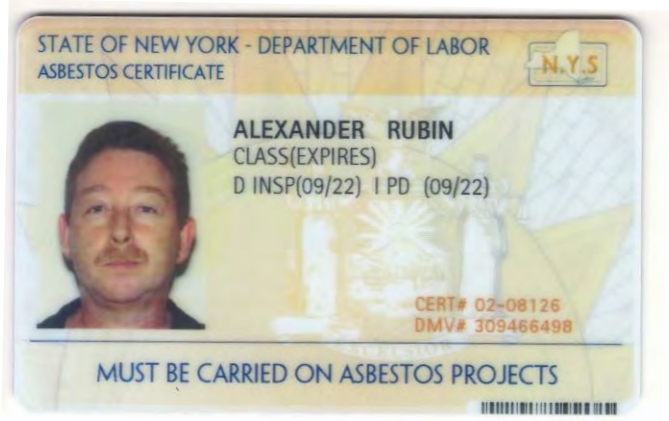
Green Path
Environmental, Inc

Alexander Rubin

NYC DEP Certified Asbestos Investigator



NYS DOL Certified Asbestos Inspector

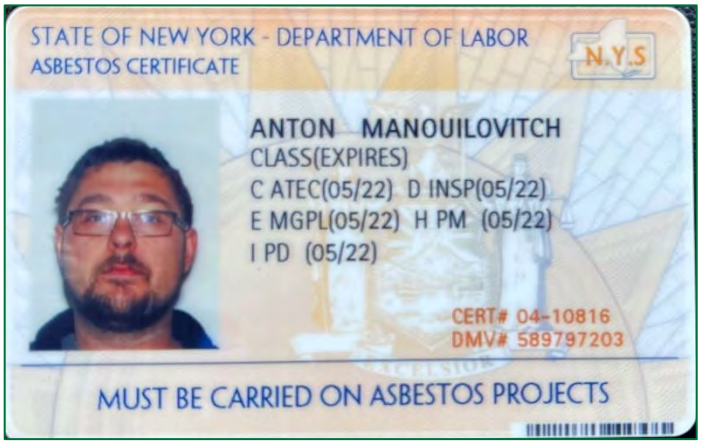


Green Path
Environmental, Inc

ANTON MANOUILOVITCH

NYC DEP Certified Asbestos Investigator

NYS DOL Certified Asbestos Inspector/Project Design Management Planner
Project Monitor/Air Sampling Technician



Laboratory Certification

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2022
Issued April 01, 2021

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. ZLATAN DIMITRIJEVIC
METRO ANALYTICAL LABORATORIES, LLC.
255 WEST 36TH STREET SUITE 101
NEW YORK, NY 10018-0022

NY Lab Id No: 12003

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
Lead in Dust Wipes	EPA 7000B
Lead in Paint	EPA 7000B

Sample Preparation Methods

EPA 3050B

NEW YORK STATE OF OPPORTUNITY. Department of Health

Serial No.: 63263

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.

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2022
Issued April 01, 2021

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

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METRO ANALYTICAL LABORATORIES, LLC.
255 WEST 36TH STREET SUITE 101
NEW YORK, NY 10018-0022

NY Lab Id No: 12003

is hereby APPROVED as an Environmental Laboratory for the category
ENVIRONMENTAL ANALYSES AIR AND EMISSIONS
All approved subcategories and/or analytes are listed below:

Metals I	
Lead, Total	NIOSH 7082
Miscellaneous	
Asbestos	40 CFR 763 APX A No. III
Fibers	NIOSH 7400 A RULES

NEW YORK STATE OF OPPORTUNITY | Department of Health

Serial No.: 63264

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Certified Women-Owned Business Enterprise

Green Path Environmental, Inc

March 14, 2022

To: Mr. Rudy Villanyi
Nanuet Public Schools
103 Church Street
Nanuet, New York 10954

Re: **Expedited Limited Asbestos Survey**
George W. Miller Elementary School – Bond Projects
50 Blauvelt Street, Nanuet, New York
GPE Project #: 1937.07.01

Dear Mr. Villanyi:

Green Path Environmental, Inc (GPE) was retained by the Nanuet Public Schools to conduct an expedited limited asbestos survey at the George W. Miller Elementary School (Miller ES) regarding the Bond Projects renovation in reference to the KSQ Design Architects drawings dated January 31, 2022. The survey conducted on March 6, 2022 included visual observation, material sampling and laboratory sample analysis of the suspect asbestos containing material (ACM). A drawing showing the asbestos containing material locations with quantities will be provided at a later date.

Based upon a visual inspection of materials determined to be impacted by the renovation project and the attached bulk sample laboratory analytical results, **following materials from that collected** (Boys Restroom C124 ceiling plaster/upper and lower wall plaster/ceramic tile grout/ceramic tile thin set/ceramic tile mortar/wet wall black pipe insulation outer coat tar paper/wet wall pipe insulation brown inner coat paper/floor soft filler brown mortar/ceramic tile grey thin set and grout, Girls Restroom C126 ceiling plaster/upper and lower wall plaster/ceramic tile grout/ceramic tile thin set/ceramic tile mortar/wet wall black pipe insulation outer coat tar paper/wet wall pipe insulation brown inner coat paper/floor soft filler brown mortar/ceramic tile grey thin set and grout, Kindergarten Restrooms C132 & C133 ceiling plaster/door frame white caulking/wall panel brown glue/wall plaster/behind ceramic tile cove base black tar paper and glue/floor and cove base ceramic tile brown grout/floor thin set with grey-brown glue to ceramic tile/outside the restrooms upper ceiling plaster/wall light brown pegboard with brown glue/wet wall white pipe insulation, Restrooms C128,C129,C134 and C135 ceiling plaster/upper wall plaster/wall CMU grey block/wall CMU white grout/ceramic tile thin set white mortar/ceramic tile grey mortar/wall ceramic tile grey mortar/wet wall pipe insulation outer layer black tar paper/wet wall pipe insulation inner layer brown paper, Restrooms C134 and C135 in wall radiator pipe insulation outer layer black tar paper/in wall radiator pipe insulation inner layer beige air cell, Restrooms C128 and C129 wet wall grey elbow insulation, Restrooms C128, C129, C134 and C135 floor ceramic tile grey grout/ceramic tile thin set brown mortar and Throughout School hallway floor grey terrazzo) **are identified as asbestos containing materials (greater than one percent asbestos);**

- Boys Restroom C124; ceiling white plaster
[approximately 253 Square Feet]

- Boys Restroom C124; wet wall black pipe insulation outer coat tar paper and brown inner coat paper [approximately 160 Linear Feet]
- Girls Restroom C126; ceiling white plaster
[approximately 208 Square Feet]
- Girls Restroom C126; wet wall black pipe insulation outer coat tar paper and brown inner coat paper [approximately 160 Linear Feet]
- Kindergarten Restrooms C132 & C133; lower ceiling white plaster
[approximately 48 Square Feet]
- Kindergarten Restrooms C132 & C133; floor ceramic tile thin set with grey-brown glue [approximately 48 Square Feet]
Kindergarten Restrooms C132 & C133; outside wall light brown pegboards
[approximately 60 Square Feet]
- Restrooms C128, C129, C134 and C135; wet wall black pipe insulation outer coat tar paper and brown inner coat paper [approximately 240 Linear Feet]
- Restrooms C134 and C135; in wall radiator pipe insulation outer layer black tar paper and inner layer beige air cell [approximately 60 Linear Feet]
- Restrooms C128 and C129; wet wall grey elbow insulation
[approximately 20 Linear Feet]

It should be noted that the Boys Restroom C124 upper wall white plaster, Kindergarten Restrooms C132 & C133 upper ceiling white plaster (outside of restrooms) laboratory results are currently inconclusive and laboratory analysis must go to Vermiculite analytical method 198.8 for further verification. The laboratory analytical results will be provided in 1 week.

Per discussions with the Nanuet School District, the Miller ES **classroom floor tiles with associated mastic (quantity to be determined), classroom cove base with associated adhesive (quantity to be determined), Kindergarten classroom 9"x 9" multicolor floor tiles and associated mastics (approximately 48 Square feet), switchgear components (including exterior wiring wrap) and classroom exterior wrap on wire connected to ceiling lighting (quantity to be determined) are Presumed Asbestos Containing Materials (PACM).**

In addition, GPE did not sample behind the white boards since they are supposedly bolted in place.

Representative bulk samples of all suspect materials were collected and analyzed by Polarized Light Microscopy (PLM). Bulk Sample Analysis by PLM NOB for non-friable materials adheres to NYS ELAP 198.6. The State of New York Environmental Laboratory Approval Program (ELAP) has determined that Polarized Light Microscopy is not consistently reliable in detecting asbestos in non-friable organically bound materials. Quantitative transmission electron microscopy (TEM) is currently the only method that can be used to determine if this material can be considered or treated as non-asbestos containing. Therefore, if PLM yields negative results for a non-friable material (NOB), it must be confirmed by Transmission Electron Microscopy (TEM). Bulk Sample Analysis by Transmission Electron Microscopy (TEM) NOB adheres to NYS ELAP Method 198.4.

Analysis of the bulk samples collected was performed by Metro Analytical Labs (Metro) located at 255 West 36th Street, Suite 101, New York, NY 10018.

Metro is accredited by the New York State Department of Health, Environmental Laboratory Accreditation Program (ELAP Accreditation No. 12003) for Bulk Sample Analysis by Polarized

Light Microscopy (PLM) Friable adheres to EPA/600/M4-082-20 or NYS ELAP Method 198.1 and Bulk Sample Analysis by Polarized Light Microscopy (PLM) NOB by NYS ELAP Method 198.6 and Bulk Sample Analysis by Transmission Electron Microscopy (TEM) NOB adheres to NYS ELAP Method 198.4. as required.

According to the EPA regulations and NYS DOL Industrial Code Rule 56 asbestos-containing materials (ACM) must be removed prior to disturbance during renovation activities.

If you have any questions, please do not hesitate to call me at (917)-623-2411.

Sincerely,
Green Path Environmental, Inc

Scott Graber
Client Manager

Attachments:

- Laboratory Analytical Results with Chain of Custody Form (analysis March 7, 2022 and report dated March 8, 2022)
- GPE License and Certification
- Laboratory Certification

Laboratory Analytical Results with Chain of Custody Forms (Analysis March 7, 2022 and Report dated March 8, 2022)

METRO ANALYTICAL LABORATORIES
255 West 36th St., Suite #101
New York, NY 10018
p: (212) 695-0165 f: (212) 695-0183

ASBESTOS ANALYSIS of BULK SAMPLE by POLARIZED LIGHT MICROSCOPY and TRANSMISSION ELECTRON MICROSCOPY

Client:	**Green Path Environmental Inc**	Contract:	**Nanuet UFSD**	**Metro Lab ID #:**	**B22030206**
Address:	79 Glover Street	Client Job #:	**1937.07.01**		
	Staten Island NY 10308	Location:	**50 Blauvelt Road**		
	P: (347) 276-2339 F: (631) 991-9143		**Miller ES - Various**	Sample Received:	03/06/2022
			Nanuet	PLM Analysis Date:	03/07/2022
Contact:	**Alex Rubin**	Sampled By:	A.R.	TEM Analysis Date:	03/07/2022
	M:	Sampled Date:	03/05/2022	Reported By:	Turiana Moreira
	E:	Turnaround Time:	24 hrs	Report Date:	03/08/2022

Summary of Analysis

LAB ID #	Client Sample #	Sample Description	Test	Fibrous Material	Non-Fibrous Material	Asbestos	Total Asbestos
1	1	White Homogenous Granular BOYS RESTROOM - C124 - CEILING PLASTER - TOP LAYER	NY ELAP 198.1	5% Cellulose	92.13% Non-Fibrous	2.87% Chrysotile	2.9%
			NY ELAP 198.6				
			NY ELAP 198.4				
2	2	BOYS RESTROOM - C124 - CEILING PLASTER - TOP LAYER	NY ELAP 198.1			Positive Stop	Not Analyzed
			NY ELAP 198.6				
			NY ELAP 198.4				
3	3	BOYS RESTROOM - C124 - CEILING PLASTER - TOP LAYER	NY ELAP 198.1			Positive Stop	Not Analyzed
			NY ELAP 198.6				
			NY ELAP 198.4				
4	4	White Homogenous Granular BOYS RESTROOM - C124 - CEILING PLASTER - MIDDLE LAYER	NY ELAP 198.1	4% Cellulose	92.59% Non-Fibrous	3.41% Chrysotile	3.4%
			NY ELAP 198.6				
			NY ELAP 198.4				
5	5	BOYS RESTROOM - C124 - CEILING PLASTER - MIDDLE LAYER	NY ELAP 198.1			Positive Stop	Not Analyzed
			NY ELAP 198.6				
			NY ELAP 198.4				
6	6	BOYS RESTROOM - C124 - CEILING PLASTER - MIDDLE LAYER	NY ELAP 198.1			Positive Stop	Not Analyzed
			NY ELAP 198.6				
			NY ELAP 198.4				
7	7	Brown Homogenous Granular BOYS RESTROOM - C124 - CEILING PLASTER - BOTTOM LAYER	NY ELAP 198.1	5% Cellulose	75% Non-Fibrous 20% Vermiculite	Analysis Halted	
			NY ELAP 198.6				
			NY ELAP 198.4				
8	8	Brown Homogenous Granular BOYS RESTROOM - C124 - CEILING PLASTER - BOTTOM LAYER	NY ELAP 198.1	7% Cellulose	78% Non-Fibrous 15% Vermiculite	Analysis Halted	
			NY ELAP 198.6				
			NY ELAP 198.4				
9	9	Brown Homogenous Granular BOYS RESTROOM - C124 - CEILING PLASTER - BOTTOM LAYER	NY ELAP 198.1	4% Cellulose	71% Non-Fibrous 25% Vermiculite	Analysis Halted	
			NY ELAP 198.6				
			NY ELAP 198.4				
10	10	White Homogenous Granular BOYS RESTROOM - C124 - UPPER WALL PLASTER - TOP LAYER	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				

Comments: Samples7,8,9,13,14,15,41,42,43,69,70,71,93,94,95,96,97 & 98 analysis was terminated due to the presence of vermiculite. Results are inconclusive and must go for 198.8 method for further verification.

Equipment: PLM SCOPE Nikon Optiphot-2
TEM SCOPE #1 - Hitachi H-600

Zlatan Dimitrijevic
Laboratory Director

Sameh Youssef
PLM Analyst

Zlatan Dimitrijevic
TEM Analyst

NYS ELAP ID # 12003

NVLAP Lab Code 500081-0

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	P: (347) 276-2339 F: (631) 991-9143		**Miller ES - Various**	Sample Received:	03/06/2022
			Nanuet	PLM Analysis Date:	03/07/2022
Contact:	**Alex Rubin**	Sampled By:	A.R.	TEM Analysis Date:	03/07/2022
	M:	Sampled Date:	03/05/2022	Reported By:	Turiana Moreira
	E:	Turnaround Time:	24 hrs	Report Date:	03/08/2022

Summary of Analysis

LAB ID #	Client Sample #	Sample Description	Test	Fibrous Material	Non-Fibrous Material	Asbestos	Total Asbestos
11	11	White Homogenous Granular BOYS RESTROOM - C124 - UPPER WALL PLASTER - TOP LAYER	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4		100% Non-Fibrous	None Detected	
12	12	White Homogenous Granular BOYS RESTROOM - C124 - UPPER WALL PLASTER - TOP LAYER	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4		100% Non-Fibrous	None Detected	
13	13	Brown Homogenous Granular BOYS RESTROOM - C124 - UPPER WALL PLASTER - BOTTOM LAYER	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4	3% Cellulose	87% Non-Fibrous 10% Vermiculite	Analysis Halted	
14	14	Brown Homogenous Granular BOYS RESTROOM - C124 - UPPER WALL PLASTER - BOTTOM LAYER	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4	2% Cellulose	78% Non-Fibrous 20% Vermiculite	Analysis Halted	
15	15	Brown Homogenous Granular BOYS RESTROOM - C124 - UPPER WALL PLASTER - BOTTOM LAYER	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4	4% Cellulose	86% Non-Fibrous 10% Vermiculite	Analysis Halted	
16	16	White Homogenous Granular BOYS RESTROOM - C124 - LOWER WALL - C.T. GROUT	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4		100% Non-Fibrous	None Detected	
17	17	White Homogenous Granular BOYS RESTROOM - C124 - LOWER WALL - C.T. GROUT	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4		100% Non-Fibrous	None Detected	
18	18	White Homogenous Granular BOYS RESTROOM - C124 - LOWER WALL - C.T. GROUT	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4		100% Non-Fibrous	None Detected	
19	19	Grey Homogenous Granular BOYS RESTROOM - C124 - LOWER WALL - C.T. THINSET	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4		100% Non-Fibrous	None Detected	
20	20	Grey Homogenous Granular BOYS RESTROOM - C124 - LOWER WALL - C.T. THINSET	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4		100% Non-Fibrous	None Detected	

Comments: Samples7,8,9,13,14,15,41,42,43,69,70,71,93,94,95,96,97 & 98 analysis was terminated due to the presence of vermiculite. Results are inconclusive and must go for 198.8 method for further verification.

Equipment: PLM SCOPE Nikon Optiphot-2
TEM SCOPE #1 - Hitachi H-600

Zlatan Dimitrijevic
Laboratory Director

Sameh Youssef
PLM Analyst

Zlatan Dimitrijevic
TEM Analyst

NYS ELAP ID # 12003

NVLAP Lab Code 500081-0

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	P: (347) 276-2339 F: (631) 991-9143		**Miller ES - Various**	Sample Received:	03/06/2022
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Contact:	**Alex Rubin**	Sampled By:	A.R.	TEM Analysis Date:	03/07/2022
	M:	Sampled Date:	03/05/2022	Reported By:	Turiana Moreira
	E:	Turnaround Time:	24 hrs	Report Date:	03/08/2022

Summary of Analysis

LAB ID #	Client Sample #	Sample Description	Test	Fibrous Material	Non-Fibrous Material	Asbestos	Total Asbestos
21	21	Grey Homogenous Granular BOYS RESTROOM - C124 - LOWER WALL - C.T. THINSET	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
22	22	Grey Homogenous Granular BOYS RESTROOM - C124 - LOWER WALL - MORTAR	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
23	23	Grey Homogenous Granular BOYS RESTROOM - C124 - LOWER WALL - MORTAR	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
24	24	Grey Homogenous Granular BOYS RESTROOM - C124 - LOWER WALL - MORTAR	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
25	25	Black Homogenous NOB BOYS RESTROOM - C124 - WET WALLS - PIPE INSULATION OUTER COAT - TAR PAPER	NY ELAP 198.1				
			NY ELAP 198.6			1.8% Chrysotile	1.8%
			NY ELAP 198.4			Not Analyzed	
26	26	Black Homogenous NOB BOYS RESTROOM - C124 - WET WALLS - PIPE INSULATION OUTER COAT - TAR PAPER	NY ELAP 198.1				
			NY ELAP 198.6			Positive Stop Not Analyzed	
			NY ELAP 198.4			Not Analyzed	
27	27	Black Homogenous NOB BOYS RESTROOM - C124 - WET WALLS - PIPE INSULATION OUTER COAT - TAR PAPER	NY ELAP 198.1				
			NY ELAP 198.6			Positive Stop Not Analyzed	
			NY ELAP 198.4			Not Analyzed	
28	28	Brown Homogenous Fibrous BOYS RESTROOM - C124 - WET WALLS - PIPE INSULATION INNER COAT - PAPER	NY ELAP 198.1	95% Cellulose	3.3% Non-Fibrous	1.70% Chrysotile	1.7%
			NY ELAP 198.6				
			NY ELAP 198.4				
29	29	BOYS RESTROOM - C124 - WET WALLS - PIPE INSULATION INNER COAT - PAPER	NY ELAP 198.1			Positive Stop Not Analyzed	
			NY ELAP 198.6				
			NY ELAP 198.4				
30	30	BOYS RESTROOM - C124 - WET WALLS - PIPE INSULATION INNER COAT - PAPER	NY ELAP 198.1			Positive Stop Not Analyzed	
			NY ELAP 198.6				
			NY ELAP 198.4				

Comments: Samples7,8,9,13,14,15,41,42,43,69,70,71,93,94,95,96,97 & 98 analysis was terminated due to the presence of vermiculite. Results are inconclusive and must go for 198.8 method for further verification.

Equipment: PLM SCOPE Nikon Optiphot-2
TEM SCOPE #1 - Hitachi H-600

Zlatan Dimitrijevic
Laboratory Director

Sameh Youssef
PLM Analyst

Zlatan Dimitrijevic
TEM Analyst

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	P: (347) 276-2339 F: (631) 991-9143		**Miller ES - Various**	Sample Received:	03/06/2022
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Contact:	**Alex Rubin**	Sampled By:	A.R.	TEM Analysis Date:	03/07/2022
	M:	Sampled Date:	03/05/2022	Reported By:	Turiana Moreira
	E:	Turnaround Time:	24 hrs	Report Date:	03/08/2022

Summary of Analysis

LAB ID #	Client Sample #	Sample Description	Test	Fibrous Material	Non-Fibrous Material	Asbestos	Total Asbestos
31	31	Grey Homogenous Granular BOYS RESTROOM - C124 - FLOOR - SOFT FILLER MORTAR	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
32	32	Grey Homogenous Granular BOYS RESTROOM - C124 - FLOOR - SOFT FILLER MORTAR	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
33	33	Grey Homogenous Granular BOYS RESTROOM - C124 - FLOOR - C.T. THINSET / GROUT	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
34	34	Grey Homogenous Granular BOYS RESTROOM - C124 - FLOOR - C.T. THINSET / GROUT	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
35	35	White Homogenous Granular GIRLS RESTROOM - C126 - CEILING PLASTER - TOP LAYER	NY ELAP 198.1	1% Cellulose	97.15% Non-Fibrous	1.85% Chrysotile	1.9%
			NY ELAP 198.6				
			NY ELAP 198.4				
36	36	GIRLS RESTROOM - C126 - CEILING PLASTER - TOP LAYER	NY ELAP 198.1			Positive Stop Not Analyzed	
			NY ELAP 198.6				
			NY ELAP 198.4				
37	37	GIRLS RESTROOM - C126 - CEILING PLASTER - TOP LAYER	NY ELAP 198.1			Positive Stop Not Analyzed	
			NY ELAP 198.6				
			NY ELAP 198.4				
38	38	White Homogenous Granular GIRLS RESTROOM - C126 - CEILING PLASTER - MIDDLE LAYER	NY ELAP 198.1	3% Cellulose	94.46% Non-Fibrous	2.54% Chrysotile	2.5%
			NY ELAP 198.6				
			NY ELAP 198.4				
39	39	GIRLS RESTROOM - C126 - CEILING PLASTER - MIDDLE LAYER	NY ELAP 198.1			Positive Stop Not Analyzed	
			NY ELAP 198.6				
			NY ELAP 198.4				
40	40	GIRLS RESTROOM - C126 - CEILING PLASTER - MIDDLE LAYER	NY ELAP 198.1			Positive Stop Not Analyzed	
			NY ELAP 198.6				
			NY ELAP 198.4				

Comments: Samples7,8,9,13,14,15,41,42,43,69,70,71,93,94,95,96,97 & 98 analysis was terminated due to the presence of vermiculite. Results are inconclusive and must go for 198.8 method for further verification.

Equipment: PLM SCOPE Nikon Optiphot-2
TEM SCOPE #1 - Hitachi H-600

Zlatan Dimitrijevic
Laboratory Director

Sameh Youssef
PLM Analyst

Zlatan Dimitrijevic
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	E:	Turnaround Time:	24 hrs	Report Date:	03/08/2022

Summary of Analysis

LAB ID #	Client Sample #	Sample Description	Test	Fibrous Material	Non-Fibrous Material	Asbestos	Total Asbestos
41	41	Brown Homogenous Granular GIRLS RESTROOM - C126 - CEILING PLASTER - BOTTOM LAYER	NY ELAP 198.1		85% Non-Fibrous 15% Vermiculite	**Analysis Halted**	
			NY ELAP 198.6				
			NY ELAP 198.4				
42	42	Brown Homogenous Granular GIRLS RESTROOM - C126 - CEILING PLASTER - BOTTOM LAYER	NY ELAP 198.1		75% Non-Fibrous 25% Vermiculite	**Analysis Halted**	
			NY ELAP 198.6				
			NY ELAP 198.4				
43	43	Brown Homogenous Granular GIRLS RESTROOM - C126 - CEILING PLASTER - BOTTOM LAYER	NY ELAP 198.1		90% Non-Fibrous 10% Vermiculite	**Analysis Halted**	
			NY ELAP 198.6				
			NY ELAP 198.4				
44	44	White Homogenous Granular GIRLS RESTROOM - C126 - UPPER WALLS PLASTER - TOP LAYER	NY ELAP 198.1		100% Non-Fibrous	**None Detected**	
			NY ELAP 198.6				
			NY ELAP 198.4				
45	45	White Homogenous Granular GIRLS RESTROOM - C126 - UPPER WALLS PLASTER - TOP LAYER	NY ELAP 198.1		100% Non-Fibrous	**None Detected**	
			NY ELAP 198.6				
			NY ELAP 198.4				
46	46	White Homogenous Granular GIRLS RESTROOM - C126 - UPPER WALLS PLASTER - TOP LAYER	NY ELAP 198.1		100% Non-Fibrous	**None Detected**	
			NY ELAP 198.6				
			NY ELAP 198.4				
47	47	Brown Homogenous Granular GIRLS RESTROOM - C126 - UPPER WALLS PLASTER - BOTTOM LAYER	NY ELAP 198.1		100% Non-Fibrous	**None Detected**	
			NY ELAP 198.6				
			NY ELAP 198.4				
48	48	Brown Homogenous Granular GIRLS RESTROOM - C126 - UPPER WALLS PLASTER - BOTTOM LAYER	NY ELAP 198.1		100% Non-Fibrous	**None Detected**	
			NY ELAP 198.6				
			NY ELAP 198.4				
49	49	Brown Homogenous Granular GIRLS RESTROOM - C126 - UPPER WALLS PLASTER - BOTTOM LAYER	NY ELAP 198.1		100% Non-Fibrous	**None Detected**	
			NY ELAP 198.6				
			NY ELAP 198.4				
50	50	Beige Homogenous Granular GIRLS RESTROOM - C126 - LOWER WALLS - C.T. GROUT	NY ELAP 198.1		100% Non-Fibrous	**None Detected**	
			NY ELAP 198.6				
			NY ELAP 198.4				

Comments: Samples7,8,9,13,14,15,41,42,43,69,70,71,93,94,95,96,97 & 98 analysis was terminated due to the presence of vermiculite. Results are inconclusive and must go for 198.8 method for further verification.

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	Staten Island NY 10308	Location:	**50 Blauvelt Road**		
	P: (347) 276-2339 F: (631) 991-9143		**Miller ES - Various**	Sample Received:	03/06/2022
			Nanuet	PLM Analysis Date:	03/07/2022
Contact:	**Alex Rubin**	Sampled By:	A.R.	TEM Analysis Date:	03/07/2022
	M:	Sampled Date:	03/05/2022	Reported By:	Turiana Moreira
	E:	Turnaround Time:	24 hrs	Report Date:	03/08/2022

Summary of Analysis

LAB ID #	Client Sample #	Sample Description	Test	Fibrous Material	Non-Fibrous Material	Asbestos	Total Asbestos
51	51	Beige Homogenous Granular GIRLS RESTROOM - C126 - LOWER WALLS - C.T. GROUT	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
52	52	White Homogenous Granular GIRLS RESTROOM - C126 - LOWER WALLS - C.T. GROUT	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
53	53	Grey Homogenous Granular GIRLS RESTROOM - C126 - LOWER WALLS - C.T. THINSET	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
54	54	Grey Homogenous Granular GIRLS RESTROOM - C126 - LOWER WALLS - C.T. THINSET	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
55	55	Grey Homogenous Granular GIRLS RESTROOM - C126 - LOWER WALLS - C.T. THINSET	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
56	56	Grey Homogenous Granular GIRLS RESTROOM - C126 - LOWER WALLS - MORTAR	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
57	57	Grey Homogenous Granular GIRLS RESTROOM - C126 - LOWER WALLS - MORTAR	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
58	58	Grey Homogenous Granular GIRLS RESTROOM - C126 - LOWER WALLS - MORTAR	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
59	59	Black Homogenous NOB GIRLS RESTROOM - C126 - WET WALLS PIPE INSULATION OUTER COAT - TAR PAPER	NY ELAP 198.1				
			NY ELAP 198.6			2.2% Chrysotile	2.2%
			NY ELAP 198.4			Not Analyzed	
60	60	Black Homogenous NOB GIRLS RESTROOM - C126 - WET WALLS PIPE INSULATION OUTER COAT - TAR PAPER	NY ELAP 198.1				
			NY ELAP 198.6			Positive Stop Not Analyzed	
			NY ELAP 198.4			Not Analyzed	

Comments: Samples7,8,9,13,14,15,41,42,43,69,70,71,93,94,95,96,97 & 98 analysis was terminated due to the presence of vermiculite. Results are inconclusive and must go for 198.8 method for further verification.

Equipment: PLM SCOPE Nikon Optiphot-2
TEM SCOPE #1 - Hitachi H-600

Zlatan Dimitrijevic
Laboratory Director

Sameh Youssef
PLM Analyst

Zlatan Dimitrijevic
TEM Analyst

NYS ELAP ID # 12003

NVLAP Lab Code 500081-0

METRO ANALYTICAL LABORATORIES
255 West 36th St., Suite #101
New York, NY 10018
p: (212) 695-0165 f: (212) 695-0183

ASBESTOS ANALYSIS of BULK SAMPLE by POLARIZED LIGHT MICROSCOPY and TRANSMISSION ELECTRON MICROSCOPY

Client:	**Green Path Environmental Inc**	Contract:	**Nanuet UFSD**	**Metro Lab ID #:**	**B22030206**
Address:	79 Glover Street	Client Job #:	**1937.07.01**		
	Staten Island NY 10308	Location:	**50 Blauvelt Road**		
	P: (347) 276-2339 F: (631) 991-9143		**Miller ES - Various**	Sample Received:	03/06/2022
			Nanuet	PLM Analysis Date:	03/07/2022
Contact:	**Alex Rubin**	Sampled By:	A.R.	TEM Analysis Date:	03/07/2022
	M:	Sampled Date:	03/05/2022	Reported By:	Turiana Moreira
	E:	Turnaround Time:	24 hrs	Report Date:	03/08/2022

Summary of Analysis

LAB ID #	Client Sample #	Sample Description	Test	Fibrous Material	Non-Fibrous Material	Asbestos	Total Asbestos
61	61	Black Homogenous NOB GIRLS RESTROOM - C126 - WET WALLS PIPE INSULATION OUTER COAT - TAR PAPER	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4			**Positive Stop** **Not Analyzed** **Not Analyzed**	
62	62	Brown Homogenous Fibrous GIRLS RESTROOM - C126 - WET WALLS PIPE INSULATION INNER COAT - PAPER	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4	95% Cellulose	2.72% Non-Fibrous	**2.28% Chrysotile**	**2.3%**
63	63	GIRLS RESTROOM - C126 - WET WALLS PIPE INSULATION INNER COAT - PAPER	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4			**Positive Stop** **Not Analyzed**	
64	64	GIRLS RESTROOM - C126 - WET WALLS PIPE INSULATION INNER COAT - PAPER	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4			**Positive Stop** **Not Analyzed**	
65	65	Grey Homogenous Granular GIRLS RESTROOM - C126 - FLOOR - C.T. THINSET / GROUT	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4		100% Non-Fibrous	**None Detected**	
66	66	Grey Homogenous Granular GIRLS RESTROOM - C126 - FLOOR - C.T. THINSET / GROUT	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4		100% Non-Fibrous	**None Detected**	
67	67	Grey Homogenous Granular GIRLS RESTROOM - C126 - SOFT FILLER MORTAR	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4		100% Non-Fibrous	**None Detected**	
68	68	Grey Homogenous Granular GIRLS RESTROOM - C126 - SOFT FILLER MORTAR	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4		100% Non-Fibrous	**None Detected**	
69	69	White Homogenous Granular KINDERGARTEN RESTROOMS C132/C133 - CEILING PLASTER - TOP LAYER	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4		93% Non-Fibrous 7% Vermiculite	**Analysis Halted**	
70	70	White Homogenous Granular KINDERGARTEN RESTROOMS C132/C133 - CEILING PLASTER - TOP LAYER	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4		91% Non-Fibrous 9% Vermiculite	**Analysis Halted**	

Comments: Samples7,8,9,13,14,15,41,42,43,69,70,71,93,94,95,96,97 & 98 analysis was terminated due to the presence of vermiculite. Results are inconclusive and must go for 198.8 method for further verification.

Equipment: PLM SCOPE Nikon Optiphot-2
TEM SCOPE #1 - Hitachi H-600

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Sameh Youssef
PLM Analyst

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NVLAP Lab Code 500081-0

METRO ANALYTICAL LABORATORIES
255 West 36th St., Suite #101
New York, NY 10018
p: (212) 695-0165 f: (212) 695-0183

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	Staten Island NY 10308	Location:	**50 Blauvelt Road**		
	P: (347) 276-2339 F: (631) 991-9143		**Miller ES - Various**	Sample Received:	03/06/2022
			Nanuet	PLM Analysis Date:	03/07/2022
Contact:	**Alex Rubin**	Sampled By:	A.R.	TEM Analysis Date:	03/07/2022
	M:	Sampled Date:	03/05/2022	Reported By:	Turiana Moreira
	E:	Turnaround Time:	24 hrs	Report Date:	03/08/2022

Summary of Analysis

LAB ID #	Client Sample #	Sample Description	Test	Fibrous Material	Non-Fibrous Material	Asbestos	Total Asbestos
71	71	White Homogenous Granular KINDERGARTEN RESTROOMS C132/C133 - CEILING PLASTER - TOP LAYER	NY ELAP 198.1		92% Non-Fibrous 8% Vermiculite	**Analysis Halted**	
			NY ELAP 198.6				
			NY ELAP 198.4				
72	72	Grey Homogenous Granular KINDERGARTEN RESTROOMS C132/C133 - CEILING PLASTER - BOTTOM LAYER	NY ELAP 198.1	2% Cellulose	96.32% Non-Fibrous	**1.68% Chrysotile**	**1.7%**
			NY ELAP 198.6				
			NY ELAP 198.4				
73	73	KINDERGARTEN RESTROOMS C132/C133 - CEILING PLASTER - BOTTOM LAYER	NY ELAP 198.1			**Positive Stop** **Not Analyzed**	
			NY ELAP 198.6				
			NY ELAP 198.4				
74	74	KINDERGARTEN RESTROOMS C132/C133 - CEILING PLASTER - BOTTOM LAYER	NY ELAP 198.1			**Positive Stop** **Not Analyzed**	
			NY ELAP 198.6				
			NY ELAP 198.4				
75	75	White Homogenous NOB KINDERGARTEN RESTROOMS C132/C133 - DOOR FRAME - CAULKING	NY ELAP 198.1				
			NY ELAP 198.6			**Inconclusive** **None Detected**	
			NY ELAP 198.4			**None Detected**	
76	76	White Homogenous NOB KINDERGARTEN RESTROOMS C132/C133 - DOOR FRAME - CAULKING	NY ELAP 198.1				
			NY ELAP 198.6			**Inconclusive** **None Detected**	
			NY ELAP 198.4			**None Detected**	
77	77	Brown Homogenous NOB KINDERGARTEN RESTROOMS C132/C133 - WALL PANELS GLUE	NY ELAP 198.1				
			NY ELAP 198.6			**Inconclusive** **None Detected**	
			NY ELAP 198.4			**None Detected**	
78	78	Brown Homogenous NOB KINDERGARTEN RESTROOMS C132/C133 - WALL PANELS GLUE	NY ELAP 198.1				
			NY ELAP 198.6			**Inconclusive** **None Detected**	
			NY ELAP 198.4			**None Detected**	
79	79	Grey Homogenous Granular KINDERGARTEN RESTROOMS C132/C133 - WALL PLASTER - BOTTOM LAYER	NY ELAP 198.1		100% Non-Fibrous	**None Detected**	
			NY ELAP 198.6				
			NY ELAP 198.4				
80	80	Grey Homogenous Granular KINDERGARTEN RESTROOMS C132/C133 - WALL PLASTER - BOTTOM LAYER	NY ELAP 198.1		100% Non-Fibrous	**None Detected**	
			NY ELAP 198.6				
			NY ELAP 198.4				

Comments: Samples7,8,9,13,14,15,41,42,43,69,70,71,93,94,95,96,97 & 98 analysis was terminated due to the presence of vermiculite. Results are inconclusive and must go for 198.8 method for further verification.

Equipment: PLM SCOPE Nikon Optiphot-2
TEM SCOPE #1 - Hitachi H-600

Zlatan Dimitrijevic
Laboratory Director

Sameh Youssef
PLM Analyst

Zlatan Dimitrijevic
TEM Analyst

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METRO ANALYTICAL LABORATORIES
255 West 36th St., Suite #101
New York, NY 10018
p: (212) 695-0165 f: (212) 695-0183

ASBESTOS ANALYSIS of BULK SAMPLE by POLARIZED LIGHT MICROSCOPY and TRANSMISSION ELECTRON MICROSCOPY

Client:	**Green Path Environmental Inc**	Contract:	**Nanuet UFSD**	**Metro Lab ID #:**	**B22030206**
Address:	79 Glover Street	Client Job #:	**1937.07.01**		
	Staten Island NY 10308	Location:	**50 Blauvelt Road**		
	P: (347) 276-2339 F: (631) 991-9143		**Miller ES - Various**	Sample Received:	03/06/2022
			Nanuet	PLM Analysis Date:	03/07/2022
Contact:	**Alex Rubin**	Sampled By:	A.R.	TEM Analysis Date:	03/07/2022
	M:	Sampled Date:	03/05/2022	Reported By:	Turiana Moreira
	E:	Turnaround Time:	24 hrs	Report Date:	03/08/2022

Summary of Analysis

LAB ID #	Client Sample #	Sample Description	Test	Fibrous Material	Non-Fibrous Material	Asbestos	Total Asbestos
81	81	Grey Homogenous Granular KINDERGARTEN RESTROOMS C132/C133 - WALL PLASTER - BOTTOM LAYER	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
82	82	Grey Homogenous Granular KINDERGARTEN RESTROOMS C132/C133 - WALL PLASTER - TOP LAYER	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
83	83	White Homogenous Granular KINDERGARTEN RESTROOMS C132/C133 - WALL PLASTER - TOP LAYER	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
84	84	White Homogenous Granular KINDERGARTEN RESTROOMS C132/C133 - WALL PLASTER - TOP LAYER	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
85	85	Black Homogenous NOB KINDERGARTEN RESTROOMS C132/C133 - BEHIND C.T. COVEBASE - TAR PAPER	NY ELAP 198.1				
			NY ELAP 198.6			Inconclusive	None Detected
			NY ELAP 198.4				None Detected
86	86	Black Homogenous NOB KINDERGARTEN RESTROOMS C132/C133 - BEHIND C.T. COVEBASE - TAR PAPER	NY ELAP 198.1				
			NY ELAP 198.6			Inconclusive	None Detected
			NY ELAP 198.4				None Detected
87	87	White Homogenous NOB KINDERGARTEN RESTROOMS C132/C133 - BEHIND C.T. COVEBASE - GLUE	NY ELAP 198.1				
			NY ELAP 198.6			Inconclusive	None Detected
			NY ELAP 198.4				None Detected
88	88	White Homogenous NOB KINDERGARTEN RESTROOMS C132/C133 - BEHIND C.T. COVEBASE - GLUE	NY ELAP 198.1				
			NY ELAP 198.6			Inconclusive	None Detected
			NY ELAP 198.4				None Detected
89	89	Beige Homogenous Granular KINDERGARTEN RESTROOMS C132/C133 - FLOOR & COVE BASE C.T. GROUT	NY ELAP 198.1		100% Non-Fibrous		None Detected
			NY ELAP 198.6				
			NY ELAP 198.4				
90	90	Beige Homogenous Granular KINDERGARTEN RESTROOMS C132/C133 - FLOOR & COVE BASE C.T. GROUT	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				

Comments: Samples7,8,9,13,14,15,41,42,43,69,70,71,93,94,95,96,97 & 98 analysis was terminated due to the presence of vermiculite. Results are inconclusive and must go for 198.8 method for further verification.

Equipment: PLM SCOPE Nikon Optiphot-2
TEM SCOPE #1 - Hitachi H-600

Zlatan Dimitrijevic
Laboratory Director

Sameh Youssef
PLM Analyst

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TEM Analyst

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NVLAP Lab Code 500081-0

METRO ANALYTICAL LABORATORIES
255 West 36th St., Suite #101
New York, NY 10018
p: (212) 695-0165 f: (212) 695-0183

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Address:	79 Glover Street	Client Job #:	**1937.07.01**		
	Staten Island NY 10308	Location:	**50 Blauvelt Road**		
	P: (347) 276-2339 F: (631) 991-9143		**Miller ES - Various**	Sample Received:	03/06/2022
			Nanuet	PLM Analysis Date:	03/07/2022
Contact:	**Alex Rubin**	Sampled By:	A.R.	TEM Analysis Date:	03/07/2022
	M:	Sampled Date:	03/05/2022	Reported By:	Turiana Moreira
	E:	Turnaround Time:	24 hrs	Report Date:	03/08/2022

Summary of Analysis

LAB ID #	Client Sample #	Sample Description	Test	Fibrous Material	Non-Fibrous Material	Asbestos	Total Asbestos
91	91	Brown / Grey Homogenous NOB KINDERGARTEN RESTROOMS C132/C133 - FLOOR - THINSET W/ GLUE TO C.T.	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4			 2.5% Chrysotile Not Analyzed	2.5%
92	92	Brown / Grey Homogenous NOB KINDERGARTEN RESTROOMS C132/C133 - FLOOR - THINSET W/ GLUE TO C.T.	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4			 Positive Stop Not Analyzed Not Analyzed	
93	93	Brown Homogenous Granular KINDERGARTEN RESTROOMS C132/C133 - UPPER CEILING PLASTER - BOTTOM LAYER	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4		70% Non-Fibrous 30% Vermiculite	Analysis Halted	
94	94	Brown Homogenous Granular KINDERGARTEN RESTROOMS C132/C133 - UPPER CEILING PLASTER - BOTTOM LAYER	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4		80% Non-Fibrous 20% Vermiculite	Analysis Halted	
95	95	Brown Homogenous Granular KINDERGARTEN RESTROOMS C132/C133 - UPPER CEILING PLASTER - BOTTOM LAYER	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4		75% Non-Fibrous 25% Vermiculite	Analysis Halted	
96	96	White Homogenous Granular KINDERGARTEN RESTROOMS C132/C133 - UPPER CEILING PLASTER - TOP LAYER	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4		70% Non-Fibrous 30% Vermiculite	Analysis Halted	
97	97	White Homogenous Granular KINDERGARTEN RESTROOMS C132/C133 - UPPER CEILING PLASTER - TOP LAYER	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4		85% Non-Fibrous 15% Vermiculite	Analysis Halted	
98	98	White Homogenous Granular KINDERGARTEN RESTROOMS C132/C133 - UPPER CEILING PLASTER - TOP LAYER	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4		80% Non-Fibrous 20% Vermiculite	Analysis Halted	
99	99	Yellow / Brown Homogenous NOB KINDERGARTEN RESTROOMS C132/C133 - WALL PEDBOARD W/ GLUE	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4			 2.5% Chrysotile Not Analyzed	2.5%
100	100	Yellow / Brown Homogenous NOB KINDERGARTEN RESTROOMS C132/C133 - WALL PEDBOARD W/ GLUE	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4			 Positive Stop Not Analyzed Not Analyzed	

Comments: Samples7,8,9,13,14,15,41,42,43,69,70,71,93,94,95,96,97 & 98 analysis was terminated due to the presence of vermiculite. Results are inconclusive and must go for 198.8 method for further verification.

Equipment: PLM SCOPE Nikon Optiphot-2
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255 West 36th St., Suite #101
New York, NY 10018
p: (212) 695-0165 f: (212) 695-0183

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	P: (347) 276-2339 F: (631) 991-9143		**Miller ES - Various**	Sample Received:	03/06/2022
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Contact:	**Alex Rubin**	Sampled By:	A.R.	TEM Analysis Date:	03/07/2022
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	E:	Turnaround Time:	24 hrs	Report Date:	03/08/2022

Summary of Analysis

LAB ID #	Client Sample #	Sample Description	Test	Fibrous Material	Non-Fibrous Material	Asbestos	Total Asbestos
101	101	Brown Homogenous NOB KINDERGARTEN RESTROOMS C132/C133 - GLUE BEHIND PEDBOARD	NY ELAP 198.1				
			NY ELAP 198.6			Inconclusive	None Detected
			NY ELAP 198.4				None Detected
102	102	Brown Homogenous NOB KINDERGARTEN RESTROOMS C132/C133 - GLUE BEHIND PEDBOARD	NY ELAP 198.1				
			NY ELAP 198.6			Inconclusive	None Detected
			NY ELAP 198.4				None Detected
103	103	Grey Homogenous Fibrous KINDERGARTEN RESTROOMS C132/C133 - WET WALL PIPE INSULATION	NY ELAP 198.1	40% Fiberglass	60% Non-Fibrous		None Detected
			NY ELAP 198.6				
			NY ELAP 198.4				
104	104	Grey Homogenous Fibrous KINDERGARTEN RESTROOMS C132/C133 - WET WALL PIPE INSULATION	NY ELAP 198.1	25% Fiberglass	75% Non-Fibrous		None Detected
			NY ELAP 198.6				
			NY ELAP 198.4				
105	105	Grey Homogenous Fibrous KINDERGARTEN RESTROOMS C132/C133 - WET WALL PIPE INSULATION	NY ELAP 198.1	25% Fiberglass	75% Non-Fibrous		None Detected
			NY ELAP 198.6				
			NY ELAP 198.4				
106	106	White Homogenous Granular RESTROOMS C128/C129 + C134/C135 - CEILING PLASTER MATERIAL	NY ELAP 198.1		100% Non-Fibrous		None Detected
			NY ELAP 198.6				
			NY ELAP 198.4				
107	107	White Homogenous Granular RESTROOMS C128/C129 + C134/C135 - CEILING PLASTER MATERIAL	NY ELAP 198.1		100% Non-Fibrous		None Detected
			NY ELAP 198.6				
			NY ELAP 198.4				
108	108	White Homogenous Granular RESTROOMS C128/C129 + C134/C135 - CEILING PLASTER MATERIAL	NY ELAP 198.1		100% Non-Fibrous		None Detected
			NY ELAP 198.6				
			NY ELAP 198.4				
109	109	Grey Homogenous Granular RESTROOMS C128/C129 - UPPER WALL PLASTER - BOTTOM LAYER	NY ELAP 198.1		100% Non-Fibrous		None Detected
			NY ELAP 198.6				
			NY ELAP 198.4				
110	110	Grey Homogenous Granular RESTROOMS C128/C129 - UPPER WALL PLASTER - BOTTOM LAYER	NY ELAP 198.1		100% Non-Fibrous		None Detected
			NY ELAP 198.6				
			NY ELAP 198.4				

Comments: Samples7,8,9,13,14,15,41,42,43,69,70,71,93,94,95,96,97 & 98 analysis was terminated due to the presence of vermiculite. Results are inconclusive and must go for 198.8 method for further verification.

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			Nanuet	PLM Analysis Date:	03/07/2022
Contact:	**Alex Rubin**	Sampled By:	A.R.	TEM Analysis Date:	03/07/2022
	M:	Sampled Date:	03/05/2022	Reported By:	Turiana Moreira
	E:	Turnaround Time:	24 hrs	Report Date:	03/08/2022

Summary of Analysis

LAB ID #	Client Sample #	Sample Description	Test	Fibrous Material	Non-Fibrous Material	Asbestos	Total Asbestos
111	111	Grey Homogenous Granular RESTROOMS C128/C129 - UPPER WALL PLASTER - BOTTOM LAYER	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
112	112	White Homogenous Granular RESTROOMS C128/C129 - UPPER WALL PLASTER - BOTTOM LAYER	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
113	113	White Homogenous Granular RESTROOMS C128/C129 - UPPER WALL PLASTER - BOTTOM LAYER	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
114	114	White Homogenous Granular RESTROOMS C128/C129 - UPPER WALL PLASTER - BOTTOM LAYER	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
115	115	Grey Homogenous Granular RESTROOMS C134/C135 - WALL - CMU BLOCK	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
116	116	Grey Homogenous Granular RESTROOMS C134/C135 - WALL - CMU BLOCK	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
117	117	Tan Homogenous Granular RESTROOMS C134/C135 + C128/C129 - WALL C.T. GROUT	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
118	118	Tan Homogenous Granular RESTROOMS C134/C135 + C128/C129 - WALL C.T. GROUT	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
119	119	Tan Homogenous Granular RESTROOMS C134/C135 + C128/C129 - WALL C.T. GROUT	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
120	120	Grey Homogenous Granular RESTROOMS C134/C135 + C128/C129 - WALL C.T. THINSET MORTAR	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				

Comments: Samples7,8,9,13,14,15,41,42,43,69,70,71,93,94,95,96,97 & 98 analysis was terminated due to the presence of vermiculite. Results are inconclusive and must go for 198.8 method for further verification.

Equipment: PLM SCOPE Nikon Optiphot-2
TEM SCOPE #1 - Hitachi H-600

Zlatan Dimitrijevic
Laboratory Director

Sameh Youssef
PLM Analyst

Zlatan Dimitrijevic
TEM Analyst

NYS ELAP ID # 12003

NVLAP Lab Code 500081-0

METRO ANALYTICAL LABORATORIES
255 West 36th St., Suite #101
New York, NY 10018
p: (212) 695-0165 f: (212) 695-0183

ASBESTOS ANALYSIS of BULK SAMPLE by POLARIZED LIGHT MICROSCOPY and TRANSMISSION ELECTRON MICROSCOPY

Client:	**Green Path Environmental Inc**	Contract:	**Nanuet UFSD**	**Metro Lab ID #:**	**B22030206**
Address:	79 Glover Street	Client Job #:	**1937.07.01**		
	Staten Island NY 10308	Location:	**50 Blauvelt Road**		
	P: (347) 276-2339 F: (631) 991-9143		**Miller ES - Various**	Sample Received:	03/06/2022
			Nanuet	PLM Analysis Date:	03/07/2022
Contact:	**Alex Rubin**	Sampled By:	A.R.	TEM Analysis Date:	03/07/2022
	M:	Sampled Date:	03/05/2022	Reported By:	Turiana Moreira
	E:	Turnaround Time:	24 hrs	Report Date:	03/08/2022

Summary of Analysis

LAB ID #	Client Sample #	Sample Description	Test	Fibrous Material	Non-Fibrous Material	Asbestos	Total Asbestos
121	121	Grey Homogenous Granular RESTROOMS C134/C135 + C128/C129 - WALL C.T. THINSET MORTAR	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4		100% Non-Fibrous	None Detected	
122	122	Grey Homogenous Granular RESTROOMS C134/C135 + C128/C129 - WALL C.T. THINSET MORTAR	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4		100% Non-Fibrous	None Detected	
123	123	Grey Homogenous Granular RESTROOMS C134/C135 + C128/C129 - WALL C.T. MORTAR	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4		100% Non-Fibrous	None Detected	
124	124	Grey Homogenous Granular RESTROOMS C134/C135 + C128/C129 - WALL C.T. MORTAR	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4		100% Non-Fibrous	None Detected	
125	125	Grey Homogenous Granular RESTROOMS C134/C135 + C128/C129 - WALL C.T. MORTAR	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4		100% Non-Fibrous	None Detected	
126	126	Black Homogenous NOB RESTROOMS C134/C135 + C128/C129 - WET WALL PIPE INSUL OUTER LYR - TAR PAPER	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4			Inconclusive None Detected None Detected	
127	127	Black Homogenous NOB RESTROOMS C134/C135 + C128/C129 - WET WALL PIPE INSUL OUTER LYR - TAR PAPER	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4			Inconclusive None Detected 1.6% Chrysotile	1.6%
128	128	Black Homogenous NOB RESTROOMS C134/C135 + C128/C129 - WET WALL PIPE INSUL OUTER LYR - TAR PAPER	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4			Inconclusive None Detected Positive Stop Not Analyzed	
129	129	Brown Homogenous Fibrous RESTROOMS C134/C135 + C128/C129 - WET WALL PIPE INSUL INNER LAYER - PAPER	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4	100% Cellulose		None Detected	
130	130	Brown Homogenous Fibrous RESTROOMS C134/C135 + C128/C129 - WET WALL PIPE INSUL INNER LAYER - PAPER	NY ELAP 198.1 NY ELAP 198.6 NY ELAP 198.4	100% Cellulose		None Detected	

Comments: Samples7,8,9,13,14,15,41,42,43,69,70,71,93,94,95,96,97 & 98 analysis was terminated due to the presence of vermiculite. Results are inconclusive and must go for 198.8 method for further verification.

Equipment: PLM SCOPE Nikon Optiphot-2
TEM SCOPE #1 - Hitachi H-600

Zlatan Dimitrijevic
Laboratory Director

Sameh Youssef
PLM Analyst

Zlatan Dimitrijevic
TEM Analyst

NYS ELAP ID # 12003

NVLAP Lab Code 500081-0

METRO ANALYTICAL LABORATORIES
255 West 36th St., Suite #101
New York, NY 10018
p: (212) 695-0165 f: (212) 695-0183

ASBESTOS ANALYSIS of BULK SAMPLE by POLARIZED LIGHT MICROSCOPY and TRANSMISSION ELECTRON MICROSCOPY

Client:	**Green Path Environmental Inc**	Contract:	**Nanuet UFSD**	**Metro Lab ID #:**	**B22030206**
Address:	79 Glover Street	Client Job #:	**1937.07.01**		
	Staten Island NY 10308	Location:	**50 Blauvelt Road**		
	P: (347) 276-2339 F: (631) 991-9143		**Miller ES - Various**	Sample Received:	03/06/2022
			Nanuet	PLM Analysis Date:	03/07/2022
Contact:	**Alex Rubin**	Sampled By:	A.R.	TEM Analysis Date:	03/07/2022
	M:	Sampled Date:	03/05/2022	Reported By:	Turiana Moreira
	E:	Turnaround Time:	24 hrs	Report Date:	03/08/2022

Summary of Analysis

LAB ID #	Client Sample #	Sample Description	Test	Fibrous Material	Non-Fibrous Material	Asbestos	Total Asbestos
131	131	Brown Homogenous Fibrous RESTROOMS C134/C135 + C128/C129 - WET WALL PIPE INSUL INNER LAYER - PAPER	NY ELAP 198.1	100% Cellulose		None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
132	132	Black Homogenous NOB RESTROOMS C134/C135 - IN-WALL RADIATOR PIPE INSULATION OUTER LAYER - TAR PAPER	NY ELAP 198.1				3.0%
			NY ELAP 198.6			3.0% Chrysotile	
			NY ELAP 198.4			Not Analyzed	
133	133	Black Homogenous NOB RESTROOMS C134/C135 - IN-WALL RADIATOR PIPE INSULATION OUTER LAYER - TAR PAPER	NY ELAP 198.1				
			NY ELAP 198.6			Positive Stop Not Analyzed	
			NY ELAP 198.4			Not Analyzed	
134	134	Black Homogenous NOB RESTROOMS C134/C135 - IN-WALL RADIATOR PIPE INSULATION OUTER LAYER - TAR PAPER	NY ELAP 198.1				
			NY ELAP 198.6			Positive Stop Not Analyzed	
			NY ELAP 198.4			Not Analyzed	
135	135	Beige Homogenous Fibrous RESTROOMS C134/C135 - IN-WALL RADIATOR PIPE INSULATION INNER LAYER - AIRCELL	NY ELAP 198.1	85% Cellulose	1.67% Non-Fibrous	13.33% Chrysotile	13.3%
			NY ELAP 198.6				
			NY ELAP 198.4				
136	136	RESTROOMS C134/C135 - IN-WALL RADIATOR PIPE INSULATION INNER LAYER - AIRCELL	NY ELAP 198.1			Positive Stop Not Analyzed	
			NY ELAP 198.6				
			NY ELAP 198.4				
137	137	RESTROOMS C134/C135 - IN-WALL RADIATOR PIPE INSULATION INNER LAYER - AIRCELL	NY ELAP 198.1			Positive Stop Not Analyzed	
			NY ELAP 198.6				
			NY ELAP 198.4				
138	138	Grey Homogenous Fibrous RESTROOMS C128/C129 - WET WALL ELBOW INSULATION	NY ELAP 198.1	30% Cellulose	64.67% Non-Fibrous	5.33% Chrysotile	5.3%
			NY ELAP 198.6				
			NY ELAP 198.4				
139	139	RESTROOMS C128/C129 - WET WALL ELBOW INSULATION	NY ELAP 198.1			Positive Stop Not Analyzed	
			NY ELAP 198.6				
			NY ELAP 198.4				
140	140	RESTROOMS C128/C129 - WET WALL ELBOW INSULATION	NY ELAP 198.1			Positive Stop Not Analyzed	
			NY ELAP 198.6				
			NY ELAP 198.4				

Comments: Samples7,8,9,13,14,15,41,42,43,69,70,71,93,94,95,96,97 & 98 analysis was terminated due to the presence of vermiculite. Results are inconclusive and must go for 198.8 method for further verification.

Equipment: PLM SCOPE Nikon Optiphot-2
TEM SCOPE #1 - Hitachi H-600

Zlatan Dimitrijevic
Laboratory Director

Sameh Youssef
PLM Analyst

Zlatan Dimitrijevic
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NYS ELAP ID # 12003

NVLAP Lab Code 500081-0

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New York, NY 10018
p: (212) 695-0165 f: (212) 695-0183

ASBESTOS ANALYSIS of BULK SAMPLE by POLARIZED LIGHT MICROSCOPY and TRANSMISSION ELECTRON MICROSCOPY

Client:	**Green Path Environmental Inc**	Contract:	**Nanuet UFSD**	**Metro Lab ID #:**	**B22030206**
Address:	79 Glover Street	Client Job #:	**1937.07.01**		
	Staten Island NY 10308	Location:	**50 Blauvelt Road**		
	P: (347) 276-2339 F: (631) 991-9143		**Miller ES - Various**	Sample Received:	03/06/2022
			Nanuet	PLM Analysis Date:	03/07/2022
Contact:	**Alex Rubin**	Sampled By:	A.R.	TEM Analysis Date:	03/07/2022
	M:	Sampled Date:	03/05/2022	Reported By:	Turiana Moreira
	E:	Turnaround Time:	24 hrs	Report Date:	03/08/2022

Summary of Analysis

LAB ID #	Client Sample #	Sample Description	Test	Fibrous Material	Non-Fibrous Material	Asbestos	Total Asbestos
141	141	Grey Homogenous Granular RESTROOMS C128/C129/C134/C135 - FLOOR - C.T. GROUT	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
142	142	Grey Homogenous Granular RESTROOMS C128/C129/C134/C135 - FLOOR - C.T. GROUT	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
143	143	Grey Homogenous Granular RESTROOMS C128/C129/C134/C135 - FLOOR - C.T. THINSET MORTAR	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
144	144	Grey Homogenous Granular RESTROOMS C128/C129/C134/C135 - FLOOR - C.T. THINSET MORTAR	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
145	145	Grey Homogenous Granular THROUGHOUT SCHOOL HALLWAY - FLOOR - TERRAZZO	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				
146	146	Grey Homogenous Granular THROUGHOUT SCHOOL HALLWAY - FLOOR - TERRAZZO	NY ELAP 198.1		100% Non-Fibrous	None Detected	
			NY ELAP 198.6				
			NY ELAP 198.4				

Comments: Samples7,8,9,13,14,15,41,42,43,69,70,71,93,94,95,96,97 & 98 analysis was terminated due to the presence of vermiculite. Results are inconclusive and must go for 198.8 method for further verification.

Equipment: PLM SCOPE Nikon Optiphot-2
TEM SCOPE #1 - Hitachi H-600

Zlatan Dimitrijevic
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p: (212) 695-0165 f: (212) 695-0183

Report Notes

General Notes and Disclaimers

- The samples analyzed in this report were not collected by this laboratory - they were received from the client, or an agent of the client, in good condition, unless otherwise noted.
- All results are calculated based on client-provided samples and / or measurements and fall within the acceptable Quality Control limits, unless otherwise noted.
- The report shall not be reproduced, except in full, without the written approval of the laboratory.
- This report relates only to the samples tested. It may not be used by the client to claim project endorsement by NVLAP, NYS ELAP, or any other government agency.
- All samples will be properly disposed of after 60 days.
- Quality Control data (including 95% confidence limits, laboratory / analysis accuracy and precision) is available upon request.

Notes Regarding Asbestos Testing

- Air Sample Analysis by Phase Contrast Microscopy (PCM) adheres to Method NIOSH-7400. Results < 7 fibers / mm^2 are statistically insignificant.
- Percentages are calculated using the EPA equivalent Stratified Point-Count Method.
- Bulk Sample Analysis by Polarized Light Microscopy (PLM) Friable adheres to EPA/600/M4-082-20 or NYS ELAP 198.1.
- Bulk Sample Analysis by Polarized Light Microscopy (PLM) NOB adheres to NYS ELAP 198.6. This method does not remove vermiculite and may underestimate the level of asbestos present in a sample containing greater than 10% vermiculite.
- All inhomogeneous layers of the bulk samples were analyzed separately.
- Analytical results are sometimes based on the residue percentage(s) provided by the client along with the filters. Trace denotes asbestos detected at < 1%. Smiliarly, samples below quantitation limit (RL) are reported with a less than sign (<).
- Polarized Light Microscopy is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Quantitative TEM is currently the only method that can be used to determine if this material can be considered or treated as non-asbestos containing.
- Bulk Sample Analysis by Transmission Electron Microscopy (TEM) NOB adheres to NYS ELAP Method 198.4.
- Air Sample Analysis by Transmission Electron Microscopy (TEM) adheres to Method EPA CFR Part 763 Final Rule (AHERA).
- Air Sample Analysis by Transmission Electron Microscopy (TEM) Worksheets are available upon request.

Green Path
Environmental, Inc

BULK SAMPLE DATA AND CHAIN OF CUSTODY FORM

79 Glover Street, Suite 1, Staten Island, NY 10308
T. (347) 276-2839 • F. (646) 774-0354

Please e-mail results to: info@gpe.nyc and office@gpe.nyc

Client name: Nanuet UFSD	**LAB ID No.:** B22030206	**Date:** 3/5/22 **Time:** 9:15AM-5:00pm
Project address: 50 Blauvelt Rd, Nanuet - Miller ES	**Green Path Project #** 1937.07.01 **PO #:**	**Inspector/investigator name:** Alexander Rubin
Sampling Areas: Various	**Analysis Requested:** TAT ☐ Rush ☐ 12 Hr ☒ 24 Hr ☐ 48 Hr ☐ 72 Hr ☐ Other	**Comments:** Stop at first positive in the each homogeneous group

H.A.	SAMPLE ID	SAMPLE LOCATION	SAMPLE DESCRIPTION	COLOR	Q/TY SQ FT	Q/TY LN. FT	MATERIAL CONDITION
1	1	Boys Restroom - C124	Ceiling Plaster - Top Layer	white	253		Damaged
	2						
	3						
2	4		- Middle Layer	white			
	5						
	6						
3	7		- Bottom Layer	Brown			
	8						
	9						
4	10		Upper Wall Plaster - Top Layer	white	240		
	11						
	12						
5	13		- Bottom Layer	Brown			
	14						
	15						
		4	4			4	

☒ PLM ☒ NOB PLM ☒ NOB TEM [ ] TEM DUST WIPE - ASTM D6480-05 [ ] OTHER Specify:

Client Manager: Scott Graber - 917-623-2411

Chain Of Custody

Relinquished by: (Full Name & Signature)	Date & Time	Method of Submittal	Received by: (Full Name & Signature)	Date & Time
1. A. Rubin				3/6 3:44pm

Lab Information

Analyzed by: (Full Name)	Signature	Date	Analyzed by: (Full Name)	Signature	Date
1.			2.		

Green Path
Environmental, Inc

BULK SAMPLE DATA AND CHAIN OF CUSTODY FORM

79 Glover Street, Suite 1, Staten Island, NY 10308
T. (347) 276-2339 • F. (646) 774-0354

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Client name: Nanuet UFSD	**LAB ID No.:** B22030206	**Date:** 3/5/22 **Time:** 9:15AM-5pm
Project address: 50 Blauvelt Rd, Nanuet - Miller ES	**Green Path Project #** 1937.07.01 **PO #:**	**Inspector/investigator name:** Alexander Rubin
Sampling Areas: Various	**Analysis Requested:** TAT ☐ Rush ☐ 12 Hr ☒ 24 Hr ☐ 48 Hr ☐ 72 Hr ☐ Other	**Comments:** Stop at first positive in the each homogeneous group

H.A.	SAMPLE ID	SAMPLE LOCATION	SAMPLE DESCRIPTION	COLOR	Q/TY SQ FT	Q/TY LN. FT	MATERIAL CONDITION
6	16	Boys Restroom - C124	Lower walls - C.T. grout	white	360		Damaged
	17						
	18						
7	19		- C.T. thinset	Grey			
	20						
	21						
8	22		- mortar	D. Gray			
	23						
	24						
9	25		wet walls pipe insulation	Black		160	
	26		outer coat - TAR PAPER				
	27						
10	28		wet walls pipe insulation	Brown			
	29		inner coat - PAPER				
	30						
		"	"				"

☒ PLM ☒ NOB PLM ☒ NOB TEM ☐ TEM DUST WIPE - ASTM D6480-05 ☐ OTHER Specify:

Client Manager: Scott Graber - 917-623-2411

Chain Of Custody

Relinquished by: (Full Name & Signature)	Date & Time	Method of Submittal	Received by: (Full Name & Signature)	Date & Time
1. A. Rubin				3/6/22 3:44pm

Lab Information

Analyzed by: (Full Name)	Signature	Date	Analyzed by: (Full Name)	Signature	Date
1.			2.		

Green Path
Environmental, Inc

BULK SAMPLE DATA AND CHAIN OF CUSTODY FORM

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Please e-mail results to: info@gpe.nyc and office@gpe.nyc

Client name: Nanuet UFSD	**LAB ID No.:** B22030206	**Date:** 3/5/22 **Time:** 9:15AM - 5:00pm
Project address: 50 Blauvelt Rd, Nanuet - Miller ES	**Green Path Project #** 1937.07.01 **PO #:**	**Inspector/investigator name:** Alexander Rubin
Sampling Areas: Various	**Analysis Requested:** TAT ☐ Rush ☐ 12 Hr ☒ 24 Hr ☐ 48 Hr ☐ 72 Hr ☐ Other	**Comments:** Stop at first positive in the each homogeneous group

H.A.	SAMPLE ID	SAMPLE LOCATION	SAMPLE DESCRIPTION	COLOR	Q/TY SQ FT	Q/TY LN. FT	MATERIAL CONDITION
11	31	Boys Restroom - C124	FLOOR - Soft Filler Mortar	Brown	253		Damaged
	32						
12	33		- C.T. Thinset/Grout	Gray			
	34						
13	35	GIRLS Restroom - C126	Ceiling Plaster - Top Layer	white	208		Damaged
	36						
	37						
14	38		- Middle Layer	white			
	39						
	40						
15	41		- Bottom Layer	Brown			
	42						
	43						
16	44		Copper walls Plaster - Top Layer	white	240		
	45						
	46						

☒ PLM ☒ NOB PLM ☒ NOB TEM ☐ TEM DUST WIPE - ASTM D6480-05 ☐ OTHER Specify:

Client Manager: Scott Graber - 917-623-2411

Chain Of Custody

Relinquished by: (Full Name & Signature)	Date & Time	Method of Submittal	Received by: (Full Name & Signature)	Date & Time
1. A. Rubin				3/6/22 8:24PM

Lab Information

Analyzed by: (Full Name)	Signature	Date	Analyzed by: (Full Name)	Signature	Date
1.			2.		

Green Path
Environmental, Inc

BULK SAMPLE DATA AND CHAIN OF CUSTODY FORM

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Please e-mail results to: info@gpe.nyc and office@gpe.nyc

Client name: Nanuet UFSD	LAB ID No.: B2203020 6	Date: 3/5/22 Time: 9:15AM - 5:00pm
Project address: 50 Blauvelt Rd, Nanuet - Miller ES	Green Path Project # 1937.07.01 PO #:	Inspector/investigator name: Alexander Rubin
Sampling Areas: Various	Analysis Requested: TAT ☐ Rush ☐ 12 Hr ☒ 24 Hr ☐ 48 Hr ☐ 72 Hr ☐ Other	Comments: Stop at first positive in the each homogeneous group

H.A.	SAMPLE ID	SAMPLE LOCATION	SAMPLE DESCRIPTION	COLOR	Q/TY SQ FT	Q/TY LN. FT	MATERIAL CONDITION
17	47	GR/S Restroom - C 126	Upper walls Plaster-Bottom Layer	Brown	240		Damaged
	48						
	49						
18	50		Lower walls - C.T. grout	white	420		
	51						
	52						
19	53		- C.T. thinset	Gray			
	54						
	55						
20	56		- mortar	D. Gray			
	57						
	58						
21	59		wet walls pipe insulation	Black		160	
	60		outer coat - TAR PAPER				
	61						
	~~62~~	4	4			4	

☒ PLM ☒ NOB PLM ☒ NOB TEM ☐ TEM DUST WIPE - ASTM D6480-05 ☐ OTHER Specify:

Client Manager: Scott Graber - 917-623-2411

Chain Of Custody

Relinquished by: (Full Name & Signature)	Date & Time	Method of Submittal	Received by: (Full Name & Signature)	Date & Time
1. A. Rubin			Janet	3/6/22 8:24pm

Lab Information

Analyzed by: (Full Name)	Signature	Date	Analyzed by: (Full Name)	Signature	Date
1.			2.		

Green Path
Environmental, Inc

BULK SAMPLE DATA AND CHAIN OF CUSTODY FORM

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Please e-mail results to: info@gpe.nyc and office@gpe.nyc

Client name: Nanuet UFSD	**LAB ID No:** B22030206	**Date:** 3/5/22 **Time:** 9:15AM - 5:00pm
Project address: 50 Blauvelt Rd, Nanuet - Miller ES	**Green Path Project #** 1937.07.01 **PO #:**	**Inspector/investigator name:** Alexander Rubin
Sampling Areas: Various	**Analysis Requested:** TAT ☐ Rush ☐ 12 Hr ☒ 24 Hr ☐ 48 Hr ☐ 72 Hr ☐ Other	**Comments:** Stop at first positive in the each homogeneous group

H.A.	SAMPLE ID	SAMPLE LOCATION	SAMPLE DESCRIPTION	COLOR	Q/TY SQ FT	Q/TY LN. FT	MATERIAL CONDITION
22	62	Girls Restroom - C126	Wet Walls - Pipe Insulation	Brown		160	Damaged
	63	↓	Inner coat - Paper	↓		↓	↓
	64	↓	↓	↓		↓	↓
23	65	↓	Floor - C.T. Thinset/Grout	Gray	208	↓	↓
	66	↓	↓	↓	↓	↓	↓
24	67	↓	- Soft Filler Mortar	Brown	↓	↓	↓
	68	↓	↓	↓	↓	↓	↓
25	69	Kindergarten Restrooms C132/C133	Ceiling Plaster - Top Layer	white	48	↓	↓
	70	↓	↓	↓	↓	↓	↓
	71	↓	↓	↓	↓	↓	↓
26	72	↓	- Bottom Layer	Brown	↓	↓	↓
	73	↓	↓	↓	↓	↓	↓
	74	↓	↓	↓	↓	↓	↓
27	75	↓	Door Frame - Ceiling	white	1	↓	↓
	76	↓	↓	↓	↓	↓	↓

☒ PLM ☒ NOB PLM ☒ NOB TEM ☐ TEM DUST WIPE - ASTM D6480-05 ☐ OTHER Specify:

Client Manager: Scott Graber - 917-623-2411

Chain Of Custody

Relinquished by: (Full Name & Signature)	Date & Time	Method of Submittal	Received by: (Full Name & Signature)	Date & Time
1. A. Rubin			Janet	3/6/22 8:44 am

Lab Information

Analyzed by: (Full Name)	Signature	Date	Analyzed by: (Full Name)	Signature	Date
1.			2.		

Green Path
Environmental, Inc

BULK SAMPLE DATA AND CHAIN OF CUSTODY FORM

79 Glover Street, Suite 1, Staten Island, NY 10308
T. (347) 276-2339 • F. (646) 774-0354

Please e-mail results to: info@gpe.nyc and office@gpe.nyc

Client name: Nanuet UFSD	LAB ID No.: B220302206	Date: 3/5/22 Time: 9:15AM-5:00pm
Project address: 50 Blauvelt Rd, Nanuet - Miller ES	Green Path Project # 1937.07.01 PO #:	Inspector/investigator name: Alexander Rubin
Sampling Areas: Various	Analysis Requested: TAT ☐ Rush ☐ 12 Hr ☒ 24 Hr ☐ 48 Hr ☐ 72 Hr ☐ Other	Comments: Stop at first positive in the each homogeneous group

H.A.	SAMPLE ID	SAMPLE LOCATION	SAMPLE DESCRIPTION	COLOR	Q/TY SQ FT	Q/TY LN. FT	MATERIAL CONDITION
28	77	Kindergarten Restroom's C132/C133	wall paint's glue	Brown	120		Damaged
	78			↓	↓		
29	79		wall Plaster-Bottom layer	Gray	240		
	80						
	81						
30	82		-Top layer	white			
	83						
	84						
31	85		Behind C.T. Cove Base-Tar Paper	Black	8		
	86						
32	87		-Glue	white	8		
	88						
33	89		Floor & Cove Base C.T. grout	Brown	48		
	90						
34	91		Floor - Thinset w/glue	Gray/Brown	48		
	92		To C.T.				

☒ PLM ☒ NOB PLM ☒ NOB TEM ☐ TEM DUST WIPE - ASTM D6480-05 ☐ OTHER Specify:

Client Manager: Scott Graber - 917-623-2411

Chain Of Custody				
Relinquished by: (Full Name & Signature) A. Rubin	Date & Time	Method of Submittal	Received by: (Full Name & Signature)	Date & Time
1.				3/6/22 8:44pm

Lab Information

Analyzed by: (Full Name)	Signature	Date	Analyzed by: (Full Name)	Signature	Date
1.			2.		

Green Path
Environmental, Inc

BULK SAMPLE DATA AND CHAIN OF CUSTODY FORM

79 Glover Street, Suite 1, Staten Island, NY 10308
T. (347) 276-2339 • F. (646) 774-0354

Please e-mail results to: info@gpe.nyc and office@gpe.nyc

Client name: Nanuet UFSD	**LAB ID No.:** B22030206	**Date:** 3/6/22 **Time:** 9:30AM – 1pm
Project address: 50 Blauvelt Rd, Nanuet - Miller ES	**Green Path Project #** 1937.07.01 **PO #:**	**Inspector/investigator name:** Alexander Rubin
Sampling Areas: Various	**Analysis Requested:** TAT ☐ Rush ☐ 12 Hr ☒ 24 Hr ☐ 48 Hr ☐ 72 Hr ☐ Other	**Comments:** Stop at first positive in the each homogeneous group

H.A.	SAMPLE ID	SAMPLE LOCATION	SAMPLE DESCRIPTION	COLOR	Q/TY SQ FT	Q/TY LN. FT	MATERIAL CONDITION
35	93	Kindergarten Restrooms C132/C133	Upper Ceiling Plaster-Bottom Layer	Brown	40		Damaged
	94						
	95						
36	96		= Top layer	white			
	97						
	98						
37	99		Wall pegboard w/glue L	Brown	60		Good
	100						
38	101		Glue Behind Pegboard	Brown			
	102						
39	103		Wet wall pipe insulation	white		10	Damaged
	104						
	105						
40	106	Restrooms C128/C129+ C134/C135	Ceiling Plaster Material	white	554		Damaged
	107						
	108						

☒ PLM ☒ NOB PLM ☒ NOB TEM ☐ TEM DUST WIPE - ASTM D6480-05 [ ] OTHER Specify:

Client Manager: Scott Graber - 917-623-2411

Chain Of Custody

Relinquished by: (Full Name & Signature)	Date & Time	Method of Submittal	Received by: (Full Name & Signature)	Date & Time
1. A. Rubin				3/6/22 8:44pm

Lab Information

Analyzed by: (Full Name)	Signature	Date	Analyzed by: (Full Name)	Signature	Date
1.			2.		

Green Path
Environmental, Inc

BULK SAMPLE DATA AND CHAIN OF CUSTODY FORM

79 Glover Street, Suite 1, Staten Island, NY 10308
T. (347) 276-2339 • F. (646) 774-0354

Please e-mail results to: info@gpe.nyc and office@gpe.nyc

Client name: Nanuet UFSD	**LAB ID No.:** B2203026	**Date:** 3/6/22 **Time:** 9:30AM - 1pm
Project address: 50 Blauvelt Rd, Nanuet - Miller ES	**Green Path Project #** 1937.07.01 **PO #:**	**Inspector/investigator name:** Alexander Rubin
Sampling Areas: Various	**Analysis Requested:** TAT ☐ Rush ☐ 12 Hr ☒ 24 Hr ☐ 48 Hr ☐ 72 Hr ☐ Other	**Comments:** Stop at first positive in the each homogeneous group

H.A.	SAMPLE ID	SAMPLE LOCATION	SAMPLE DESCRIPTION	COLOR	Q/TY SQ FT	Q/TY LN. FT	MATERIAL CONDITION
41	109	Restrooms C128/C129 +	Upper wall Plaster - Bottom Layer	Gray	400		Damaged
	110	~~C134/C135~~ DD					
	111						
42	112			white			
	113						
	114						
43	115	Restrooms C134/C135	CU All - CMU Block	Gray	520		Good
	116						
44	117	Restrooms C134/C135 +	Wall C.T. grout	white	984		Damaged
	118	C128/C129					
	119						
45	120		C.T. Thinset mortar	white			
	121						
	122						
46	123		C.T. mortar	Gray			
	124						

☒ PLM ☒ NOB PLM ☒ NOB TEM ☐ TEM DUST WIPE - ASTM D6480-05 ☐ OTHER Specify:

Client Manager: Scott Graber - 917-623-2411

Chain Of Custody

Relinquished by: (Full Name & Signature)	Date & Time	Method of Submittal	Received by: (Full Name & Signature)	Date & Time
1. A. Rubin				3/6/22 3:44pm

Lab Information

Analyzed by: (Full Name)	Signature	Date	Analyzed by: (Full Name)	Signature	Date
1.			2.		

GPE License and Certification

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

Green Path Environmental, Inc.
Suite 1
79 Glover Street

Staten Island, NY 10308

FILE NUMBER: 13-72113
LICENSE NUMBER: 72113
LICENSE CLASS: RESTRICTED
DATE OF ISSUE: 06/18/2021
EXPIRATION DATE: 06/30/2022

Duly Authorized Representative – Julia Rubin:

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.

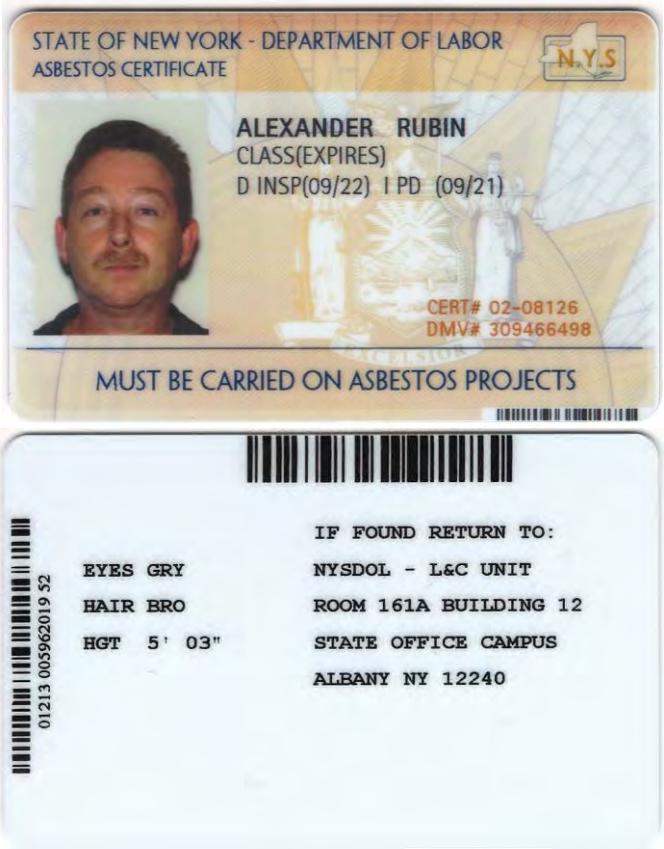
Amy Phillips, Director
For the Commissioner of Labor

SH 432 (8/12)

Green Path
Environmental, Inc

Alexander Rubin

NYS DOL Certified Asbestos Inspector/Project Design

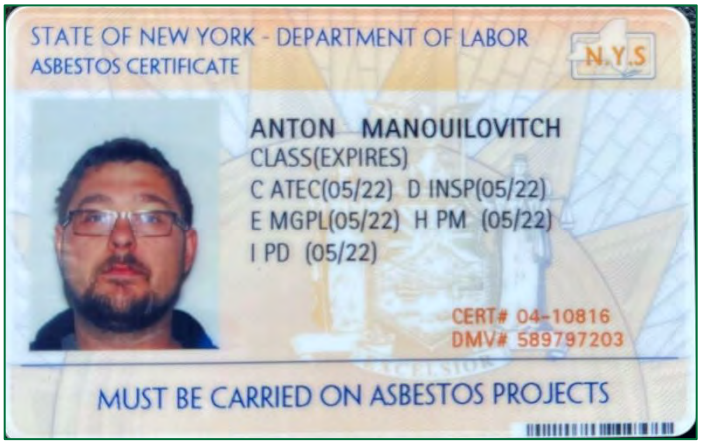


Green Path
Environmental, Inc

ANTON MANOUILOVITCH

NYC DEP Certified Asbestos Investigator

NYS DOL Certified Asbestos Inspector/Project Design Management Planner
Project Monitor/Air Sampling Technician



Laboratory Certification

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2022
Issued April 01, 2021

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. ZLATAN DIMITRIJEVIC
METRO ANALYTICAL LABORATORIES, LLC.
255 WEST 36TH STREET SUITE 101
NEW YORK, NY 10018-0022

NY Lab Id No: 12003

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
Lead in Dust Wipes	EPA 7000B
Lead in Paint	EPA 7000B

Sample Preparation Methods

EPA 3050B

NEW YORK STATE OF OPPORTUNITY. Department of Health

Serial No.: 63263

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.

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2022
Issued April 01, 2021

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. ZLATAN DIMITRIJEVIC
METRO ANALYTICAL LABORATORIES, LLC.
255 WEST 36TH STREET SUITE 101
NEW YORK, NY 10018-0022

NY Lab Id No: 12003

is hereby APPROVED as an Environmental Laboratory for the category
ENVIRONMENTAL ANALYSES AIR AND EMISSIONS
All approved subcategories and/or analytes are listed below:

Metals I	
Lead, Total	NIOSH 7082
Miscellaneous	
Asbestos	40 CFR 763 APX A No. III
Fibers	NIOSH 7400 A RULES

NEW YORK STATE OF OPPORTUNITY | Department of Health

Serial No.: 63264

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.

Green Path Environmental, Inc

NEW YORK STATE OF OPPORTUNITY. NYC Small Business Services
Certified Women-Owned Business Enterprise

March 24, 2022

To: Mr. Rudy Villanyi
Nanuet Public Schools
103 Church Street
Nanuet, New York 10954

Re: **Limited Asbestos (Vermiculite Analysis) and PCB Survey**
Nanuet High School – Phase 2 and Elevator Addition
103 Church Street, Nanuet, New York
GPE Project #: 1937.07.01

Dear Mr. Villanyi:

Green Path Environmental, Inc (GPE) was retained by the Nanuet Public Schools to conduct a limited asbestos and PCB survey at the Nanuet High School regarding the Phase 2 and elevator addition project renovation in reference to the KSQ Design Architects drawings dated January 31, 2022. The survey conducted on March 5 & 12, 2022 included visual observation, material sampling and laboratory sample analysis of the suspect asbestos containing materials and poly-chlorinated biphenyls (PCB) materials.

The east wing interior foyer ceiling plaster, interior storefront wall plaster and east wing roof bottom layer beige screed laboratory results were inconclusive using standard asbestos analytical methods 198.1, 198.6 and 198.4 so laboratory analysis went to Vermiculite analytical method 198.8 for further verification. The PCB caulking materials - exterior store front [security vestibule] window black caulking, east wing interior foyer window frame black caulking, 2nd floor science wing table top seams black caulking) were not identified as asbestos containing materials (less than one percent asbestos) using standard asbestos analytical methods and laboratory analysis went to PCB analytical EPA Method SW846 8082 for further analysis.

Based on the attached bulk sample laboratory analytical results (see attached laboratory analytical results with chain of custody forms), the Boys Restroom C124 upper wall white plaster, Kindergarten Restrooms C132 & C133 upper ceiling white plaster (outside of restrooms) were not identified as asbestos containing materials (less than one percent asbestos) using Vermiculite method 198.8.

Analysis of the bulk samples collected was performed by Alpha Labs and New York Environmental and Analytical Labs (NYE).

Alpha Labs is accredited by the New York State Department of Health, Environmental Laboratory Accreditation Program (ELAP Accreditation No. 11833) for Asbestos Bulk Sample Vermiculite Analysis by 198.8 and NYE (ELAP Accreditation No. 11510) for PCB Bulk Sample Analysis by EPA Method 7000B.

Based upon the visual inspection of suspect materials and bulk sample laboratory analytical results (see attached laboratory analytical results with chain of custody forms), the suspect materials are not identified as PCB materials (less than 50 parts per million [ppm]). The three (3) PCB sample results are non-detect at the reporting limits to 8.15 ppm.

GPE collected one caulk sample from each type of caulk at the building to be impacted by the proposed scope of work. The samples were submitted for analysis to NYE. The PCB analysis was performed using Gas Chromatography EPA Method SW846 8082.

NYE is accredited by the New York State Department of Health, Environmental Laboratory Accreditation Program (ELAP Accreditation No. 11510) for EPA Method SW846 8082.

If you have any questions, please do not hesitate to call me at (917)-623-2411.

Sincerely,
Green Path Environmental, Inc

Scott Graber
Client Manager

Attachments:
- Laboratory Analytical Results with Chain of Custody Forms (report dated March 18 and 23, 2022)
- GPE License and Certification
- Laboratory Certifications

Laboratory Analytical Results with Chain of Custody Forms (Reports dated March 18 and 23, 2022)

NEW YORK ENVIRONMENTAL

88 Harbor Road
Port Washington, NY 11050
(516) 944-9500

Laboratory Report for PCBs in Solid Waste

Report No.:2221440-21164

Customer: Green Path Environmental, Inc.
79 Glover Street
Suite 1
Staten Island, NY 10308

Project: Nanuet UFSD - Nanuet HS; 103 Church Street Nanuet, NY

Lab Sample ID: 220315K006 **Collected:** 3/14/2022
Client ID: P1 **Received:** 3/15/2022 9:53
Description: Exterior Store Front Window (Security Vestibule), Black Caulking

Parameter	Method	Analysis Date	LOQ	Result	Units	Flag(s)
PCB 1016	EPA 8082A	03/18/22	0.424	<0.424	mg/kg	
PCB 1221	EPA 8082A	03/18/22	0.424	<0.424	mg/kg	
PCB 1232	EPA 8082A	03/18/22	0.424	<0.424	mg/kg	
PCB 1242	EPA 8082A	03/18/22	0.424	<0.424	mg/kg	
PCB 1248	EPA 8082A	03/18/22	0.424	<0.424	mg/kg	
PCB 1254	EPA 8082A	03/18/22	0.424	4.30	mg/kg	
PCB 1260	EPA 8082A	03/18/22	0.424	3.85	mg/kg	
Extraction	EPA 3550C	03/16/22	Complete			

Lab Sample ID: 220315K007 **Collected:** 3/14/2022
Client ID: P2 **Received:** 3/15/2022 9:53
Description: Interior East Wing Foyer Window Frame (Elevator Project); Black Caulking

Parameter	Method	Analysis Date	LOQ	Result	Units	Flag(s)
PCB 1016	EPA 8082A	03/18/22	0.525	<0.525	mg/kg	
PCB 1221	EPA 8082A	03/18/22	0.525	<0.525	mg/kg	
PCB 1232	EPA 8082A	03/18/22	0.525	<0.525	mg/kg	
PCB 1242	EPA 8082A	03/18/22	0.525	<0.525	mg/kg	
PCB 1248	EPA 8082A	03/18/22	0.525	<0.525	mg/kg	
PCB 1254	EPA 8082A	03/18/22	0.525	<0.525	mg/kg	
PCB 1260	EPA 8082A	03/18/22	0.525	<0.525	mg/kg	
Extraction	EPA 3550C	03/16/22	Complete			

Lab Sample ID: 220315K008 **Collected:** 3/14/2022
Client ID: P3 **Received:** 3/15/2022 9:53
Description: 2nd Floor Science Wing - Table Top Seams; Black Caulking

Parameter	Method	Analysis Date	LOQ	Result	Units	Flag(s)
PCB 1016	EPA 8082A	03/18/22	0.433	<0.433	mg/kg	
PCB 1221	EPA 8082A	03/18/22	0.433	<0.433	mg/kg	
PCB 1232	EPA 8082A	03/18/22	0.433	<0.433	mg/kg	
PCB 1242	EPA 8082A	03/18/22	0.433	<0.433	mg/kg	
PCB 1248	EPA 8082A	03/18/22	0.433	<0.433	mg/kg	
PCB 1254	EPA 8082A	03/18/22	0.433	<0.433	mg/kg	
PCB 1260	EPA 8082A	03/18/22	0.433	<0.433	mg/kg	
Extraction	EPA 3550C	03/16/22	Complete			

Approved: _____
Li Tsang, Laboratory Director

NYSDOH ELAP Lab ID 11510

NEW YORK ENVIRONMENTAL

88 Harbor Road
Port Washington, NY 11050
(516) 944-9500

Laboratory Report for PCBs in Solid Waste

Report No.:2221440-21164

Comment(s):

LOQ: Limit of Quantitation PCB: Polychlorinated biphenyl

High-level Limit of Quantitation (LOQ) of prep method EPA 3550C is 20 mg/kg; any PCB quantities reported less than 20 mg/kg are estimated.

Samples analyzed on a wet-weight, "as-received" basis.

NYSDOH ELAP Lab ID 11510

Approved: _____
Li Tsang, Laboratory Director

NEW YORK ENVIRONMENTAL
88 HARBOR ROAD
PORT WASHINGTON, NY 11050
(516) 944-9500

220315K006 - 008

69450

Chain of Custody - Chemistry

Client: Green Path Environmental, Inc.	Client Proj. ID: 1937.07.01	Date: 03.14.22	Notes: **Results to info@gpe.nyc and office@gpe.nyc** **PCB analysis - 5 day TAT**
Project: Nanuet UFSD - Nanuet HS	Address: 103 Church Street, Nanuet, NY 10954		
Inspector: Alexander Rubin Signed:			
Turnaround Time: **5 days TAT**			

Sample ID. .	Location and/or Sample Description	Time of Collection	Material Sampled	Analysis	# and Type of Container	Preservative (if any)
P1	Exterior Store Front Window (Security Vestibule)	N/A	Black Caulking	PCB		
P2	Interior East Wing Foyer Window Frame (Elevator Project)	N/A	↓	↓		
P3	2nd Floor Science Wing - Table Top Seams	N/A	↓	↓		

2221440
C21164

Relinquished: S. Emmel Signature: A. Rubin Date: _____ Time: _____

Received: S. Emmel Signature: S. Emmel Date: 3/15/22 Time: 9:53am

Lab Use Only:

NYEA Project No.	Temp. °C	Analyst Initials AL	Analysis Date: 03/18/22

alpha Labs
14-26 28th Avenue Long Island City, NY 11102
Tel.: (718) 482-7525 Fax: (718) 482-7524 www.alphalabsllc.com

BULK SAMPLE PLM ANALYSIS REPORT FOR ASBESTOS IN SURFACING MATERIAL CONTAINING VERMICULITE (SM-V)

CLIENT: Metro Analytical Laboratories, 255 West 36th St., Suite 101, New York, NY 10018
BUILDING ADDRESS: Metro Lab# B22030205

Client Sample ID# Lab Sample ID#	Sample Description	Sample Location	Appearance	GRAVIMETRIC PREPARATION				MISCROSCOPY RESULTS				
				% Ashed Organic + Water Component	% Floats Component	% Residue	% Centrifugate	% Non-Asbestos Fibrous Material	% Non-Fibrous Matrix Material (including Vermiculite)	Chrysotile Percentage	Amphibole Percentage	Total Asbestos Percentage
27 22-03-095-01	Bottom layer - screed	East Wing Roof	Beige Homogeneous Friable	13.47%	0.22%	21.57%	10.96%	0%	1% VERM 99% OTHER	NAD	0.0340% AMPH	**0.0340%**
28 22-03-095-02			Beige Homogeneous Friable	14.03%	0.17%	22.67%	12.75%	0%	1% VERM 99% OTHER	NAD	0.0397% AMPH	**0.0397%**
45 22-03-095-03	Ceiling Plaster – Bottom layer	Exterior – east Wing Foyer	Beige Homogeneous Friable	13.18%	0.18%	33.56%	22.47%	0%	4% VERM 96% OTHER	NAD	0.1321% AMPH	**0.1321%**
46 22-03-095-04			Dark Brown Homogeneous Friable	14.88%	0.26%	36.52%	19.93%	0%	5% VERM 95% OTHER	NAD	0.1665% AMPH	**0.1665%**
47 22-03-095-05			Brown Homogeneous Friable	13.85%	0.76%	31.19%	21.75%	0%	4% VERM 96% OTHER	NAD	0.1919% AMPH	**0.1919%**
74 22-03-095-06	Wall Plaster – Bottom layer	Interior – store front	Gray Homogeneous Friable	14.42%	0.20%	21.08%	19.55%	0%	3% VERM 97% OTHER	NAD	0.1502% AMPH	**0.1502%**
75 22-03-095-07			Gray Homogeneous Friable	14.26%	0.24%	21.19%	15.58%	0%	2% VERM 98% OTHER	NAD	0.1424% AMPH	**0.1424%**
76 22-03-095-08			Gray Homogeneous Friable	14.44%	0.19%	21.61%	16.78%	0%	3% VERM 97% OTHER	NAD	0.1992% AMPH	**0.1992%**

alpha Labs
14-26 28th Avenue Long Island City, NY 11102
Tel.: (718) 482-7525 Fax: (718) 482-7524 www.alphalabsllc.com

BULK SAMPLE PLM ANALYSIS REPORT FOR ASBESTOS IN SURFACING MATERIAL CONTAINING VERMICULITE (SM-V)

CLIENT: Metro Analytical Laboratories, 255 West 36th St., Suite 101, New York, NY 10018
BUILDING ADDRESS: Metro Lab# B22030205

Date Received: 3/18/22
Date of Stereo-binocular Analysis: 3/18/22
Date of PLM Analysis (for Chrysotile): 3/22/22
Date of PLM Analysis (for Amphiboles): 3/23/22
Date of Report: 3/23/22

Final report 22-03-095 includes an attachment of 16 lab bench sheets

Analyst: D. Molohides

QC Review / Date: 3/23/2022
D. Molohides, Lab Director

NAD= No Asbestos Detected; NA/PS = Not Analyzed / Positive Stop; Trace = < 1%, CH = Chrysotile, AMO = Amosite, CRO = Crocidolite, ANTH = Anthophyllite, TRE = Tremolite, ACT = Actinolite, AMPH = amphiboles asbestos, FBGL = Fiberglass, CELL = Cellulose, VERM=Vermiculite. Samples are analyzed by Polarized Light Microscopy (PLM) by ELAP Analysis Protocol 198.8 (surfacing material containing vermiculite bulk samples). Analytical equipment: Stereobinocular microscopes: Professional Bin (PM #1), Accuscope (Ser#:120405), Carlsan (Ser#: 011418), Olympus VMZ (Ser#: 983350); Polarized Light Microscopes: Olympus BH-2 (Ser #: 214335), Olympus BH-2 (Ser #: 236532), Olympus BH-2 (Ser#: 227128), Meiji ML 9000 (Ser#: 902028). Samples will be stored for ninety (90) days and then returned to the client upon request. The results relate only to the items calibrated or tested. This report may not be reproduced, except in full, without the written approval of Alpha Labs LLC. The report must not be used by the client to claim endorsement by NVLAP, NIST or any agency of the US Government. The liability of Alpha Labs LLC with respect to the services charged shall in no event exceed the amount of the invoice. Copies of the lab's bench-sheets are attached as part of this final report. **(May 1, 2019)**

NYS-DOH ELAP # 11833

METRO
ANALYTICAL LABORATORIES
255 West 36th St., Suite 101
New York, NY 10018
p: (212) 695-0165 f: (212) 695-0183

CHAIN of CUSTODY BULK SAMPLES

22-03-095

Metro Lab # B22030205

Client: METRO

Client Job #:

Project: Nanuet HS

Location:

Contact: Moe Soliman

P: (347)819-6446 F:

Method: ☐ PLM - Friables ☐ PLM - NOB ☐ TEM - NOB
☐ NYS ELAP 198.1 ☐ NYS ELAP 198.6 ☐ NYS ELAP 198.4
☐ EPA 600/M4/82/020 ☐ EPA 600/R-96/116 ☐ EPA /600/R-96/116B

Special Instructions:

Turnaround Time
☐ Rush ☐ 3 Hours
☐ 6 Hours ☐ 12 Hours
☐ 24 Hours ☒ 48 Hours
☐ 72 Hours ☐ 3-5 Days

Sample #	Location	Material Description	Results: PLM Friable	PLM NOB	TEM NOB	Other
27	East wing roof	Bottom layer - screed				
28	East wing roof	Bottom layer - screed				
45	Exterior - East wing foyer	Ceiling Plaster - Bottom layer				
46	Exterior - East wing foyer	Ceiling Plaster - Bottom layer				
47	Exterior - East wing foyer	Ceiling Plaster - Bottom layer				
74	Interior - Store front	Wall Plaster - Bottom layer				
75	Interior - Store front	Wall Plaster - Bottom layer				
76	Interior - Store front	Wall Plaster - Bottom layer				

Sampled: Name / Signature / Date & Time

Received: C. Mejean (Name) 03/18/2022 (Date & Time)

Released: Name / Signature / Date & Time

Analyzed: Name / Date & Time

GPE License and Certification

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

Green Path Environmental, Inc.
Suite 1
79 Glover Street

Staten Island, NY 10308

FILE NUMBER: 13-72113
LICENSE NUMBER: 72113
LICENSE CLASS: RESTRICTED
DATE OF ISSUE: 06/18/2021
EXPIRATION DATE: 06/30/2022

Duly Authorized Representative – Julia Rubin:

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.

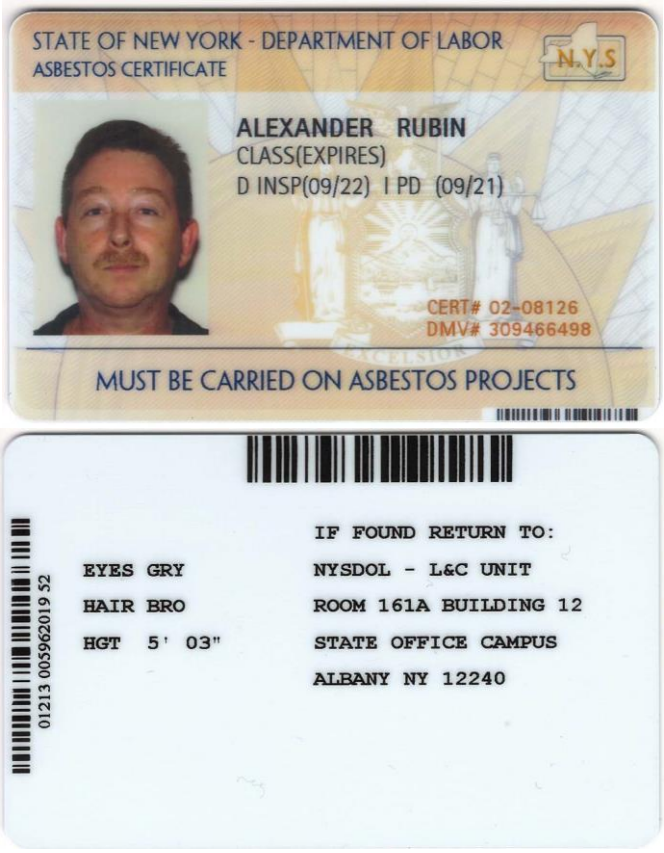
Amy Phillips, Director
For the Commissioner of Labor

SH 432 (8/12)

Green Path
Environmental, Inc

Alexander Rubin

NYS DOL Certified Asbestos Inspector/Project Design



Laboratory Certifications

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2022
Issued April 01, 2021

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. LI TSANG
NY ENVIRONMENTAL AND ANALYTICAL LABS INC
88 HARBOR ROAD
PORT WASHINGTON, NY 11050

NY Lab Id No: 11510

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2016) for the category ENVIRONMENTAL ANALYSES SOLID AND HAZARDOUS WASTE
All approved analytes are listed below:

Characteristic Testing	
TCLP	EPA 1311
Polychlorinated Biphenyls	
Aroclor 1016 (PCB-1016)	EPA 8082A
Aroclor 1221 (PCB-1221)	EPA 8082A
Aroclor 1232 (PCB-1232)	EPA 8082A
Aroclor 1242 (PCB-1242)	EPA 8082A
Aroclor 1248 (PCB-1248)	EPA 8082A
Aroclor 1254 (PCB-1254)	EPA 8082A
Aroclor 1260 (PCB-1260)	EPA 8082A
Sample Preparation Methods	
	EPA 3550C

Serial No.: 63015

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2022
Issued April 01, 2021

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. DIMITRIOS MOLOHIDES
ALPHA LABS LLC
14-26 28TH AVENUE
LONG ISLAND CITY, NY 11102

NY Lab Id No: 11833

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
	ASTM D3335-85A

Sample Preparation Methods

	EPA 3051A
	ASTM D3335-85A
	ASTM E-1644-17

Serial No.: 63179

Green Path Environmental, Inc

NEW YORK STATE OF OPPORTUNITY. NYC Small Business Services
Certified Women-Owned Business Enterprise

March 24, 2022

To: Mr. Rudy Villanyi
Nanuet Public Schools
103 Church Street
Nanuet, New York 10954

Re: **Limited Asbestos (Vermiculite Analysis) Survey**
George W. Miller Elementary School – Bond Projects
50 Blauvelt Street, Nanuet, New York
GPE Project #: 1937.07.01

Dear Mr. Villanyi:

Green Path Environmental, Inc (GPE) was retained by the Nanuet Public Schools to conduct a limited asbestos survey at the George W. Miller Elementary School (Miller ES) regarding the Bond Projects renovation in reference to the KSQ Design Architects drawings dated January 31, 2022. The survey conducted on March 5, 2022 included visual observation, material sampling and laboratory sample analysis of the suspect asbestos containing materials.

The Boys Restroom C124 upper wall white plaster, Kindergarten Restrooms C132 & C133 upper ceiling white plaster (outside of restrooms) laboratory results were inconclusive using standard asbestos analytical methods 198.1, 198.6 and 198.4 so laboratory analysis went to Vermiculite analytical method 198.8 for further verification.

Based on the attached bulk sample laboratory analytical results (see attached laboratory analytical results with chain of custody forms), the Boys Restroom C124 upper wall white plaster, Kindergarten Restrooms C132 & C133 upper ceiling white plaster (outside of restrooms) were not identified as asbestos containing materials (less than one percent asbestos) using Vermiculite method 198.8.

Analysis of the bulk samples collected was performed by Alpha Labs located at 14-26 28th Avenue in Long Island City.

Alpha Labs is accredited by the New York State Department of Health, Environmental Laboratory Accreditation Program (ELAP Accreditation No. 11833) for Asbestos Bulk Sample Vermiculite Analysis by 198.8.

If you have any questions, please do not hesitate to call me at (917)-623-2411.

Sincerely,
Green Path Environmental, Inc

Scott Graber
Client Manager

Attachments:

- Laboratory Analytical Results with Chain of Custody Form (report dated March 22, 2022)
- GPE License and Certification
- Laboratory Certification

Laboratory Analytical Results with Chain of Custody Form (Report dated March 22, 2022)

alpha Labs
14-26 28th Avenue Long Island City, NY 11102
Tel.: (718) 482-7525 Fax: (718) 482-7524 www.alphalabsllc.com

BULK SAMPLE PLM ANALYSIS REPORT FOR ASBESTOS IN SURFACING MATERIAL CONTAINING VERMICULITE (SM-V)

CLIENT: Metro Analytical Laboratories, 255 West 36th St., Suite 101, New York, NY 10018
BUILDING ADDRESS: Miller ES, 50 Blauvelt Rd., Nanuet

Client Sample ID# Lab Sample ID#	Sample Description	Sample Location	Appearance	GRAVIMETRIC PREPARATION				MISCROSCOPY RESULTS				
				% Ashed Organic + Water Component	% Floats Component	% Residue	% Centrifugate	% Non-Asbestos Fibrous Material	% Non-Fibrous Matrix Material (including Vermiculite)	Chrysotile Percentage	Amphibole Percentage	Total Asbestos Percentage
5-13 22-03-047-01	Upper wall plaster (bottom layer brown)	Boys Restroom C124	Gray Homogeneous Friable	7.13%	0.83%	46.24%	47.43%	0%	2% VERM 98% OTHER	0.2312% CH	0.7505% AMPH	**0.9817%**
5-14 22-03-047-02			Gray Homogeneous Friable	5.70%	0.40%	70.17%	54.20%	0%	2% VERM 98% OTHER	0.3508% CH	NAD	**0.3508%**
5-15 22-03-047-03			Gray Homogeneous Friable	4.38%	0.07%	74.71%	55.31%	0%	1% VERM 99% OTHER	0.1868% CH	NAD	**0.1868%**
35-93 22-03-047-04	Upper ceiling plaster (bottom layer - brown)	Kinder garden Restrooms C132/C133	Gray Homogeneous Friable	10.87%	1.09%	48.39%	28.29%	1% CELL	3.5% VERM 95.5% OTHER	NAD	0.4528% AMPH	**0.4528%**
35-94 22-03-047-05			Gray Homogeneous Friable	11.92%	0.41%	80.48%	53.02%	0%	4% VERM 96% OTHER	NAD	0.6968% AMPH	**0.6968%**
35-95 22-03-047-06			Gray Homogeneous Friable	9.30%	0.25%	41.25%	18.14%	0%	4% VERM 96% OTHER	0.3093% CH	0.4812% AMPH	**0.7906%**
36-96 22-03-047-07	Upper ceiling plaster (top layer - white)	Kinder garden Restrooms C132/C133	Light Gray Homogeneous Friable	9.92%	2.64%	40.42%	8.68%	0%	3% VERM 97% OTHER	NAD	0.0491% AMPH	**0.0491%**
36-97 22-03-047-08			Light Gray Homogeneous Friable	8.44%	4.26%	34.22%	7.78%	5% FBGL	3% VERM 92% OTHER	0.7700% CH	0.0621% AMPH	**0.8322%**
36-98 22-03-047-09			Light Gray Homogeneous Friable	9.05%	3.70%	16.22%	1.90%	5% FBGL	1% VERM 94% OTHER	NAD	0.0047% AMPH	**0.0047%**

14-26 28th Avenue Long Island City, NY 11102
Tel.: (718) 482-7525 Fax: (718) 482-7524 www.alphalabsllc.com

BULK SAMPLE PLM ANALYSIS REPORT FOR ASBESTOS IN SURFACING MATERIAL CONTAINING VERMICULITE (SM-V)

CLIENT: Metro Analytical Laboratories, 255 West 36th St., Suite 101, New York, NY 10018
BUILDING ADDRESS: Miller ES, 50 Blauvelt Rd., Nanuet

Date Received: 3/10/22
Date of Stereo-binocular Analysis: 3/11/22
Date of PLM Analysis (for Chrysotile): 3/14/22
Date of PLM Analysis (for Amphiboles): 3/21-22/22
Date of Report: 3/22/22

Final report 22-03-049 includes an attachment of 18 lab bench sheets

Analyst: D. Kogan

QC Review / Date: 3/22/2022
D. Molohides, Lab Director

NAD= No Asbestos Detected; NA/PS = Not Analyzed / Positive Stop; Trace = < 1%, CH = Chrysotile, AMO = Amosite, CRO = Crocidolite, ANTH = Anthophyllite, TRE = Tremolite, ACT = Actinolite, AMPH = amphiboles asbestos, FBGL = Fiberglass, CELL = Cellulose, VERM=Vermiculite. Samples are analyzed by Polarized Light Microscopy (PLM) by ELAP Analysis Protocol 198.8 (surfacing material containing vermiculite bulk samples). Analytical equipment: Stereobinocular microscopes: Professional Bin (PM #1), Accuscope (Ser#:120405), Carlsan (Ser#: 011418), Olympus VMZ (Ser#: 983350); Polarized Light Microscopes: Olympus BH-2 (Ser #: 214335), Olympus BH-2 (Ser #: 236532), Olympus BH-2 (Ser#: 227128), Meiji ML 9000 (Ser#: 902028). Samples will be stored for ninety (90) days and then returned to the client upon request. The results relate only to the items calibrated or tested. This report may not be reproduced, except in full, without the written approval of Alpha Labs LLC. The report must not be used by the client to claim endorsement by NVLAP, NIST or any agency of the US Government. The liability of Alpha Labs LLC with respect to the services charged shall in no event exceed the amount of the invoice. Copies of the lab's bench-sheets are attached as part of this final report. **(May 1, 2019)**

NYS-DOH ELAP # 11833

22-03-047 1/2

[redacted]

-10 DAY TAT
-9 SAMPLES -
STOP AT 1ST POSITIVE

[redacted]

METRO ANALYTICAL LABORATORIES
255 West 36th St., Suite 101
New York, NY 10018
p: (212) 695-0165 f: (212) 695-0183

[redacted]

LAB ID No.: B22030206

Date: 3/5/22 Time: 9:15AM - 5:00pm

Project address: 50 Blauvelt Rd, Nanuet - Miller ES

Inspector/investigator name: [redacted]

Sampling Areas: Various

Analysis Requested: TAT [redacted]

Comments: Stop at first positive in the each homogeneous group

H.A.	SAMPLE ID	SAMPLE LOCATION	SAMPLE DESCRIPTION	COLOR	Q/TY SQ FT	Q/TY LN. FT	MATERIAL CONDITION
[redacted]							
[redacted]							
[redacted]							
5	13	BOYS RESTROOM - C124	UPPER WALL PLASTER Bottom Layer Brown				
	14						
	15						

[X] PLM [X] NOB PLM [X] NOB TEM [ ] TEM DUST WIPE - ASTM D6480-05 [ ] OTHER Specify: [redacted]

[redacted]

Chain Of Custody:

Received by: (Full Name & Signature)	Date & Time
Jaret	3/6 @ 5:44pm

Analyzed by: (Full Name)	Signature	Date

Received by: JM 3/10/22

22-03-0173 1/2

[redacted]

[redacted]

METRO ANALYTICAL LABORATORIES
255 West 36th St., Suite 101
New York, NY 10018
p: (212) 695-0165 f: (212) 695-0183

[redacted]

LAB ID No.: R22030206

Date: 3/6/22 Time: 9:30 AM – 1pm

Project address: 50 Blauvelt Rd, Nanuet - Miller ES

[redacted]

Sampling Areas: Various

[redacted]

Comments: Stop at first positive in the each homogeneous group

H.A.	SAMPLE ID	SAMPLE LOCATION	SAMPLE DESCRIPTION	COLOR	Q/TY SQ FT	Q/TY LN. FT	MATERIAL CONDITION
35	93	Kindergarten Restrooms C132/C133	Upper Ceiling Plaster-Bottom Layer	Brown	40		Damaged
	94			↓	↓		↓
	95			↓	↓		↓
36	96		Top Layer	white	↓		↓
	97		↓	↓	↓		↓
	98		↓	↓	↓		↓

[redacted]

[redacted]

Chain Of Custody

	Method of Submittal	Received by: (Full Name & Signature)	Date & Time
		[signature]	3/6/22 3:44pm

	Analyzed by: (Full Name)	Signature	Date
	2.		

Received by: DM 3/10/22

GPE License and Certification

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

Green Path Environmental, Inc.
Suite 1
79 Glover Street

Staten Island, NY 10308

FILE NUMBER: 13-72113
LICENSE NUMBER: 72113
LICENSE CLASS: RESTRICTED
DATE OF ISSUE: 06/18/2021
EXPIRATION DATE: 06/30/2022

Duly Authorized Representative – Julia Rubin:

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.

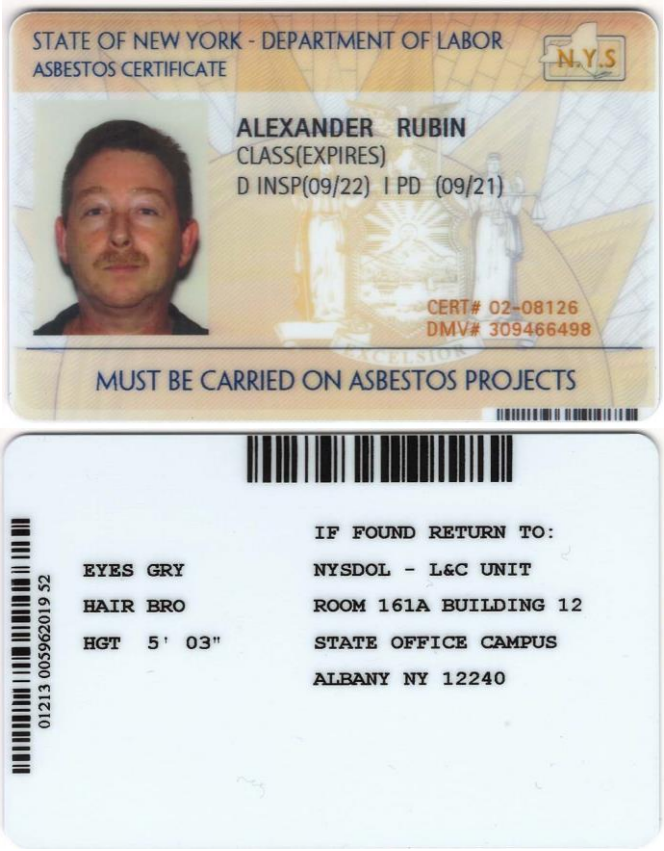
Amy Phillips, Director
For the Commissioner of Labor

SH 432 (8/12)

Green Path
Environmental, Inc

Alexander Rubin

NYS DOL Certified Asbestos Inspector/Project Design



Laboratory Certification

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2022
Issued April 01, 2021

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

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MR. DIMITRIOS MOLOHIDES
ALPHA LABS LLC
14-26 28TH AVENUE
LONG ISLAND CITY, NY 11102

NY Lab Id No: 11833

is hereby APPROVED as an Environmental Laboratory for the category
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All approved subcategories and/or analytes are listed below:

Miscellaneous

Asbestos in Friable Material	Item 198.1 of Manual
	EPA 600/M4/82/020
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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
	ASTM D3335-85A

Sample Preparation Methods

	EPA 3051A
	ASTM D3335-85A
	ASTM E-1644-17

Serial No.: 63179

Green Path Environmental, Inc

Certified Women-Owned Business Enterprise

March 14, 2022

To: Mr. Rudy Villanyi
Nanuet Public Schools
103 Church Street
Nanuet, New York 10954

Re: **Lead-Based Paint Survey**
A. Macarthur Barr Middle School – Phase 2 Bond Projects
143 Church Street, Nanuet, New York
GPE Project #: 1937.07.01

Dear Mr. Villanyi:

Green Path Environmental, Inc (GPE) was retained by the Nanuet Public Schools to conduct a limited lead-based paint survey at the Nanuet High School regarding the Phase 2 Bonds Projects renovation in reference to the KSQ Design Architects drawings dated January 31, 2022. The survey conducted on March 12, 2022 included visual observation, material sampling and laboratory sample analysis of the suspect lead-based paint (LBP).

Based on the attached bulk sample laboratory analytical results (<0.03 to 0.24 percent [%] lead paint by weight), the interior security vestibule black radiator cover, tech classroom and woodshop CMU wall beige paint/metal pipe beige paint/floor grey paint/door frame black paint/CMU wall grey paint samples collected were not identified as lead-based paint.

The samples were analyzed using atomic absorption spectrometry (AAS) and were prepared and analyzed in accordance with the EPA Method (SW 846 Prep = EPA 3050B. Analysis = EPA 7000B).

Analysis of the bulk samples collected was performed by Metro Analytical Labs (Metro) located at 255 West 36th Street, Suite 101, New York, NY 10018.

Metro is accredited by the New York State Department of Health, Environmental Laboratory Accreditation Program (ELAP Accreditation No. 12003) for Bulk Sample Analysis by EPA Method 7000B.

The U.S. Department of Housing and Urban Development (HUD) has established a definition of lead-based paint as paint or other surface coatings that contain lead equal to or greater than 0.5% by weight.

If you have any questions, please do not hesitate to call me at (917)-623-2411.

Sincerely,
Green Path Environmental, Inc

Scott Graber
Client Manager

Attachments:

- Laboratory Analytical Results with Chain of Custody Form (report dated March 14, 2022)
- GPE License and Certification
- Laboratory Certification

Laboratory Analytical Results with Chain of Custody Form (Report dated March 14, 2022)

METRO ANALYTICAL LABORATORIES
255 West 36th St., Suite #101
New York, NY 10018
p: (212) 695-0165 f: (212) 695-0183

ANALYSIS of LEAD PAINT CHIP SAMPLES

Client: **Green Path Environmental Inc**
Address: 79 Glover Street
Staten Island NY 10308
P: (347) 276-2339 F: (631) 991-9143

Contact: **Alex Rubin**
M:
E:

Contract: **Nanuet UFSD**
Client Job #: **1937.07.01**
Location: **140 Church Street - Barr Middle School**
Nanuet **NY**
Sampled By: A.R.
Sampled Date: 03/11/2022
Turnaround Time: 24 hrs

Metro Lab ID #: **L22030118**
Sample Received: 03/12/2022
Lead Analysis Date: 03/14/2022
Reported By: Sharye Bethancourt
Report Date: 03/14/2022

Summary of Analysis

LAB ID #	Client Sample #	Sample Description	Area (cm^2)	Lead Reading (µg Pb / ml)	Lead Concentration (mg/cm^2)	Lead Concentration % wt
1	L1	INTERIOR - SECURITY VESTIBULE - RADIATOR COVER - BLACK - METAL		1.34		0.06%
2	L2	TECH CLASSROOM & WOOD SHOP - WALLS - BEIGE - CMU		0.29		< 0.03%
3	L3	TECH CLASSROOM & WOOD SHOP - PIPES - BEIGE - METAL		0.19		< 0.03%
4	L4	TECH CLASSROOM & WOOD SHOP - FLOOR - GRAY - CONCRETE		0.01		< 0.03%
5	L5	TECH CLASSROOM & WOOD SHOP - DOOR FRAME - BLACK - METAL		5.15		0.24%
6	L6	TECH CLASSROOM & WOOD SHOP - WALLS - GRAY - CMU		0.81		0.04%

Comments

Equipment: Flame Atomic Absorption Spectrometer #1 - Perkin Elmer AAnalyst 400
Hotblock - Perkin Elmer SPB 50

**Prep = EPA 3050B. Analysis = EPA 7000B. Reporting Limit (RL) - 0.03% by weight (based upon 100 mg sample) or 0.01 mg/cm^2 (based upon area).

Zlatan Dimitrijevic
Laboratory Director

Sharye M Bethancourt
Sharye Bethancourt
Lead Analyst

NYS ELAP ID # 12003

AIHA-PAT, LLC # 220677

METRO ANALYTICAL LABORATORIES
255 West 36th St., Suite #101
New York, NY 10018
p: (212) 695-0165 f: (212) 695-0183

Report Notes

General Notes and Disclaimers

- The samples analyzed in this report were not collected by this laboratory - they were received from the client, or an agent of the client, in good condition, unless otherwise noted.
- All results are calculated based on client-provided samples and / or measurements and fall within the acceptable Quality Control limits and the reported data included in this document has not been corrected based on blank values.
- This report shall not be reproduced, except in full, without the written approval of the laboratory.
- This report relates only to the samples tested. It may not be used by the client to claim project endorsement by NVLAP, NYS ELAP, or any other government agency.
- Quality Control data (including 95% confidence limits, laboratory / analysis accuracy and precision) is available upon request.

Lead Exposure Limits

Matrix	Concentration	Details
Air	0.15 µg/m^3	EPA National Ambient Air Quality Standard (Quality Time - Weight Average)
	30 µg/m^3	OSHA action level (8-hour time-weighted average)
	50 µg/m^3	OSHA permissible exposure limit (General Industry)
Dust	5 µg/ft²	NYC DOHMH Clearance Level for Floors (includes carpeted and uncarpeted interior floors)
	40 µg/ft²	NYC DOHMH Clearance Level for Interior Window Sills
	100 µg/ft²	NYC DOHMH Clearance Level for Window Wells / Window Troughs
	N/A	NYC DOHMH Clearance Level for Porch Floors
Paint	1.0 mg/cm^2	EPA Clearance Level of Lead Based Paint
	5000 µg/g (5,000 ppm, 0.5% by weight)	
Soil	400 µg/g	EPA Bare Residential Soil Hazard Levels (play areas used by young children)

L22030118

LEAD-SAFE EPA CERTIFIED FIRM
NAT-F113768-1

Green Path
Environmental, Inc

79 Glover Street, Suite 1, Staten Island, NY 10308
T. (347) 276-2339 • F. (646) 774-0354
Please e-mail results to: info@gpe.nyc and office@gpe.nyc

LEAD PAINT BULK CHAIN OF CUSTODY

PROJECT NUMBER #: 1937.07.01 CLIENT NAME: Nanuet UFSD

PROJECT ADDRESS: 140 Church Street , Nanuet, NY - Barr Middle School

SAMPLE BY: Alexander Rubin CERT #: LBP-R-I149001-2_Exp 01.15.2024

DATE/TIME SAMPLED: 3/11/22 INITIAL TEST: X RE-TEST: ___ PLEASE PROVIDE RESULTS: X Email ☐ Fax

INSTRUCTION/NOTES:

TURNAROUND TIME(TAT)	☐ Same Day	X 24 Hours	☐ 48 Hours	☐ 3 Days	☐ 4 Days
	☐ Standard (5 Days)	☐ Full TCLP (10day)			

SAMPLE NUMBER	Sample Identification/Location	Color	Substrate Component	Condition	Area (Sq ft)
L1	Interior-Security Vestibule	Black	metal	FAIR	25
	RADIATOR COVER	↓	↓		
L2	-Tech Classroom &	Beige	CMU	FAIR	2,000
	wood Shop-walls	↓	↓		
L3	-Tech Classroom &	Beige	Metal	FAIR	80
	& wood Shop-PIPE'S	↓	↓		
L4	-Tech Classroom &	Gray	Concrete	FAIR	3,600
	wood Shop-FLOOR				
L5	-Tech Classroom &	Black	metal	FAIR	20
	wood Shop-DOOR FRAME				
L6	-Tech Classroom &	Gray	CMU	FAIR	1,800
	wood Shop-walls	↓	↓		

Matrix Types
- ☐Bulk ☐ Paint
- ☐ Soil
- ☐Dust
- ☐ Other

Metals Analysis Types
- ☐Total Concentration of Lead
- ☐Total Concentration of RCRA 8 Metals
- ☐TCLP for Lead
- ☐TCLP for RCRA 8 Metals

EPA as paint with lead levels:

Greater than or equal to 1.0 mg/cm², or more than 0.5% by weight

Relinquished By: Alexander Rubin Date: ___ Time: ___

Received By: K. John Date: 3/12/22 Time: 315P

Analyzed By: ___ Date: ___ Time: ___

GPE License and Certification

United States Environmental Protection Agency

This is to certify that

Green Path Environmental, Inc

has fulfilled the requirements of the Toxic Substances Control Act (TSCA) Section 402, and has received certification to conduct lead-based paint activities pursuant to 40 CFR Part 745.226

In the Jurisdiction of:

All EPA Administered Lead-based Paint Activities Program States, Tribes and Territories

This certification is valid from the date of issuance and expires June 20, 2022

LBP-F113768-2

Certification #

December 13, 2018

Issued On

Michelle Price, Chief

Lead, Heavy Metals, and Inorganics Branch

United States Environmental Protection Agency

This is to certify that

Alexander Rubin

has fulfilled the requirements of the Toxic Substances Control Act (TSCA) Section 402, and has received certification to conduct lead-based paint activities pursuant to 40 CFR Part 745.226 as:

Risk Assessor

In the Jurisdiction of:

All EPA Administered Lead-based Paint Activities Program States, Tribes and Territories

This certification is valid from the date of issuance and expires January 15, 2024

LBP-R-I149001-2

Certification #

November 30, 2020

Issued On

Ben Conetta, Chief

Chemicals and Multimedia Programs Branch

Laboratory Certification

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2022
Issued April 01, 2021

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. ZLATAN DIMITRIJEVIC
METRO ANALYTICAL LABORATORIES, LLC.
255 WEST 36TH STREET SUITE 101
NEW YORK, NY 10018-0022

NY Lab Id No: 12003

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
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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
Lead in Dust Wipes	EPA 7000B
Lead in Paint	EPA 7000B

Sample Preparation Methods

EPA 3050B

NEW YORK STATE OF OPPORTUNITY. Department of Health

Serial No.: 63263

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.

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2022
Issued April 01, 2021

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. ZLATAN DIMITRIJEVIC
METRO ANALYTICAL LABORATORIES, LLC.
255 WEST 36TH STREET SUITE 101
NEW YORK, NY 10018-0022

NY Lab Id No: 12003

is hereby APPROVED as an Environmental Laboratory for the category
ENVIRONMENTAL ANALYSES AIR AND EMISSIONS
All approved subcategories and/or analytes are listed below:

Metals I	
Lead, Total	NIOSH 7082
Miscellaneous	
Asbestos	40 CFR 763 APX A No. III
Fibers	NIOSH 7400 A RULES

NEW YORK STATE OF OPPORTUNITY | Department of Health

Serial No.: 63264

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.

Green Path Environmental, Inc

NEW YORK STATE OF OPPORTUNITY. NYC Small Business Services
Certified Women-Owned Business Enterprise

March 14, 2022

To: Mr. Rudy Villanyi
Nanuet Public Schools
103 Church Street
Nanuet, New York 10954

Re: **Expedited Lead-Based Paint Survey**
Nanuet High School – Phase 2 and Elevator Addition
103 Church Street, Nanuet, New York
GPE Project #: 1937.07.01

Dear Mr. Villanyi:

Green Path Environmental, Inc (GPE) was retained by the Nanuet Public Schools to conduct an expedited limited lead-based paint survey at the Nanuet High School regarding the Phase 2 and elevator addition project renovation in reference to the KSQ Design Architects drawings dated January 31, 2022. The survey conducted on March 6 and 12, 2022 included visual observation, material sampling and laboratory sample analysis of the suspect lead-based paint (LBP).

Based on the attached bulk sample laboratory analytical results (<0.03 to 0.04 percent [%] lead paint by weight), the exterior store front frame brown paint, east wing interior foyer radiator grey paint, east wing foyer wall beige paint, 2nd floor science wing wall CMU white paint/wall green-yellow paint/door frame yellow paint/wall wallboard green paint/door frame green paint samples collected were not identified as lead-based paint.

The samples were analyzed using atomic absorption spectrometry (AAS) and were prepared and analyzed in accordance with the EPA Method (SW 846 Prep = EPA 3050B. Analysis = EPA 7000B).

Analysis of the bulk samples collected was performed by Metro Analytical Labs (Metro) located at 255 West 36th Street, Suite 101, New York, NY 10018.

Metro is accredited by the New York State Department of Health, Environmental Laboratory Accreditation Program (ELAP Accreditation No. 12003) for Bulk Sample Analysis by EPA Method 7000B.

The U.S. Department of Housing and Urban Development (HUD) has established a definition of lead-based paint as paint or other surface coatings that contain lead equal to or greater than 0.5% by weight.

If you have any questions, please do not hesitate to call me at (917)-623-2411.

Sincerely,
Green Path Environmental, Inc

Scott Graber
Client Manager

Attachments:

- Laboratory Analytical Results with Chain of Custody Form (reports dated March 7 and 14, 2022)
- GPE License and Certification
- Laboratory Certification

Laboratory Analytical Results with Chain of Custody Forms (Reports dated March 7 and 13, 2022)

METRO ANALYTICAL LABORATORIES
255 West 36th St., Suite #101
New York, NY 10018
p: (212) 695-0165 f: (212) 695-0183

ANALYSIS of LEAD PAINT CHIP SAMPLES

Client: **Green Path Environmental Inc**
Address: 79 Glover Street
Staten Island NY 10308
P: (347) 276-2339 F: (631) 991-9143

Contact: **Alex Rubin**
M:
E:

Contract: **Nanuet UFSD**
Client Job #: **1937.07.01**
Location: **103 Church Street - Nanuet High School**
Nanuet **NY**
Sampled By: A.R.
Sampled Date: 03/06/2022
Turnaround Time: 24 hrs

Metro Lab ID #: **L22030059**
Sample Received: 03/06/2022
Lead Analysis Date: 03/08/2022
Reported By: Sharye Bethancourt
Report Date: 03/08/2022

Summary of Analysis

LAB ID #	Client Sample #	Sample Description	Area (cm^2)	Lead Reading (µg Pb / ml)	Lead Concentration (mg/cm^2)	Lead Concentration % wt
1	L1	EXTERIOR STORE FRONT FRAME - BROWN - METAL		0.05		< 0.03%
2	L2	INTERIOR EAST WING FOYER RADIATOR - GRAY - METAL		0.60		< 0.03%
3	L3	INTERIOR EAST WING FOYER - WALL - BEIGE - CMU		0.28		< 0.03%

Comments

Equipment: Flame Atomic Absorption Spectrometer #1 - Perkin Elmer AAnalyst 400
Hotblock - Perkin Elmer SPB 50

**Prep = EPA 3050B. Analysis = EPA 7000B. Reporting Limit (RL) - 0.03% by weight (based upon 100 mg sample) or 0.01 mg/cm^2 (based upon area).

Zlatan Dimitrijevic
Laboratory Director

Sharye M Bethancourt Z Smirnov

Sharye Bethancourt / Zoya Smirnov
Lead Analyst

NYS ELAP ID # 12003

AIHA-PAT, LLC # 220677

METRO ANALYTICAL LABORATORIES
255 West 36th St., Suite #101
New York, NY 10018
p: (212) 695-0165 f: (212) 695-0183

Report Notes

General Notes and Disclaimers

- The samples analyzed in this report were not collected by this laboratory - they were received from the client, or an agent of the client, in good condition, unless otherwise noted.
- All results are calculated based on client-provided samples and / or measurements and fall within the acceptable Quality Control limits and the reported data included in this document has not been corrected based on blank values.
- This report shall not be reproduced, except in full, without the written approval of the laboratory.
- This report relates only to the samples tested. It may not be used by the client to claim project endorsement by NVLAP, NYS ELAP, or any other government agency.
- Quality Control data (including 95% confidence limits, laboratory / analysis accuracy and precision) is available upon request.

Lead Exposure Limits

Matrix	Concentration	Details
Air	0.15 µg/m^3	EPA National Ambient Air Quality Standard (Quality Time - Weight Average)
	30 µg/m^3	OSHA action level (8-hour time-weighted average)
	50 µg/m^3	OSHA permissible exposure limit (General Industry)
Dust	5 µg/ft²	NYC DOHMH Clearance Level for Floors (includes carpeted and uncarpeted interior floors)
	40 µg/ft²	NYC DOHMH Clearance Level for Interior Window Sills
	100 µg/ft²	NYC DOHMH Clearance Level for Window Wells / Window Troughs
	N/A	NYC DOHMH Clearance Level for Porch Floors
Paint	1.0 mg/cm^2	EPA Clearance Level of Lead Based Paint
	5000 µg/g (5,000 ppm, 0.5% by weight)	
Soil	400 µg/g	EPA Bare Residential Soil Hazard Levels (play areas used by young children)

L22030059

Green Path
Environmental, Inc

79 Glover Street, Suite 1, Staten Island, NY 10308
T. (347) 276-2339 • F. (646) 774-0354
Please e-mail results to: info@gpe.nyc and office@gpe.nyc

LEAD-SAFE EPA CERTIFIED FIRM
NAT-F113768-1

LEAD PAINT BULK CHAIN OF CUSTODY

PROJECT NUMBER #: 1937.07.01 CLIENT NAME: Nanuet UFSD

PROJECT ADDRESS: 103 Church Street , Nanuet, NY - Nanuet HS

SAMPLE BY: Alexander Rubin CERT #: LBP-R-I149001-2_Exp 01.15.2024

DATE/TIME SAMPLED: 3/6/22 9:30AM INITIAL TEST: X RE-TEST: ___ PLEASE PROVIDE RESULTS: X Email □ Fax

INSTRUCTION/NOTES: 8:30PM

TURNAROUND TIME(TAT)	□ Same Day	X 24 Hours	□ 48 Hours	□ 3 Days	□ 4 Days
	□ Standard (5 Days)	□ Full TCLP (10day)			

SAMPLE NUMBER	Sample Identification/Location	Color	Substrate Component	Condition	Area (Sq ft)
L1	Exterior Store Front Frame	Brown	Metal	POOR	
L2	Interior Existing Foyer Radiator	Gray	Metal	FAIR	
L3	↓ -W411	Beige	CMU	Good	

Matrix Types
□Bulk □ Paint
□ Soil
□Dust
□ Other

Metals Analysis Types
□Total Concentration of Lead
□Total Concentration of RCRA 8 Metals
□TCLP for Lead
□TCLP for RCRA 8 Metals

EPA as paint with lead levels:
Greater than or equal to 1.0 mg/cm², or more than 0.5% by weight

Relinquished By: Alexander Rubin Date: ___ Time: ___
Received By: Janet Date: 3/6/22 Time: 8:44PM
Analyzed By: ___ Date: ___ Time: ___

METRO ANALYTICAL LABORATORIES
255 West 36th St., Suite #101
New York, NY 10018
p: (212) 695-0165 f: (212) 695-0183

ANALYSIS of LEAD PAINT CHIP SAMPLES

Client:	**Green Path Environmental Inc**	Contract:	**Nanuet UFSD**	**Metro Lab ID #:**	**L22030119**
Address:	79 Glover Street	Client Job #:	**1937.07.01**		
	Staten Island NY 10308	Location:	**103 Church Street - Nanuet High School**		
	P: (347) 276-2339 F: (631) 991-9143		**2nd Floor - Science Wing**	Sample Received:	03/12/2022
			Nanuet NY	Lead Analysis Date:	03/14/2022
Contact:	**Alex Rubin**	Sampled By:	A.R.		
	M:	Sampled Date:	03/12/2022	Reported By:	Sharye Bethancourt
	E:	Turnaround Time:	24 hrs	Report Date:	03/14/2022

Summary of Analysis

LAB ID #	Client Sample #	Sample Description	Area (cm^2)	Lead Reading (µg Pb / ml)	Lead Concentration (mg/cm^2)	Lead Concentration % wt
1	L1	2ND FL. SCIENCE WING - WALL - WHITE - CMU		0.11		< 0.03%
2	L2	2ND FL. SCIENCE WING - WALL - GREEN / YELLOW - CMU		0.05		< 0.03%
3	L3	2ND FL. SCIENCE WING - DOOR GRAME - YELLOW - METAL		0.81		0.04%
4	L5	2ND FL. SCIENCE WING - WALL - GREEN - WALLBOARD		0.04		< 0.03%
5	L6	2ND FL. SCIENCE WING - DOOR GRAME - GREEN - METAL		0.03		< 0.03%

Comments

Equipment: Flame Atomic Absorption Spectrometer #1 - Perkin Elmer AAnalyst 400
Hotblock - Perkin Elmer SPB 50

**Prep = EPA 3050B. Analysis = EPA 7000B. Reporting Limit (RL) - 0.03% by weight (based upon 100 mg sample) or 0.01 mg/cm^2 (based upon area).

Zlatan Dimitrijevic
Laboratory Director

Sharye M Bethancourt
Lead Analyst

NYS ELAP ID # 12003

AIHA-PAT, LLC # 220677

METRO ANALYTICAL LABORATORIES
255 West 36th St., Suite #101
New York, NY 10018
p: (212) 695-0165 f: (212) 695-0183

Report Notes

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- Quality Control data (including 95% confidence limits, laboratory / analysis accuracy and precision) is available upon request.

Lead Exposure Limits

Matrix	Concentration	Details
Air	0.15 µg/m^3	EPA National Ambient Air Quality Standard (Quality Time - Weight Average)
	30 µg/m^3	OSHA action level (8-hour time-weighted average)
	50 µg/m^3	OSHA permissible exposure limit (General Industry)
Dust	5 µg/ft²	NYC DOHMH Clearance Level for Floors (includes carpeted and uncarpeted interior floors)
	40 µg/ft²	NYC DOHMH Clearance Level for Interior Window Sills
	100 µg/ft²	NYC DOHMH Clearance Level for Window Wells / Window Troughs
	N/A	NYC DOHMH Clearance Level for Porch Floors
Paint	1.0 mg/cm^2	EPA Clearance Level of Lead Based Paint
	5000 µg/g (5,000 ppm, 0.5% by weight)	
Soil	400 µg/g	EPA Bare Residential Soil Hazard Levels (play areas used by young children)

L22030119

Green Path
Environmental, Inc

79 Glover Street, Suite 1, Staten Island, NY 10308
T. (347) 276-2339 • F. (646) 774-0354
Email: info@gpe.nyc

NAT-F113768-1

LEAD CHAIN OF CUSTODY

PROJECT NUMBER #: 1937.07.01 CLIENT NAME: Nanuet UFSD

PROJECT ADDRESS: 103 Church St, Nanuet, NY – Nanuet HS

SAMPLE BY: Alexander Rubin CERT #: LBP-R-I149001-2_Exp 01.15.2024

DATE/TIME SAMPLED: 3/12/22 10:30 – 14:30 INITIAL TEST: X RE-TEST: ___ PLEASE PROVIDE RESULTS: X Email ☐ Fax

INSTRUCTION/NOTES:

TURNAROUND TIME(TAT)	☐ Same Day	X 24 Hours	☐ 48 Hours	☐ 3 Days	☐ 4 Days
	☐ Standard (5 Days)	☐ Full TCLP (10day)			

SAMPLE NUMBER	Sample Identification/Location	Color	Substrate Component	Condition	Area (Sq ft)
L1	2nd FL – SCIENCE WING – WALL	White	CMU	Good	
L2		Green/Yellow	CMU	Good	
L3	– DOOR FRAME	Yellow	Metal	FAIR	
L4		Gray	metal	FAIR	
L5	– wall	Green	WALLBOARD	Good	
L6	– DOOR FRAME	Green	metal	Good	

Matrix Types
X Bulk – Paint
☐ Soil
☐ Dust
☐ Other

Metals Analysis Types
X Total Concentration of Lead
☐ Total Concentration of RCRA 8 Metals
☐ TCLP for Lead
☐ TCLP for RCRA 8 Metals

EPA as paint with lead levels:
Greater than or equal to 1.0 mg/cm², or more than 0.5% by weight

Relinquished By: Alexander Rubin Date: 3/12/22 Time: ___

Received By: K. John Date: 3/12/22 Time: 315P

Analyzed By: ___ Date: ___ Time: ___

L22030119

Green Path
Environmental, Inc

79 Glover Street, Suite 1, Staten Island, NY 10308
T. (347) 276-2339 • F. (646) 774-0354
Email: info@gpe.nyc

LEAD CHAIN OF CUSTODY

PROJECT NUMBER #: 1937.07.01 CLIENT NAME: Nanuet UFSD

PROJECT ADDRESS: 103 Church St, Nanuet, NY - Nanuet HS

SAMPLE BY: Alexander Rubin CERT #: LBP-R-I149001-2_Exp 01.15.2024

DATE/TIME SAMPLED: 3/12/22 10:30 - 14:30 INITIAL TEST: X RE-TEST: ___ PLEASE PROVIDE RESULTS: X Email ☐ Fax

INSTRUCTION/NOTES:

TURNAROUND TIME(TAT)	Same Day	X 24 Hours	48 Hours	3 Days	4 Days
	Standard (5 Days)	Full TCLP (1day)			

SAMPLE NUMBER	Sample Identification/Location	Color	Substrate Component	Condition	Area (Sq ft)
L1	2nd Fl - SCIENCE WING - WALL	White	CMU	Good	
L2		Green/Yellow	CMU	Good	
L3	- DOOR FRAME	Yellow	Metal	FAIR	
~~L4~~	~~-~~	~~Gray~~	~~metal~~	~~FAIR~~	Void
L5	- WALL	Green	WALLBOARD	Good	
L6	- DOOR FRAME	Green	metal	Good	

Matrix Types
X Bulk / Paint
☐ Soil
☐ Dust
☐ Other

Metals Analysis Types
X Total Concentration of Lead
☐ Total Concentration of RCRA 8 Metals
☐ TCLP for Lead
☐ TCLP for RCRA 8 Metals

EPA as paint with lead levels:
Greater than or equal to 1.0 mg/cm², or more than 0.5% by weight

Relinquished By: Alexander Rubin Date: 3/12/22 Time: ___

Received By: K. John Date: 3/12/22 Time: 315P

Analyzed By: ___ Date: ___ Time: ___

GPE License and Certification

United States Environmental Protection Agency

This is to certify that

Green Path Environmental, Inc

has fulfilled the requirements of the Toxic Substances Control Act (TSCA) Section 402, and has received certification to conduct lead-based paint activities pursuant to 40 CFR Part 745.226

In the Jurisdiction of:

All EPA Administered Lead-based Paint Activities Program States, Tribes and Territories

This certification is valid from the date of issuance and expires June 20, 2022

LBP-F113768-2

Certification #

December 13, 2018

Issued On

Michelle Price, Chief

Lead, Heavy Metals, and Inorganics Branch

United States Environmental Protection Agency

This is to certify that

Alexander Rubin

has fulfilled the requirements of the Toxic Substances Control Act (TSCA) Section 402, and has received certification to conduct lead-based paint activities pursuant to 40 CFR Part 745.226 as:

Risk Assessor

In the Jurisdiction of:

All EPA Administered Lead-based Paint Activities Program States, Tribes and Territories

This certification is valid from the date of issuance and expires January 15, 2024

LBP-R-I149001-2

Certification #

November 30, 2020

Issued On

Ben Conetta, Chief

Chemicals and Multimedia Programs Branch

Laboratory Certification

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2022
Issued April 01, 2021

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. ZLATAN DIMITRIJEVIC
METRO ANALYTICAL LABORATORIES, LLC.
255 WEST 36TH STREET SUITE 101
NEW YORK, NY 10018-0022

NY Lab Id No: 12003

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
Lead in Dust Wipes	EPA 7000B
Lead in Paint	EPA 7000B

Sample Preparation Methods

EPA 3050B

NEW YORK STATE OF OPPORTUNITY. Department of Health

Serial No.: 63263

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NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2022
Issued April 01, 2021

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

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MR. ZLATAN DIMITRIJEVIC
METRO ANALYTICAL LABORATORIES, LLC.
255 WEST 36TH STREET SUITE 101
NEW YORK, NY 10018-0022

NY Lab Id No: 12003

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ENVIRONMENTAL ANALYSES AIR AND EMISSIONS
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Metals I	
Lead, Total	NIOSH 7082
Miscellaneous	
Asbestos	40 CFR 763 APX A No. III
Fibers	NIOSH 7400 A RULES

NEW YORK STATE OF OPPORTUNITY | Department of Health

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Certified Women-Owned Business Enterprise

Green Path Environmental, Inc

June 8, 2022

To: Mr. Rudy Villanyi
Nanuet Public Schools
103 Church Street
Nanuet, New York 10954

Re: **Expedited Limited Supplemental Lead-Based Paint Survey**
George W. Miller Elementary School – Bond Projects
50 Blauvelt Street, Nanuet, New York
GPE Project #: 1937.07.01

Dear Mr. Villanyi:

Green Path Environmental, Inc (GPE) was retained by the Nanuet Public Schools to conduct an expedited limited supplemental lead-based paint survey at the George W. Miller Elementary School (Miller ES) regarding the Bond Projects renovation in reference to the KSQ Design Architects drawings dated April 4, 2022. The survey conducted on June 6, 2022 included visual observation, material sampling and laboratory sample analysis of the suspect lead-based paint (LBP).

Based on the attached front playground bulk sample laboratory analytical results (<0.01 mg/cm2 of lead paint), the playground shed red and white painted wood and metal playground blue, white, green, red and beige painted posts paint samples collected were not identified as lead-based paint.

The samples were analyzed using atomic absorption spectrometry (AAS) and were prepared and analyzed in accordance with the EPA Method (SW 846 Prep = EPA 3050B. Analysis = EPA 7000B).

Analysis of the bulk samples collected was performed by Metro Analytical Labs (Metro) located at 255 West 36th Street, Suite 101, New York, NY 10018.

Metro is accredited by the New York State Department of Health, Environmental Laboratory Accreditation Program (ELAP Accreditation No. 12003) for Bulk Sample Analysis by EPA Method 7000B.

The U.S. Department of Housing and Urban Development (HUD) has established a definition of lead-based paint as paint or other surface coatings that contain lead equal to or greater than 1.0 mg/cm2.

If you have any questions, please do not hesitate to call me at (917)-623-2411.

Sincerely,
Green Path Environmental, Inc

Scott Graber
Client Manager

Attachments:

- Laboratory Analytical Results with Chain of Custody Form (report dated June 7, 2022)
- GPE License and Certification
- Laboratory Certification

Laboratory Analytical Results with Chain of Custody Form (Report dated June 7, 2022)

METRO ANALYTICAL LABORATORIES
255 West 36th St., Suite #101
New York, NY 10018
p: (212) 695-0165 f: (212) 695-0183

ANALYSIS of LEAD PAINT CHIP SAMPLES

Client:	**Green Path Environmental Inc**	Contract:	**Nanuet UFSD**	**Metro Lab ID #:**	**L22060067**
Address:	79 Glover Street	Client Job #:	**1937.07.01**		
	Staten Island NY 10308	Location:	**Miller ES - 50 Blauvert Rd #1 Playground**		
	P: (347) 276-2339 F: (631) 991-9143		**Nanuet New York 10954**	Sample Received:	06/06/2022
Contact:	**Alex Rubin**	Sampled By:	A.M	Lead Analysis Date:	06/06/2022
	M:	Sampled Date:	06/06/2022	Reported By:	Janet Herminia-Santos
	E:	Turnaround Time:	24 hrs	Report Date:	06/06/2022

Summary of Analysis

LAB ID #	Client Sample #	Sample Description	Area (cm^2)	Lead Reading (µg Pb / ml)	Lead Concentration (mg/cm²)	Lead Concentration % wt
1	1	WOODEN SHED - WOOD - RED	360.00	0.03	< 0.01	
2	2	WOODEN SHED - WOOD - WHITE	20.00	0.02	< 0.01	
3	3	METAL PLAYGROUND POSTS - METAL - BLUE	20.00	0.01	< 0.01	
4	4	METAL PLAYGROUND POSTS - METAL - WHITE	20.00	0.01	< 0.01	
5	5	METAL PLAYGROUND POSTS - METAL - GREEN	10.00	0.01	< 0.01	
6	6	METAL PLAYGROUND POSTS - METAL - RED	20.00	0.00	< 0.01	
7	7	METAL PLAYGROUND POSTS - METAL - BEIGE	60.00	0.02	< 0.01	

Comments	Equipment	Flame Atomic Absorption Spectrometer #1 - Perkin Elmer AAnalyst 400 Hotblock - Perkin Elmer SPB 50

**Prep = EPA 3050B. Analysis = EPA 7000B. Reporting Limit (RL) - 0.03% by weight (based upon 100 mg sample) or 0.01 mg/cm^2 (based upon area).

Zlatan Dimitrijevic
Laboratory Director

Zoya Smirnov
Lead Analyst

NYS ELAP ID # 12003

AIHA-PAT, LLC # 220677

METRO ANALYTICAL LABORATORIES
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Report Notes

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- Quality Control data (including 95% confidence limits, laboratory / analysis accuracy and precision) is available upon request.

Lead Exposure Limits

Matrix	Concentration	Details
Air	0.15 µg/m^3	EPA National Ambient Air Quality Standard (Quality Time - Weight Average)
	30 µg/m^3	OSHA action level (8-hour time-weighted average)
	50 µg/m^3	OSHA permissible exposure limit (General Industry)
Dust	5 µg/ft²	NYC DOHMH Clearance Level for Floors (includes carpeted and uncarpeted interior floors)
	40 µg/ft²	NYC DOHMH Clearance Level for Interior Window Sills
	100 µg/ft²	NYC DOHMH Clearance Level for Window Wells / Window Troughs
	N/A	NYC DOHMH Clearance Level for Porch Floors
Paint	1.0 mg/cm^2	EPA Clearance Level of Lead Based Paint
	5000 µg/g (5,000 ppm, 0.5% by weight)	
Soil	400 µg/g	EPA Bare Residential Soil Hazard Levels (play areas used by young children)

L22060067

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T. (347) 276-2339 • F. (646) 774-0354
Email: info@gpe.nyc

LEAD-SAFE EPA CERTIFIED FIRM
NAT-F113768-1

LEAD PAINT BULK CHAIN OF CUSTODY

PROJECT NUMBER #: 1937.07.01 **CLIENT NAME:** Nanuet UFSD

PROJECT ADDRESS: Miller ES - 50 Blauvelt Rd #1, Nanuet, NY 10954

SAMPLE BY: Anton Manouilovitch **CERT #:** Cert #: LBP-R-15068-2; Exp. 03/16/24

DATE/TIME SAMPLED: 6/6/22 16:00 **INITIAL TEST:** X **RE-TEST:** ____ **PLEASE PROVIDE RESULTS:** ☒ Email ☐ Fax

INSTRUCTION/NOTES: Playground (front)

TURNAROUND TIME(TAT)	☐ Same Day	X 24 Hours	☐ 48 Hours	☐ 3 Days	☐ 4 Days
	☐ Standard (5 Days)	☐ Full TCLP (10day)			

SAMPLE NUMBER	Sample Identification/Location	Color	Substrate Component	Condition	Area (Sq ft)
1	Wooden Shed	Red	Wood	Good	360
2	↓	White	↓	↓	20
3	Metal Playground Posts	Blue	metal	Good	20
4		White	↓	↓	10
5		Green	↓	↓	20
6		Red	↓	↓	20
		Beige	↓	↓	60

Matrix Types
X Bulk X Paint
☐ Soil
☐ Dust
☐ Other

Metals Analysis Types
X Total Concentration of Lead
☐ Total Concentration of RCRA 8 Metals
☐ TCLP for Lead
☐ TCLP for RCRA 8 Metals

EPA as paint with lead levels:
Greater than or equal to 1.0 mg/cm², or more than 0.5% by weight

Relinquished By: Anton Manouilovitch **Date:** 6/6/22 **Time:** ____

Received By: JLG **Date:** 6/6/22 **Time:** 4:57pm

Analyzed By: ____ **Date:** ____ **Time:** ____

GPE License and Certification

United States Environmental Protection Agency

This is to certify that

Green Path Environmental, Inc

has fulfilled the requirements of the Toxic Substances Control Act (TSCA) Section 402, and has received certification to conduct lead-based paint activities pursuant to 40 CFR Part 745.226

In the Jurisdiction of:

All EPA Administered Lead-based Paint Activities Program States, Tribes and Territories

This certification is valid from the date of issuance and expires June 20, 2025

LBP-F113768-3

Certification #

April 18, 2022

Issued On

Michelle Price, Chief

Lead, Heavy Metals, and Inorganics Branch

United States Environmental Protection Agency

This is to certify that

Anton Manouilovitch

has fulfilled the requirements of the Toxic Substances Control Act (TSCA) Section 402, and has received certification to conduct lead-based paint activities pursuant to 40 CFR Part 745.226 as:

Risk Assessor

In the Jurisdiction of:

All EPA Administered Lead-based Paint Activities Program States, Tribes and Territories

This certification is valid from the date of issuance and expires March 16, 2024

LBP-R-15068-2

Certification #

March 02, 2021

Issued On

Ben Conetta, Chief

Chemicals and Multimedia Programs Branch

Laboratory Certification

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2023
Issued April 01, 2022

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. ZLATAN DIMITRIJEVIC
METRO ANALYTICAL LABORATORIES, LLC.
255 WEST 36TH STREET SUITE 101
NEW YORK, NY 10018-0022

NY Lab Id No: 12003

is hereby APPROVED as an Environmental Laboratory for the category
ENVIRONMENTAL ANALYSES AIR AND EMISSIONS
All approved subcategories and/or analytes are listed below:

Metals I	
Lead, Total	NIOSH 7082
Miscellaneous	
Asbestos	40 CFR 763 APX A No. III
Fibers	NIOSH 7400 A RULES

Serial No.: 64914

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.

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2023
Issued April 01, 2022

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. ZLATAN DIMITRIJEVIC
METRO ANALYTICAL LABORATORIES, LLC.
255 WEST 36TH STREET SUITE 101
NEW YORK, NY 10018-0022

NY Lab Id No: 12003

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
Lead in Dust Wipes	EPA 7000B
Lead in Paint	EPA 7000B

Sample Preparation Methods

EPA 3050B

Serial No.: 64913

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Green Path Environmental, Inc

NEW YORK STATE OF OPPORTUNITY. NYC Small Business Services
Certified Women-Owned Business Enterprise

April 25, 2022

To: Mr. Rudy Villanyi
Nanuet Public Schools
103 Church Street
Nanuet, New York 10954

Re: **Follow Up Soil Limited PCB Survey**
A. Macarthur Barr Middle School – Phase 2 Bond Projects
143 Church Street, Nanuet, New York
GPE Project #: 1937.07.01

Dear Mr. Villanyi:

Green Path Environmental, Inc (GPE) was retained by the Nanuet Public Schools to conduct a follow up limited soil PCB survey at the A. Macarthur Barr Middle School regarding the Phase 2 Bond Projects renovation in reference to the KSQ Design Architects drawings dated January 31, 2022. The follow up soil limited PCB survey conducted on April 11, 2022 included visual observation, material sampling and laboratory sample analysis of the suspect polychlorinated biphenyls (PCB) materials.

The initial limited PCB survey conducted on March 11, 2022 indicated that the exterior security vestibule frame/expansion joint grey caulking **is identified** as a PCB material (greater than 50 ppm)**.** The PCB sample result is 33,100 ppm (mg/kg).

GPE collected soil samples near the exterior security vestibule frame/expansion joint in order to check for possible residual PCB contamination in adjacent soils. An adequate representation of surface soils (five samples on the courtyard side and four samples on the entrance side) were collected and sent to the laboratory for PCB analysis under EPA Method SW846 8082.

Based upon the bulk sample laboratory analytical results (see attached laboratory analytical results with chain of custody form), the suspect materials (front security vestibule soil samples and rear courtyard soil samples) **are not identified** as PCB materials (greater than 50 parts per million [ppm]). The nine (9) PCB sample results ranged from non-detect at the reporting limits to 6.4 ppm (mg/kg).

Analysis of the bulk samples collected was performed by Phoenix Environmental Laboratories, Inc. through New York Environmental and Analytical Labs (NYE) who is accredited by the New York State Department of Health, Environmental Laboratory Accreditation Program (ELAP Accreditation No. 11301) for PCB Bulk Sample Analysis by EPA Method SW846 8082.

If you have any questions, please do not hesitate to call me at (917)-623-2411.

Sincerely,
Green Path Environmental, Inc

Scott Graber
Client Manager

Attachments:

- Laboratory Analytical Results with Chain of Custody Form (report dated April 15, 2022)
- Laboratory Certification

Laboratory Analytical Results with Chain of Custody Form (Report dated April 15, 2022)

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

NY # 11301

Sample Id Cross Reference

April 15, 2022

SDG I.D.: GCL07886

Project ID: GREENPATH 69900

Client Id	Lab Id	Matrix
P1	CL07886	SOIL
P2	CL07887	SOIL
P3	CL07888	SOIL
P4	CL07889	SOIL
P5	CL07890	SOIL
P6	CL07891	SOIL
P7	CL07892	SOIL
P8	CL07893	SOIL
P9	CL07894	SOIL

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

ACCREDITED IN ACCORDANCE WITH nelac NY # 11301

Analysis Report

April 15, 2022

FOR: Attn: Li Tsang
NY Environmental
88-90 Harbor Rd
Port Washington, NY 11050

Sample Information		Custody Information		Date	Time
Matrix:	SOIL	Collected by:		04/11/22	10:30
Location Code:	NY-ENV	Received by:	CP	04/13/22	16:26
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:					

Laboratory Data

SDG ID: GCL07886
Phoenix ID: CL07886

Project ID: GREENPATH 69900
Client ID: P1

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Percent Solid	65		%		04/13/22	H	SW846-%Solid
Soil Extraction for PCB	Completed				04/13/22	O/E	SW3545A
Polychlorinated Biphenyls							
PCB-1016	ND	510	ug/Kg	10	04/14/22	SC	SW8082A
PCB-1221	ND	510	ug/Kg	10	04/14/22	SC	SW8082A
PCB-1232	ND	510	ug/Kg	10	04/14/22	SC	SW8082A
PCB-1242	ND	510	ug/Kg	10	04/14/22	SC	SW8082A
PCB-1248	ND	510	ug/Kg	10	04/14/22	SC	SW8082A
PCB-1254	ND	510	ug/Kg	10	04/14/22	SC	SW8082A
PCB-1260	ND	510	ug/Kg	10	04/14/22	SC	SW8082A
PCB-1262	ND	510	ug/Kg	10	04/14/22	SC	SW8082A
PCB-1268	ND	510	ug/Kg	10	04/14/22	SC	SW8082A
QA/QC Surrogates							
% DCBP	70		%	10	04/14/22	SC	30 - 150 %
% DCBP (Confirmation)	68		%	10	04/14/22	SC	30 - 150 %
% TCMX	69		%	10	04/14/22	SC	30 - 150 %
% TCMX (Confirmation)	69		%	10	04/14/22	SC	30 - 150 %

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference

RL/PQL=Reporting/Practical Quantitation Level (Equivalent to NELAC LOQ, Limit of Quantitation) ND=Not Detected at RL/PQL
BRL=Below Reporting Level L=Biased Low
QA/QC Surrogates: Surrogates are compounds (preceeded with a %) added by the lab to determine analysis efficiency. Surrogate results(%) listed in the report are not "detected" compounds.

Comments:

All soils, solids and sludges are reported on a dry weight basis unless otherwise noted in the sample comments.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200.
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Phyllis Shiller, Laboratory Director
April 15, 2022
Reviewed and Released by: Rashmi Makol, Project Manager

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

ACCREDITED IN ACCORDANCE WITH nelac NY # 11301

Analysis Report

April 15, 2022

FOR: Attn: Li Tsang
NY Environmental
88-90 Harbor Rd
Port Washington, NY 11050

Sample Information		Custody Information		Date	Time
Matrix:	SOIL	Collected by:		04/11/22	10:35
Location Code:	NY-ENV	Received by:	CP	04/13/22	16:26
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:					

Laboratory Data

SDG ID: GCL07886
Phoenix ID: CL07887

Project ID: GREENPATH 69900
Client ID: P2

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Percent Solid	71		%		04/13/22	H	SW846-%Solid
Soil Extraction for PCB	Completed				04/13/22	O/E	SW3545A
Polychlorinated Biphenyls							
PCB-1016	ND	460	ug/Kg	10	04/14/22	SC	SW8082A
PCB-1221	ND	460	ug/Kg	10	04/14/22	SC	SW8082A
PCB-1232	ND	460	ug/Kg	10	04/14/22	SC	SW8082A
PCB-1242	ND	460	ug/Kg	10	04/14/22	SC	SW8082A
PCB-1248	ND	460	ug/Kg	10	04/14/22	SC	SW8082A
PCB-1254	ND	460	ug/Kg	10	04/14/22	SC	SW8082A
PCB-1260	ND	460	ug/Kg	10	04/14/22	SC	SW8082A
PCB-1262	ND	460	ug/Kg	10	04/14/22	SC	SW8082A
PCB-1268	ND	460	ug/Kg	10	04/14/22	SC	SW8082A
QA/QC Surrogates							
% DCBP	58		%	10	04/14/22	SC	30 - 150 %
% DCBP (Confirmation)	66		%	10	04/14/22	SC	30 - 150 %
% TCMX	66		%	10	04/14/22	SC	30 - 150 %
% TCMX (Confirmation)	66		%	10	04/14/22	SC	30 - 150 %

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference

RL/PQL=Reporting/Practical Quantitation Level (Equivalent to NELAC LOQ, Limit of Quantitation) ND=Not Detected at RL/PQL
BRL=Below Reporting Level L=Biased Low
QA/QC Surrogates: Surrogates are compounds (preceeded with a %) added by the lab to determine analysis efficiency. Surrogate results(%) listed in the report are not "detected" compounds.

Comments:

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Phyllis Shiller, Laboratory Director
April 15, 2022
Reviewed and Released by: Rashmi Makol, Project Manager

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

ACCREDITED IN ACCORDANCE WITH nelac NY # 11301

Analysis Report

April 15, 2022

FOR: Attn: Li Tsang
NY Environmental
88-90 Harbor Rd
Port Washington, NY 11050

Sample Information		Custody Information		Date	Time
Matrix:	SOIL	Collected by:		04/11/22	10:40
Location Code:	NY-ENV	Received by:	CP	04/13/22	16:26
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:					

Laboratory Data

SDG ID: GCL07886
Phoenix ID: CL07888

Project ID: GREENPATH 69900
Client ID: P3

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Percent Solid	72		%		04/13/22	H	SW846-%Solid
Soil Extraction for PCB	Completed				04/13/22	O/E	SW3545A
Polychlorinated Biphenyls							
PCB-1016	ND	2300	ug/Kg	50	04/14/22	SC	SW8082A
PCB-1221	ND	2300	ug/Kg	50	04/14/22	SC	SW8082A
PCB-1232	ND	2300	ug/Kg	50	04/14/22	SC	SW8082A
PCB-1242	ND	2300	ug/Kg	50	04/14/22	SC	SW8082A
PCB-1248	ND	2300	ug/Kg	50	04/14/22	SC	SW8082A
PCB-1254	ND	2300	ug/Kg	50	04/14/22	SC	SW8082A
PCB-1260	6400	2300	ug/Kg	50	04/14/22	SC	SW8082A
PCB-1262	ND	2300	ug/Kg	50	04/14/22	SC	SW8082A
PCB-1268	ND	2300	ug/Kg	50	04/14/22	SC	SW8082A
QA/QC Surrogates							
% DCBP	Diluted Out		%	50	04/14/22	SC	30 - 150 %
% DCBP (Confirmation)	Diluted Out		%	50	04/14/22	SC	30 - 150 %
% TCMX	Diluted Out		%	50	04/14/22	SC	30 - 150 %
% TCMX (Confirmation)	Diluted Out		%	50	04/14/22	SC	30 - 150 %

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference

RL/PQL=Reporting/Practical Quantitation Level (Equivalent to NELAC LOQ, Limit of Quantitation) ND=Not Detected at RL/PQL
BRL=Below Reporting Level L=Biased Low
QA/QC Surrogates: Surrogates are compounds (preceeded with a %) added by the lab to determine analysis efficiency. Surrogate results(%) listed in the report are not "detected" compounds.

Comments:

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Phyllis Shiller, Laboratory Director
April 15, 2022
Reviewed and Released by: Rashmi Makol, Project Manager

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

ACCREDITED IN ACCORDANCE WITH nelac NY # 11301

Analysis Report

April 15, 2022

FOR: Attn: Li Tsang
NY Environmental
88-90 Harbor Rd
Port Washington, NY 11050

Sample Information		Custody Information		Date	Time
Matrix:	SOIL	Collected by:		04/11/22	10:45
Location Code:	NY-ENV	Received by:	CP	04/13/22	16:26
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:					

Laboratory Data

SDG ID: GCL07886
Phoenix ID: CL07889

Project ID: GREENPATH 69900
Client ID: P4

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Percent Solid	80		%		04/13/22	H	SW846-%Solid
Soil Extraction for PCB	Completed				04/13/22	O/E	SW3545A
Polychlorinated Biphenyls							
PCB-1016	ND	410	ug/Kg	10	04/14/22	SC	SW8082A
PCB-1221	ND	410	ug/Kg	10	04/14/22	SC	SW8082A
PCB-1232	ND	410	ug/Kg	10	04/14/22	SC	SW8082A
PCB-1242	ND	410	ug/Kg	10	04/14/22	SC	SW8082A
PCB-1248	ND	410	ug/Kg	10	04/14/22	SC	SW8082A
PCB-1254	ND	410	ug/Kg	10	04/14/22	SC	SW8082A
PCB-1260	ND	410	ug/Kg	10	04/14/22	SC	SW8082A
PCB-1262	ND	410	ug/Kg	10	04/14/22	SC	SW8082A
PCB-1268	ND	410	ug/Kg	10	04/14/22	SC	SW8082A
QA/QC Surrogates							
% DCBP	73		%	10	04/14/22	SC	30 - 150 %
% DCBP (Confirmation)	77		%	10	04/14/22	SC	30 - 150 %
% TCMX	70		%	10	04/14/22	SC	30 - 150 %
% TCMX (Confirmation)	71		%	10	04/14/22	SC	30 - 150 %

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference

RL/PQL=Reporting/Practical Quantitation Level (Equivalent to NELAC LOQ, Limit of Quantitation) ND=Not Detected at RL/PQL
BRL=Below Reporting Level L=Biased Low
QA/QC Surrogates: Surrogates are compounds (preceeded with a %) added by the lab to determine analysis efficiency. Surrogate results(%) listed in the report are not "detected" compounds.

Comments:

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Phyllis Shiller, Laboratory Director
April 15, 2022
Reviewed and Released by: Rashmi Makol, Project Manager

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

ACCREDITED IN ACCORDANCE WITH nelac NY # 11301

Analysis Report

April 15, 2022

FOR: Attn: Li Tsang
NY Environmental
88-90 Harbor Rd
Port Washington, NY 11050

Sample Information		Custody Information		Date	Time
Matrix:	SOIL	Collected by:		04/11/22	11:15
Location Code:	NY-ENV	Received by:	CP	04/13/22	16:26
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:					

Laboratory Data

SDG ID: GCL07886
Phoenix ID: CL07890

Project ID: GREENPATH 69900
Client ID: P5

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Percent Solid	87		%		04/13/22	H	SW846-%Solid
Soil Extraction for PCB	Completed				04/13/22	O/E	SW3545A
Polychlorinated Biphenyls							
PCB-1016	ND	380	ug/Kg	10	04/14/22	SC	SW8082A
PCB-1221	ND	380	ug/Kg	10	04/14/22	SC	SW8082A
PCB-1232	ND	380	ug/Kg	10	04/14/22	SC	SW8082A
PCB-1242	ND	380	ug/Kg	10	04/14/22	SC	SW8082A
PCB-1248	ND	380	ug/Kg	10	04/14/22	SC	SW8082A
PCB-1254	ND	380	ug/Kg	10	04/14/22	SC	SW8082A
PCB-1260	1300	380	ug/Kg	10	04/14/22	SC	SW8082A
PCB-1262	ND	380	ug/Kg	10	04/14/22	SC	SW8082A
PCB-1268	ND	380	ug/Kg	10	04/14/22	SC	SW8082A
QA/QC Surrogates							
% DCBP	88		%	10	04/14/22	SC	30 - 150 %
% DCBP (Confirmation)	63		%	10	04/14/22	SC	30 - 150 %
% TCMX	69		%	10	04/14/22	SC	30 - 150 %
% TCMX (Confirmation)	69		%	10	04/14/22	SC	30 - 150 %

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference

RL/PQL=Reporting/Practical Quantitation Level (Equivalent to NELAC LOQ, Limit of Quantitation) ND=Not Detected at RL/PQL
BRL=Below Reporting Level L=Biased Low
QA/QC Surrogates: Surrogates are compounds (preceeded with a %) added by the lab to determine analysis efficiency. Surrogate results(%) listed in the report are not "detected" compounds.

Comments:

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Phyllis Shiller, Laboratory Director
April 15, 2022
Reviewed and Released by: Rashmi Makol, Project Manager

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

ACCREDITED IN ACCORDANCE WITH nelac NY # 11301

Analysis Report

April 15, 2022

FOR: Attn: Li Tsang
NY Environmental
88-90 Harbor Rd
Port Washington, NY 11050

Sample Information		Custody Information		Date	Time
Matrix:	SOIL	Collected by:		04/11/22	11:20
Location Code:	NY-ENV	Received by:	CP	04/13/22	16:26
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:					

Laboratory Data

SDG ID: GCL07886
Phoenix ID: CL07891

Project ID: GREENPATH 69900
Client ID: P6

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Percent Solid	86		%		04/13/22	H	SW846-%Solid
Soil Extraction for PCB	Completed				04/13/22	O/E	SW3545A
Polychlorinated Biphenyls							
PCB-1016	ND	390	ug/Kg	10	04/14/22	SC	SW8082A
PCB-1221	ND	390	ug/Kg	10	04/14/22	SC	SW8082A
PCB-1232	ND	390	ug/Kg	10	04/14/22	SC	SW8082A
PCB-1242	ND	390	ug/Kg	10	04/14/22	SC	SW8082A
PCB-1248	ND	390	ug/Kg	10	04/14/22	SC	SW8082A
PCB-1254	ND	390	ug/Kg	10	04/14/22	SC	SW8082A
PCB-1260	ND	390	ug/Kg	10	04/14/22	SC	SW8082A
PCB-1262	ND	390	ug/Kg	10	04/14/22	SC	SW8082A
PCB-1268	ND	390	ug/Kg	10	04/14/22	SC	SW8082A
QA/QC Surrogates							
% DCBP	63		%	10	04/14/22	SC	30 - 150 %
% DCBP (Confirmation)	59		%	10	04/14/22	SC	30 - 150 %
% TCMX	66		%	10	04/14/22	SC	30 - 150 %
% TCMX (Confirmation)	63		%	10	04/14/22	SC	30 - 150 %

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference

RL/PQL=Reporting/Practical Quantitation Level (Equivalent to NELAC LOQ, Limit of Quantitation) ND=Not Detected at RL/PQL
BRL=Below Reporting Level L=Biased Low
QA/QC Surrogates: Surrogates are compounds (preceeded with a %) added by the lab to determine analysis efficiency. Surrogate results(%) listed in the report are not "detected" compounds.

Comments:

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Phyllis Shiller, Laboratory Director
April 15, 2022
Reviewed and Released by: Rashmi Makol, Project Manager

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

ACCREDITED IN ACCORDANCE WITH nelac NY # 11301

Analysis Report

April 15, 2022

FOR: Attn: Li Tsang
NY Environmental
88-90 Harbor Rd
Port Washington, NY 11050

Sample Information		Custody Information		Date	Time
Matrix:	SOIL	Collected by:		04/11/22	11:25
Location Code:	NY-ENV	Received by:	CP	04/13/22	16:26
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:					

Laboratory Data

SDG ID: GCL07886
Phoenix ID: CL07892

Project ID: GREENPATH 69900
Client ID: P7

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Percent Solid	89		%		04/13/22	H	SW846-%Solid
Soil Extraction for PCB	Completed				04/13/22	O/E	SW3545A
Polychlorinated Biphenyls							
PCB-1016	ND	370	ug/Kg	10	04/14/22	SC	SW8082A
PCB-1221	ND	370	ug/Kg	10	04/14/22	SC	SW8082A
PCB-1232	ND	370	ug/Kg	10	04/14/22	SC	SW8082A
PCB-1242	ND	370	ug/Kg	10	04/14/22	SC	SW8082A
PCB-1248	ND	370	ug/Kg	10	04/14/22	SC	SW8082A
PCB-1254	ND	370	ug/Kg	10	04/14/22	SC	SW8082A
PCB-1260	ND	370	ug/Kg	10	04/14/22	SC	SW8082A
PCB-1262	ND	370	ug/Kg	10	04/14/22	SC	SW8082A
PCB-1268	ND	370	ug/Kg	10	04/14/22	SC	SW8082A
QA/QC Surrogates							
% DCBP	84		%	10	04/14/22	SC	30 - 150 %
% DCBP (Confirmation)	87		%	10	04/14/22	SC	30 - 150 %
% TCMX	77		%	10	04/14/22	SC	30 - 150 %
% TCMX (Confirmation)	78		%	10	04/14/22	SC	30 - 150 %

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference

RL/PQL=Reporting/Practical Quantitation Level (Equivalent to NELAC LOQ, Limit of Quantitation) ND=Not Detected at RL/PQL
BRL=Below Reporting Level L=Biased Low
QA/QC Surrogates: Surrogates are compounds (preceeded with a %) added by the lab to determine analysis efficiency. Surrogate results(%) listed in the report are not "detected" compounds.

Comments:

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If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200.
The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.

Phyllis Shiller, Laboratory Director
April 15, 2022
Reviewed and Released by: Rashmi Makol, Project Manager

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

ACCREDITED IN ACCORDANCE WITH nelac NY # 11301

Analysis Report

April 15, 2022

FOR: Attn: Li Tsang
NY Environmental
88-90 Harbor Rd
Port Washington, NY 11050

Sample Information		Custody Information		Date	Time
Matrix:	SOIL	Collected by:		04/11/22	11:30
Location Code:	NY-ENV	Received by:	CP	04/13/22	16:26
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:					

Laboratory Data

SDG ID: GCL07886
Phoenix ID: CL07893

Project ID: GREENPATH 69900
Client ID: P8

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Percent Solid	86		%		04/13/22	H	SW846-%Solid
Soil Extraction for PCB	Completed				04/13/22	O/E	SW3545A
Polychlorinated Biphenyls							
PCB-1016	ND	380	ug/Kg	10	04/14/22	SC	SW8082A
PCB-1221	ND	380	ug/Kg	10	04/14/22	SC	SW8082A
PCB-1232	ND	380	ug/Kg	10	04/14/22	SC	SW8082A
PCB-1242	ND	380	ug/Kg	10	04/14/22	SC	SW8082A
PCB-1248	ND	380	ug/Kg	10	04/14/22	SC	SW8082A
PCB-1254	ND	380	ug/Kg	10	04/14/22	SC	SW8082A
PCB-1260	ND	380	ug/Kg	10	04/14/22	SC	SW8082A
PCB-1262	ND	380	ug/Kg	10	04/14/22	SC	SW8082A
PCB-1268	ND	380	ug/Kg	10	04/14/22	SC	SW8082A
QA/QC Surrogates							
% DCBP	76		%	10	04/14/22	SC	30 - 150 %
% DCBP (Confirmation)	77		%	10	04/14/22	SC	30 - 150 %
% TCMX	73		%	10	04/14/22	SC	30 - 150 %
% TCMX (Confirmation)	73		%	10	04/14/22	SC	30 - 150 %

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference

RL/PQL=Reporting/Practical Quantitation Level (Equivalent to NELAC LOQ, Limit of Quantitation) ND=Not Detected at RL/PQL
BRL=Below Reporting Level L=Biased Low
QA/QC Surrogates: Surrogates are compounds (preceeded with a %) added by the lab to determine analysis efficiency. Surrogate results(%) listed in the report are not "detected" compounds.

Comments:

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Phyllis Shiller, Laboratory Director
April 15, 2022
Reviewed and Released by: Rashmi Makol, Project Manager

Environmental Laboratories, Inc.
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Tel. (860) 645-1102 Fax (860) 645-0823

ACCREDITED IN ACCORDANCE WITH nelac NY # 11301

Analysis Report

April 15, 2022

FOR: Attn: Li Tsang
NY Environmental
88-90 Harbor Rd
Port Washington, NY 11050

Sample Information		Custody Information		Date	Time
Matrix:	SOIL	Collected by:		04/11/22	11:35
Location Code:	NY-ENV	Received by:	CP	04/13/22	16:26
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:					

Laboratory Data

SDG ID: GCL07886
Phoenix ID: CL07894

Project ID: GREENPATH 69900
Client ID: P9

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Percent Solid	83		%		04/13/22	H	SW846-%Solid
Soil Extraction for PCB	Completed				04/13/22	O/E	SW3545A
Polychlorinated Biphenyls							
PCB-1016	ND	390	ug/Kg	10	04/14/22	SC	SW8082A
PCB-1221	ND	390	ug/Kg	10	04/14/22	SC	SW8082A
PCB-1232	ND	390	ug/Kg	10	04/14/22	SC	SW8082A
PCB-1242	ND	390	ug/Kg	10	04/14/22	SC	SW8082A
PCB-1248	ND	390	ug/Kg	10	04/14/22	SC	SW8082A
PCB-1254	ND	390	ug/Kg	10	04/14/22	SC	SW8082A
PCB-1260	1100	390	ug/Kg	10	04/14/22	SC	SW8082A
PCB-1262	ND	390	ug/Kg	10	04/14/22	SC	SW8082A
PCB-1268	ND	390	ug/Kg	10	04/14/22	SC	SW8082A
QA/QC Surrogates							
% DCBP	74		%	10	04/14/22	SC	30 - 150 %
% DCBP (Confirmation)	78		%	10	04/14/22	SC	30 - 150 %
% TCMX	70		%	10	04/14/22	SC	30 - 150 %
% TCMX (Confirmation)	71		%	10	04/14/22	SC	30 - 150 %

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference

RL/PQL=Reporting/Practical Quantitation Level (Equivalent to NELAC LOQ, Limit of Quantitation) ND=Not Detected at RL/PQL
BRL=Below Reporting Level L=Biased Low
QA/QC Surrogates: Surrogates are compounds (preceeded with a %) added by the lab to determine analysis efficiency. Surrogate results(%) listed in the report are not "detected" compounds.

Comments:

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If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200.
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Phyllis Shiller, Laboratory Director
April 15, 2022
Reviewed and Released by: Rashmi Makol, Project Manager

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

NY # 11301

QA/QC Report

April 15, 2022

QA/QC Data

SDG I.D.: GCL07886

Parameter	Blank	Blk RL	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits
QA/QC Batch 620153 (ug/Kg), QC Sample No: CL07665 2X (CL07886, CL07887, CL07888, CL07889, CL07890, CL07891, CL07892, CL07893, CL07894)										
Polychlorinated Biphenyls - Soil										
PCB-1016	ND	33	84	83	1.2	73	73	0.0	40 - 140	30
PCB-1221	ND	33							40 - 140	30
PCB-1232	ND	33							40 - 140	30
PCB-1242	ND	33							40 - 140	30
PCB-1248	ND	33							40 - 140	30
PCB-1254	ND	33							40 - 140	30
PCB-1260	ND	33	83	83	0.0	71	72	1.4	40 - 140	30
PCB-1262	ND	33							40 - 140	30
PCB-1268	ND	33							40 - 140	30
% DCBP (Surrogate Rec)	65	%	85	85	0.0	78	77	1.3	30 - 150	30
% DCBP (Surrogate Rec) (Confirm	63	%	85	87	2.3	75	70	6.9	30 - 150	30
% TCMX (Surrogate Rec)	65	%	89	86	3.4	77	76	1.3	30 - 150	30
% TCMX (Surrogate Rec) (Confirm	63	%	85	85	0.0	76	73	4.0	30 - 150	30

If there are any questions regarding this data, please call Phoenix Client Services at extension 200.

RPD - Relative Percent Difference
LCS - Laboratory Control Sample
LCSD - Laboratory Control Sample Duplicate
MS - Matrix Spike
MS Dup - Matrix Spike Duplicate
NC - No Criteria
Intf - Interference

Phyllis Shiller, Laboratory Director
April 15, 2022

Friday, April 15, 2022

Criteria: None

State: NY

Sample Criteria Exceedances Report

GCL07886 - NY-ENV

SampNo	Acode	Phoenix Analyte	Criteria	Result	RL	Criteria	RL Criteria	Analysis Units
CL07888	$PCB_SMR	PCB-1268	NY / Requested PCB RL /	ND	2300	1000	1000	ug/Kg
CL07888	$PCB_SMR	PCB-1262	NY / Requested PCB RL /	ND	2300	1000	1000	ug/Kg
CL07888	$PCB_SMR	PCB-1260	NY / Requested PCB RL /	6400	2300	1000	1000	ug/Kg
CL07888	$PCB_SMR	PCB-1254	NY / Requested PCB RL /	ND	2300	1000	1000	ug/Kg
CL07888	$PCB_SMR	PCB-1248	NY / Requested PCB RL /	ND	2300	1000	1000	ug/Kg
CL07888	$PCB_SMR	PCB-1242	NY / Requested PCB RL /	ND	2300	1000	1000	ug/Kg
CL07888	$PCB_SMR	PCB-1232	NY / Requested PCB RL /	ND	2300	1000	1000	ug/Kg
CL07888	$PCB_SMR	PCB-1221	NY / Requested PCB RL /	ND	2300	1000	1000	ug/Kg
CL07888	$PCB_SMR	PCB-1016	NY / Requested PCB RL /	ND	2300	1000	1000	ug/Kg
CL07890	$PCB_SMR	PCB-1260	NY / Requested PCB RL /	1300	380	1000	1000	ug/Kg
CL07894	$PCB_SMR	PCB-1260	NY / Requested PCB RL /	1100	390	1000	1000	ug/Kg

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Tel. (860) 645-1102 Fax (860) 645-0823

NY # 11301

Analysis Comments

April 15, 2022 SDG I.D.: GCL07886

The following analysis comments are made regarding exceptions to criteria not already noted in the Analysis Report or QA/QC Report:

PCB Narration

AU-ECD3 04/14/22-1: CL07888, CL07889, CL07892, CL07893, CL07894

The following Continuing Calibration compounds did not meet % deviation criteria:
Samples: CL07892, CL07893
Preceding CC 414B019 - PCB 1016 19%L (%)
Succeeding CC 414B032 - PCB 1016 21%L (%)
Samples: CL07888, CL07889, CL07894
Preceding CC 414B032 - PCB 1016 21%L (%)
Succeeding CC 414B045 - None.

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ACCREDITED IN ACCORDANCE WITH nelac NY # 11301

NY Temperature Narration

April 15, 2022

SDG I.D.: GCL07886

The samples in this delivery group were received at 1.0°C.
(Note acceptance criteria for relevant matrices is above freezing up to 6°C)

NEW YORK ENVIRONMENTAL

88 HARBOR ROAD
PORT WASHINGTON, NY 11050
(516) 944-9500

Chain of Custody - Chemistry

Client: Green Path Environmental, Inc.	Client Proj. ID 1937.07.01	Date 04.11.22	Notes: **Results to info@gpe.nyc and office@gpe.nyc** **PCB analysis - 5 day TAT**
Project: Nanuet UFSD - Barr Middle School	Address	143 Church Street, Nanuet, NY 10954	
Inspector: Alexander Rubin Signed:			
Turnaround Time: **5 days TAT**			

Sample ID.	Location and/or Sample Description	Time of Collection	Material Sampled	Analysis	# and Type of Container	Preservative (if any)
P1	EXTERIOR - Front Security Vestibule	10:30	SOIL (BARE)	PCB		
P2		10:35				
P3		10:40				
P4		10:45				
P5	- REAR COURT YARD	11:15				
P6		11:20				
P7		11:25				
P8		11:30				
P9		11:35				

Relinquished: _____ Signature: _____ Date: _____ Time: _____

Received: _____ Signature: _____ Date: _____ Time: _____

Lab Use Only:

NYEA Project No. 69900	Temp. °C	Analyst Initials	Analysis Date:

Laboratory Certification

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2023
Issued April 01, 2022

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MS. PHYLLIS SHILLER
PHOENIX ENVIRONMENTAL LABS
587 EAST MIDDLE TURNPIKE
MANCHESTER, CT 06040

NY Lab Id No: 11301

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2016) for the category ENVIRONMENTAL ANALYSES SOLID AND HAZARDOUS WASTE
All approved analytes are listed below:

Phthalate Esters	
Bis(2-ethylhexyl) phthalate	EPA 8270D
	EPA 8270E
Diethyl phthalate	EPA 8270D
	EPA 8270E
Dimethyl phthalate	EPA 8270D
	EPA 8270E
Di-n-butyl phthalate	EPA 8270D
	EPA 8270E
Di-n-octyl phthalate	EPA 8270D
	EPA 8270E
Polychlorinated Biphenyls	
Aroclor 1016 (PCB-1016)	EPA 8082A
Aroclor 1016 (PCB-1016) in Oil	EPA 8082A
Aroclor 1221 (PCB-1221)	EPA 8082A
Aroclor 1221 (PCB-1221) in Oil	EPA 8082A
Aroclor 1232 (PCB-1232)	EPA 8082A
Aroclor 1232 (PCB-1232) in Oil	EPA 8082A
Aroclor 1242 (PCB-1242)	EPA 8082A
Aroclor 1242 (PCB-1242) in Oil	EPA 8082A
Aroclor 1248 (PCB-1248)	EPA 8082A
Aroclor 1248 (PCB-1248) in Oil	EPA 8082A
Aroclor 1254 (PCB-1254)	EPA 8082A
Aroclor 1254 (PCB-1254) in Oil	EPA 8082A
Aroclor 1260 (PCB-1260)	EPA 8082A

Polychlorinated Biphenyls	
Aroclor 1260 (PCB-1260) in Oil	EPA 8082A
Aroclor 1262 (PCB-1262)	EPA 8082A
Aroclor 1262 (PCB-1262) in Oil	EPA 8082A
Aroclor 1268 (PCB-1268)	EPA 8082A
Aroclor 1268 (PCB-1268) in Oil	EPA 8082A
PCB 101	EPA 8082A
PCB 105	EPA 8082A
PCB 118	EPA 8082A
PCB 128	EPA 8082A
PCB 138	EPA 8082A
PCB 153	EPA 8082A
PCB 170	EPA 8082A
PCB 18	EPA 8082A
PCB 180	EPA 8082A
PCB 183	EPA 8082A
PCB 184	EPA 8082A
PCB 187	EPA 8082A
PCB 195	EPA 8082A
PCB 206	EPA 8082A
PCB 209	EPA 8082A
PCB 28	EPA 8082A
PCB 44	EPA 8082A
PCB 49	EPA 8082A
PCB 52	EPA 8082A

Serial No.: 64612

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2023
Issued April 01, 2022

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

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MS. PHYLLIS SHILLER
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All approved analytes are listed below:

Volatile Organics		**Sample Preparation Methods**
Ethylene Glycol	EPA 8260C	EPA 3545A
	EPA 8015D	EPA 3051A
Isobutyl alcohol	EPA 8015D	EPA 5021A
Methyl acetate	EPA 8260D	EPA 3060A
	EPA 8260C	EPA 9010C
Methyl cyclohexane	EPA 8260D	
	EPA 8260C	
Methyl tert-butyl ether	EPA 8260D	
	EPA 8260C	
tert-butyl alcohol	EPA 8260D	
	EPA 8260C	
Tetrahydrofuran	EPA 8260D	
	EPA 8260C	
Vinyl acetate	EPA 8260D	
	EPA 8260C	

Sample Preparation Methods

EPA 5035A-L
EPA 5035A-H
EPA 3580A
EPA 9030B
EPA 3050B
EPA 3550C
EPA 3540C
EPA 3546

Serial No.: 64612

SECTION 02 82 04 – PCB REMOVAL AND DISPOSAL SPECIFICATION

PART 1 – GENERAL

1.1 WORK INCLUDED

A. The Contractor shall furnish all labor, materials, services, insurance and equipment necessary to perform the Work of this Contract. All work will be conducted in compliance with EPA, OSHA, and NYS regulations, and other applicable federal, state, and local regulations and in accordance with these specifications. In the event there is a conflicting point between these provisions, the most stringent one shall apply.

B. The work will involve the removal, off-site transportation, and disposal of the polychlorinated biphenyls (PCB) - containing vertical expansion joint caulking on the building vestibule in accordance with all applicable rules and regulations and this specification.

C. The work shall include but not be limited to the removal of the below asbestos-containing materials (See Attachment 1 - project drawing **BM-PCB1** for type, locations and approximate quantity per Green Path Environmental, Inc's PCB survey report dated March 24, 2022).

A. Macarthur Barr Middle School

Location	Material	Estimated Quantity
Exterior Security Vestibule (North and South Sides) – Frame Perimeter	Expansion Joint Gray Caulking – **Frame Perimeter Only**	16 Square Feet
	TOTAL ACM	**16 SF**

D. The location of PCB- containing/contaminated material indicated on the Drawings is provided for guidance only**. The Contractor shall be responsible for establishing exact quantities and locations for removal. Contractor is referred to Attachment 1 - Project Drawing BM-PCB1.**

REMOVAL WILL BE COORDINATED WITH CLIENT AS NEEDED.

E. Transport off-site, and disposed to a regulated facility approximately 16 linear feet of PCB-containing vertical expansion caulk. Removal will be coordinated with Client as necessary.

1.2 DEFINITIONS

A. PCB-Containing Caulk: Caulk that has PCB content greater than or equal to 50 milligrams per kilogram. PCB-containing caulk also includes the chips and of soil and dust generated during the removal of the caulk. Note: PCB-containing waste caulk with a PCB content

greater than or equal to 50 milligrams per kilogram is defined as a hazardous waste in New York State hazardous waste regulations (6 NYCRR 371) and has a B007 waste code.

1.3 SUBMITTALS

A. Submit the following items to the Client or representative for review twenty (20) days prior to the commencement of Work associated with this section:

1. The Contractor shall submit written certification that the disposal facilities to receive PCB-containing caulk and PCB-contaminated soil are licensed, permitted and approved by the appropriate Federal, State and local agencies, and the facilities have no RCRA violations or other environmental conditions that could affect the satisfactory operation of the facility. The Contractor shall also provide letters of acceptance from the facilities stating that they will accept the estimated quantity of PCB-containing caulk.

2. The Contractor shall submit the names, addresses, contact persons and telephone numbers of the haulers that will be transporting the wastes and copies of the waste haulers' permits issued in accordance with the requirements of NYS DEC 6 NYCRR 364, and if the wastes are to be disposed outside New York State, the permits and licenses applicable in those states through which the material will be transported.

3 The Contractor shall submit a Health and Safety Plan (HASP) that will describe the procedures by which Contractor intends to conduct the Work, including measures to protect workers from exposure to PCBs during caulk and contaminated soil removal and transfer operations of the wastes. The Client and Environmental Consultant will neither approve nor disapprove the HASP.

4. The name of its on-site supervisor responsible for such operations, as well as documentation that the supervisor has completed an OSHA HAZWOPER training.

B. A Certificate of Disposal shall be prepared by the facility for each load of PCB-containing caulk delivered. A copy of each Certificate shall be submitted to the Client within sixty (60) days of the wastes leaving the Site.

1.4 APPLICABLE STANDARDS AND REGULATIONS

A. Perform all Work in compliance with the most current version of all pertinent laws, rules, and regulations, existing at the time of Work, including, but not limited to:

1. Code of Federal Regulations, including regulations by the United States Environmental Protection Agency governing PCB waste handling and disposal and regulations by the Occupational Safety and Health Administration governing worker protection.

2. New York State Code of Rules and Regulations, including regulations by the New York State Department of Environmental Conservation governing waste transportation and disposal.

- END OF PART 1 -

PART 2 – PRODUCTS

2.1 VACUUMS AND SURFACTANTS

Provide equipment and materials that meet the requirements specified in Section 02 82 00.

- END OF PART 2 -

PART 3 – EXECUTION

3.1 CAULK REMOVAL

A. Establish and maintain an exclusion zone with cones and warning tape around the work area to warn the public from entering.

B. Work is not to be done in windy conditions or during precipitation. The Client and Environmental Consultant will determine if conditions are acceptable for work to proceed.

C. Mist a surfactant to maintain moisture over the PCB-containing caulk in the immediate vicinity. Do not over-wet the Work area such that contamination may be conveyed into the joints or surrounding area.

D. Remove all PCB-containing caulk from the facade with hand tools, such as a chisel and hammer.

E. Maintain a HEPA vacuum immediately over the area where the PCB-containing caulk is being removed so that such caulk and associated dust is being contained and particles of caulk do not fall into the gaps of the soil. Change HEPA filters as needed to maintain needed vacuum, but no less frequently than required in Section 02 82 00 or as directed by the Environmental Consultant.

F. Appropriately contain and drum all PCB-containing caulk, and related wastes such as vacuumed waste, HEPA filters, etc.

3.2 DECONTAMINATION

A. Wet clean all tools and equipment that comes in contact with PCB-containing caulk.

B. Residue from cleaning and personnel protective equipment/materials not decontaminated shall be placed in appropriate waste containers suitable for off-site shipment and disposal. The Contractor shall be responsible for determining which waste residues and equipment/material are hazardous per 6 NYCRR 371 and managing the wastes accordingly.

3.3 TRANSPORTATION AND DISPOSAL

A. The Contractor shall provide all labor, materials, and equipment necessary to transport the waste generated pursuant to this Section todisposal facilities.

B. The Contractor shall be responsible for making all arrangements with the disposal facilities for the ultimate disposal of the wastes. The Contractor shall provide and pay for all labor, materials, equipment, taxes and incidentals that are required to transport and dispose of the wastes to an approved disposal facility. The Contractor shall also provide and pay for any additional analytical testing that may be required by the disposal facility.

C. In the event that the disposal facilities cease to accept the stated materials or the facility ceases operations, the Contractor shall locate an alternate permitted facility that will accept the wastes. The Contractor is responsible for making the arrangements to utilize the facility. This will be done at no additional cost or delay to the Client.

D. The Contractor shall be responsible for the day-to-day movement of truck traffic on and off the Site

and for developing and preparing detailed procedures to be used to transport the wastes to the disposal facility. In preparation of these procedures the Contractor shall address the following considerations: personnel safety; environmental effects; prevention of transporter spills and dust emissions on-site and during transport; verification of vehicle cleaning prior to leaving the Site; transport operations; accident and spill emergency procedures on-site and during transport; transportation routes; modes of transport and required permits.

E. All wastes to be transported off-site shall be transported by a permitted waste hauler in accordance with New York State Department of Environmental Conservation 6 NYCRR 364 – Waste Transporter Permits.

F. The Contractor shall obtain and complete all manifests, bills-of-lading or other shipping documents as required by Federal, State and local regulations.

G. The Client requires that all PCB waste products be incinerated at an approved facility and the contractor shall provide a Certificate of Destruction for PCB waste from the waste incinerator. The Client will sign all of the manifests as the generator of the material. The Client will provide the EPA ID number required for the Contractor to complete the manifests. The Contractor shall allow two weeks for the Client to review and sign the completed manifests. Submit originals or copies of all pertinent Hazardous Waste Manifests in triplicate to the Fund.

H. The Contractor shall be responsible for inspecting the haul routes for road conditions, overhead clearance and weight restrictions prior to transporting wastes to the disposal facilities

I. PCB-contaminated caulk shall be disposed in a landfill permitted or licensed by an appropriate government jurisdiction to accept such waste. PCB-contaminated caulk shall not be shipped to a recycler.

- END OF PART 3 –

ATTACHMENT 1
(Project Drawing BM-PCB1**)**

SECTION 03 05 16- UNDERSLAB VAPOR BARRIER

PART 1 – GENERAL

1.1 SUMMARY

A. Products supplied under this section:
1. Vapor barrier and installation accessories for installation under concrete slabs.

B. Related sections:
1. Section 03 30 00 Cast-in-Place Concrete
2. Section 07 26 00 Vapor Retarders

1.2 REFERENCES

A. ASTM International:
1. ASTM E1745-17 Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs.
2. ASTM E1643-18a Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.

B. Technical Reference - American Concrete Institute (ACI):
1. ACI 302.2R-06 Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials.
2. ACI 302.1R-15 Guide to Concrete Floor and Slab Construction.

1.3 SUBMITTALS

A. Quality control/assurance:
1. Summary of test results per paragraph 9.3 of ASTM E1745.
2. Manufacturer's samples and literature.
3. Manufacturer's installation instructions for placement, seaming, penetration prevention and repair, and perimeter seal per ASTM E1643.
4. All mandatory ASTM E1745 testing must be performed on a single production roll per ASTM E1745 Section 8.1.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Vapor barrier shall have all of the following qualities:
1. Maintain permeance of less than 0.01 Perms [grains/(ft^2 · hr · inHg)] as tested in accordance with mandatory conditioning tests per ASTM E1745 Section 7.1 (7.1.1-7.1.5).
2. Other performance criteria:
   a. Strength: ASTM E1745 Class A.
   b. Thickness: 15 mils minimum
3. Provide third party documentation that all testing was performed on a single production roll per ASTM E1745 Section 8.1

B. Vapor barrier products:
1. Basis of Design: Stego Wrap Vapor Barrier (15-mil) by Stego Industries LLC., (877) 464-7834 www.stegoindustries.com.
2. No substitutions.

2.2 ACCESSORIES

A. Seams:
1. Stego Tape by Stego Industries LLC, (877) 464-7834 www.stegoindustries.com.

B. Sealing Penetrations of Vapor barrier:
1. Stego Mastic by Stego Industries LLC, (877) 464-7834 www.stegoindustries.com.
2. Stego Tape by Stego Industries LLC, (877) 464-7834 www.stegoindustries.com.

C. Perimeter/edge seal:
1. Stego Crete Claw by Stego Industries LLC, (877) 464-7834 www.stegoindustries.com.
2. Stego Term Bar by Stego Industries LLC, (877) 464-7834 www.stegoindustries.com.
3. StegoTack Tape (double-sided sealant tape) by Stego Industries LLC, (877) 464-7834 www.stegoindustries.com.

D. Penetration Prevention:
1. Beast Foot by Stego Industries LLC, (877) 464-7834 www.stegoindustries.com.
2. Beast Form Stake by Stego Industries LLC, (877) 464-7834 www.stegoindustries.com.

E. Vapor Barrier-Safe Screed System
1. Beast Screed by Stego Industries, LLC, (877) 464-7834 www.stegoindustries.com.
2. Beast Hook by Stego Industries, LLC, (877) 464-7834 www.stegoindustries.com.

PART 3 – EXECUTION

3.1 PREPARATION

A. Ensure that subsoil is approved by Architect or Geotechnical Engineer.
1. Level and compact base material.

3.2 INSTALLATION

A. Install vapor barrier in accordance ASTM E1643.
1. Unroll vapor barrier with the longest dimension parallel with the direction of the concrete placement and face laps away from the expected direction of the placement whenever possible.
2. Extend vapor barrier to the perimeter of the slab. If practicable, terminate it at the top of the slab, otherwise (a) at a point acceptable to the structural engineer or (b) where obstructed by impediments, such as dowels, waterstops, or any other site condition requiring early termination of the vapor barrier. At the point of termination, seal vapor barrier to the foundation wall, grade beam or slab itself.
Seal vapor barrier to the entire slab perimeter using Stego Crete Claw, per manufacturer's instructions.
Overlap joints 6 inches and seal with manufacturer’s seam tape.
3. Apply seam tape/Crete Claw to a clean and dry vapor barrier.
4. Seal all penetrations (including pipes) per manufacturer’s instructions.
5. For interior forming applications, avoid the use of non-permanent stakes driven through vapor barrier. Use Beast Form Stake and Beast Foot as a vapor barrier-safe forming system. Ensure Beast Foot’s peel-and-stick adhesive base is fully adhered to the vapor barrier.
7. If non-permanent stakes must be driven through vapor retarder, repair as recommended by vapor retarder manufacturer.
8. Use reinforcing bar supports with base sections that eliminate or minimize the potential for puncture of the vapor barrier.

9. Repair damaged areas with vapor barrier material of similar (or better) permeance, puncture and tensile.
10. For vapor barrier-safe concrete screeding applications, install Beast Screed (vapor barrier-safe screed system) per manufacturer's instructions prior to placing concrete.

END OF SECTION 030516

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SECTION 03 30 00 – CAST-IN-PLACE CONCRETE (CIVIL)

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes:

1. Concrete formwork, reinforcing steel, as well as cast-in-place concrete materials, design mixes, placement procedures, and finishes for concrete sidewalks, curbs, stairs, pavement, slabs, and miscellaneous concrete.

1.2 RELATED WORK SPECIFIED ELSEWHERE

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

B. Section 31 20 00: Earth Moving

1.3 SUBMITTALS

A. Product Data: Manufacturer's name, specifications, and installation instructions, for each item specified.

B. Steel Reinforcement Shop Drawings: Details of fabrication, bending, and placement, prepared according to ACI 315, "Details and Detailing of Concrete Reinforcement." Include material, grade, bar schedules, stirrup spacing, bent bar diagrams, arrangement, and supports of concrete reinforcement. Include special reinforcement required for openings through concrete structures.

C. Construction Joint Layout: Indicate proposed construction joints required to construct the structure. Location of construction joints is subject to approval of the Engineer.

D. Formwork Shop Drawings: Prepared by or under the supervision of a qualified professional engineer detailing fabrication, assembly, and support of formwork. Design and engineering of formwork are Contractor's responsibility.

E. Design Mixes: For each concrete mix, include the following:

1. Mix identification.

2. Minimum 28-day compressive strength.

3. Durability exposure class.

4. Maximum w/cm.

5. Slump limit.

6. Air content.

7. Nominal maximum aggregate size.

8. Indicate amounts of mixing water to be withheld for later addition at Project site.

9. Include alternate mix designs when characteristics of materials, project conditions, weather, test results, or other circumstances warrant adjustments.

F. Material Certificates: Signed by manufacturers certifying that each of the following items complies with requirements:

1. Cementitious materials and aggregates.

2. Admixtures.

3. Curing materials.

4. Bonding agents.

5. Adhesives.

6. Repair materials.

1.4 REFERENCES

A. Comply with ACI 301-16 for all Work of this Section, unless otherwise indicated on the Contract Drawings or herein specified.

B. New York State Department of Transportation Standard Specifications for Construction and Materials, Latest Edition.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed concrete Work 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. Include copies of applicable ACI certificates.

B. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products complying with ASTM C 94 requirements for production facilities and equipment.

C. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.

1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.

2. Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician, Grade I. Testing agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician, Grade II.

D. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, each aggregate from one source, and each admixture from the same manufacturer.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Comply with ASTM C94 and ACI 301.

1.7 FIELD CONDITIONS

A. Cold-Weather Placement: Comply with ACI 301 and ACI 306R-16 and as follows:

1. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

2. When average high and low temperature is expected to fall below 40° F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.

3. Do not use frozen materials or materials containing ice or snow.

4. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.

5. Do not place concrete in contact with surfaces less than 35 deg F, other than reinforcing steel.

6. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.

B. Hot-Weather Placement: Comply with ACI 301 and ACI 305.1, and as follows:

1. Maintain concrete temperature at time of discharge to not exceed 95 deg F. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.

2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Prefabricated metal-framed plywood matched, tight fitting, stiffened to support weight of concrete.

B. Reinforcing Steel: ASTM A 615, Grade 60; deformed billet steel bars.

1. Joint Dowel Bars: ASTM A 615, Grade 60 plain-steel bars. Cut bars true to length with ends square and free of burrs.

2. Sizes and locations as shown on the Contract Drawings.

C. Chairs, Bolsters, Bar Supports, and Spacers: Sized and shaped for support of reinforcing.

D. Cast-In-Place Concrete: Normal weight, air entrained concrete with a minimum compressive strength of 4,500 PSI at the end of 28 days.

1. Design Air Content: ASTM C 260, and on the NYSDOT’s current “Approved List”; 6% by volume, 1.5% +/-. Entrained air shall be provided by use of an approved air-entraining admixture.

2. Cement: ASTM C 150 Type I or II Portland cement.

3. Normal-Weight Aggregates: ASTM C 33, uniformly graded. Provide aggregates from a single source.

   a. Maximum Coarse-Aggregate Size: 1-1/2 inches nominal.

   b. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement

4. Water: ASTM C94, Potable.

5. Slump: Between 2 and 4 inches; except when a water-reducing admixture is used maximum slump shall be 6 inches and when a high range water reducing admixture is used maximum slump shall be 8 inches.

6. Air-Entraining Admixture: ASTM C260.

7. Water-reducing Admixture: ASTM C 494 Type A and on the NYSDOT's current "Approved List".

8. High Range Water-reducing Admixture: ASTM C 494 Type F and on the NYSDOT's current "Approved List".

9. Retarding Admixture: ASTM C 494, Type D, Water-reducing and retarding, for use in hot weather concreting, and on the New York State Department of Transportation's current "Approved List".

E. Concrete Sealer:

1. Surebond/Safebond SB-7000 clear concrete sealer or equivalent for sidewalks.

2. Non-water based penetrating type protective sealer which is on the NYSDOT Material List for concrete pavement.

F. Concrete Hardener and Dustproofer: Magnesium-flurosilicate concrete hardener and dustproofer that bonds chemically with the concrete.

1. Lapidolith by Sonneborn Building Products, Chemrex, Inc., 889 Valley Park Dr., Shakopee, MN 55379, (800) 433-9517, or approved equivalent.

G. Fabric Reinforcement: 6 inch x 6 inch – W2.9 x W2.9, ASTM A 1064, welded wire fabric, fabricated into flat sheets.

H. Joint Filler: See Section 32 13 73: Concrete Paving Joint Sealants

I. Bedding: NYSDOT Subbase Course Type 2. See Section 312000 – Earth Moving.

J. Chamfer Strips: Wood, metal, PVC or rubber; one inch chamfer, unless stated otherwise in Construction Documents.

K. Epoxy Bonding Agent (Adhesive): ASTM C881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of Types I, II, IV and V, Grade 2 (horizontal areas) or Grade 3 (overhead/vertical areas), and Class B (40-60 degrees Fahrenheit) or Class C (60 degree Fahrenheit and above).

1. SurePoxy HM Series by Kaufman Products, Inc., 3811 Curtis Avenue, Baltimore, MD 21226, (800) 637-6372.

2. Sikadur Hi-Mod 32 by Sika Corporation, 201 Polito Avenue, Lyndhurst, NJ 07071, (800) 933-7452.

3. Epogrip by Sonneborn/ BASF Building Systems, 889 Valley Park Drive, Shakopee, MN 55379, (800) 433-9517.

4. Approved Equal.

2.2 PRODUCTION (Amendments to ACI 301, Chapter 7):

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete in accordance with ASTM C94, and furnish batch ticket information.

PART 3 - EXECUTION

3.1 FORMWORK INSTALLATION

A. Design, construct, erect, brace, and maintain formwork according to ACI 301.

3.2 EMBEDDED ITEM INSTALLATION

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

3.3 STEEL REINFORCEMENT INSTALLATION

A. Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.

3.4 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Engineer.

1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints unless otherwise indicated.

3.5 CONCRETE PLACEMENT

A. Verification of Conditions:

1. Before placing concrete, verify that installation of concrete forms, accessories, and reinforcement, and embedded items is complete and that required inspections have been performed.

2. Do not proceed until unsatisfactory conditions have been corrected.

B. Comply with ACI 301 for placing concrete.

C. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.

D. Consolidate concrete with mechanical vibrating equipment according to ACI 301.

1. Do not use vibrators to transport concrete inside forms.

2. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer.

3. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity.

4. At each insertion, limit duration of vibration to time necessary to consolidate concrete, and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.

3.6 FINISHING FORMED SURFACES

A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material.

1. Patch all defects, voids and projections exceeding 1/2 inch.

2. Apply to all concrete surfaces, including those not exposed to public view.

B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams.

1. Repair and patch tie holes and defective areas. Remove fins and other projections exceeding 1/8 inch.

2. Apply to concrete surfaces exposed to public view, to receive a rubbed finish.

C. Rubbed Finish: Apply the following rubbed finish, defined in ACI 301, to smooth-formed-finished as-cast concrete where indicated:

1. Smooth-rubbed finish:

a. Perform no later than one day after form removal.

b. Moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture.

c. If sufficient cement paste cannot be drawn from the concrete by the rubbing process, use a grout made from the same cementitious materials used in the in-place concrete.

d. Maintain required patterns or variances as shown on Drawings.

2. Grout-cleaned finish:

a. Clean concrete surfaces after contiguous surfaces are completed and accessible.

b. Do not clean concrete surfaces as Work progresses.

c. Mix 1 part portland cement to 1-1/2 parts fine sand, complying with ASTM C144 or ASTM C404, by volume, with sufficient water to produce a mixture with the consistency of thick paint. Add white portland cement in amounts determined by trial patches, so color of dry grout matches adjacent surfaces.

d. Wet concrete surfaces.

e. Scrub grout into voids and remove excess grout. When grout whitens, rub surface with clean burlap, and keep surface damp by fog spray for at least 36 hours.

f. Maintain required patterns or variances as shown on Drawings

3. Cork-floated finish:

a. Mix 1 part portland cement to 1 part fine sand, complying with ASTM C144 or ASTM C404, by volume, with sufficient water to produce a mixture with the consistency of thick paint.

b. Mix 1 part portland cement and 1 part fine sand with sufficient water to produce a mixture of stiff grout. Add white portland cement in amounts determined by trial patches, so color of dry grout matches adjacent surfaces.

c. Wet concrete surfaces.

d. Compress grout into voids by grinding surface.

e. In a swirling motion, finish surface with a cork float.

f. Maintain required patterns or variances as shown on Drawings

D. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.7 FINISHING UNFORMED SURFACES

A. General: Comply with ACI 302.1R for screeding, re-straightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

3.8 CONCRETE PROTECTING AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection during curing and with ACI 301 for hot-weather protection during curing.

B. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

C. Begin curing after finishing concrete, but not before free water has disappeared from concrete surface.

D. Curing Methods: Cure formed and unformed concrete for at least seven days by one or a combination of the following methods:

1. Absorptive Cover: As soon as concrete has sufficient set to permit application without marring concrete surface, install prewetted absorptive cover over entire area of floor.

   a. Lap edges and ends of absorptive cover not less than 12-inches.

   b. Maintain absorptive cover water saturated, and in place, for duration of curing period, but not less than seven days.

2. Continuous Moisture Curing: Maintain concrete surfaces continuously moist for not less than seven days with the following materials:

   a. Water.

   b. Continuous water-fog spray.

3. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches and sealed by waterproof tape or adhesive.

   a. Immediately repair any holes or tears during curing period, using cover material and waterproof tape.

   b. Cure for not less than seven days.

4. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

3.9 CONCRETE SURFACE REPAIRS

A. Defective Concrete:

1. Repair and patch defective areas when approved by Engineer.

2. Remove and replace concrete that cannot be repaired and patched to Engineer’s approval.

B. Patching Mortar: Mix dry-pack patching mortar, consisting of 1 part portland cement to 2-1/2 parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.

C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.

1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension to solid concrete.

   a. Limit cut depth to 3/4 inch.

   b. Make edges of cuts perpendicular to concrete surface.

   c. Clean, dampen with water, and brush-coat holes and voids with bonding agent.

d. Fill and compact with patching mortar before bonding agent has dried.

e. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.

2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement, so that, when dry, patching mortar matches surrounding color.

a. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching.

b. Compact mortar in place and strike off slightly higher than surrounding surface.

3. Repair defects on concealed formed surfaces that will affect concrete's durability and structural performance as determined by Engineer.

D. Repairing Unformed Surfaces:

1. Test unformed surfaces, such as slabs, for finish, and verify surface tolerances specified for each surface.

a. Correct low and high areas.

b. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.

2. Repair finished surfaces containing surface defects, including spalls, popouts, honeycombs, rock pockets, crazing, and cracks in excess of 1/10 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.

3. After concrete has cured at least 14 days, correct high areas by grinding.

4. Correct localized low areas during, or immediately after, completing surface-finishing operations by cutting out low areas and replacing with patching mortar.

a. Finish repaired areas to blend into adjacent concrete.

5. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete.

a. Remove defective areas with clean, square cuts, and expose steel reinforcement with at least a 3/4-inch clearance all around.

b. Dampen concrete surfaces in contact with patching concrete and apply bonding agent.

c. Mix patching concrete of same materials and mixture as original concrete, except without coarse aggregate.

d. Place, compact, and finish to blend with adjacent finished concrete.

e. Cure in same manner as adjacent concrete.

6. Repair random cracks and single holes 1 inch or less in diameter with patching mortar.

a. Groove top of cracks and cut out holes to sound concrete, and clean off dust, dirt, and loose particles.

b. Dampen cleaned concrete surfaces and apply bonding agent.

c. Place patching mortar before bonding agent has dried.

d. Compact patching mortar and finish to match adjacent concrete.

e. Keep patched area continuously moist for at least 72 hours.

3.10 FIELD QUALITY CONTROL

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

B. Batch Tickets: For each load delivered, submit three copies of batch delivery ticket to testing agency, indicating quantity, mix identification, admixtures, design strength, aggregate size, design air content, design slump at time of batching, and amount of water that can be added at Project site.

C. Inspections:

1. Steel reinforcement placement in accordance with ACI 318 Sections 3.5 and 7.1-7.7.

2. Verification of use of required design mixture.

3. Concrete placement, including conveying and depositing in accordance with ACI 318 Sections 5.9 and 5.10

4. Curing procedures and maintenance of curing temperature.

5. Verification of concrete strength before removal of shores and forms in accordance with ASTM C 39.

D. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:

1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd., but less than 25 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof.

a. When frequency of testing provides fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.

2. Slump: ASTM C 143; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.

3. Air Content: ASTM C 231, pressure method, for normal-weight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.

4. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40° F and below or 80° F and above, and one test for each composite sample.

5. Compression Test Specimens: ASTM C 31.

a. Cast and laboratory cure cylinder specimens for each composite sample.

6. Compressive-Strength Tests: ASTM C 39; at a minimum test one set of two laboratory-cured specimens at 7 days and one set of two specimens at 28 days.

   a. Test one set of two field-cured specimens at 7 days and one set of two specimens at 28 days.

   b. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.

7. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.

8. Test results shall be reported in writing to Owner and Engineer, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.

9. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Engineer but will not be used as sole basis for approval or rejection of concrete.

10. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Engineer. The cost for the additional testing shall be borne by the Contractor. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42 or by other methods as directed by Owner’s Representative.

11. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

12. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.

END OF SECTION 03 30 00

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SECTION 03 30 01 – CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes:

1. Concrete formwork, reinforcing steel, and cast-in-place concrete, for concrete foundation walls and footings.

1.2 SUBMITTALS

A. Product Data: Manufacturer's name, specifications, and installation instructions, for each item specified.

B. Steel Reinforcement Shop Drawings: Details of fabrication, bending, and placement, prepared according to ACI 315, "Details and Detailing of Concrete Reinforcement." Include material, grade, bar schedules, stirrup spacing, bent bar diagrams, arrangement, and supports of concrete reinforcement. Include special reinforcement required for openings through concrete structures.

C. Construction Joint Layout: Indicate proposed construction joints required to construct the structure.

D. Location of construction joints is subject to approval of the Engineer.

E. Design Mixes: For each concrete mix. Include alternate mix designs when characteristics of materials, project conditions, weather, test results, or other circumstances warrant adjustments.

1. Indicate amounts of mix water to be withheld for later addition at Project site.

F. Material Certificates: Signed by manufacturers certifying that each of the following items complies with requirements:

1. Cementitious materials and aggregates.
2. Admixtures.
3. Curing materials.

4. Bonding agents.
5. Adhesives.
6. Repair materials.

1.3 REFERENCES

A. Comply with ACI 301-89 for all Work of this Section, unless otherwise indicated on the Contract Drawings or herein specified.

B. New York State Department of Transportation Standard Specifications for Construction and Materials, Latest Edition.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed concrete Work 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.

B. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products complying with ASTM C 94 requirements for production facilities and equipment.

1. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.
2. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.
3. Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician, Grade I. Testing agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician, Grade II.

C. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, each aggregate from one source, and each admixture from the same manufacturer.

1.5 FIELD CONDITIONS

A. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

1. When average high and low temperature is expected to fall below 40 deg F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.

B. Hot-Weather Placement: Comply with ACI 301 and as follows:

1. Maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Prefabricated metal-framed plywood matched, tight fitting, stiffened to support weight of concrete.

B. Reinforcing Steel: ASTM A615, Grade60; deformed billet steel bars.

1. Joint Dowel Bars: ASTM A 615, Grade 60 plain-steel bars. Cut bars true to length with ends square and free of burrs.

C. Chairs, Bolsters, Bar Supports, and Spacers: Sized and shaped for support of reinforcing.

D. Cast-In-Place Concrete: Normal weight, air entrained concrete with a minimum compressive strength of 4,000 PSI at the end of 28 days.

1. Design Air Content: ASTM C-260, and on the NYSDOT's current "Approved List"; 6% by volume, 1.5% +/-. Entrained air shall be provided by use of an approved air-entraining admixture.
2. Cement: ASTM C-150 Type I or II Portland cement.
3. Normal-Weight Aggregates: ASTM C 33, uniformly graded. Provide aggregates from a single source.
   a. Maximum Coarse-Aggregate Size: 3/4 inches nominal.
   b. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement
4. Water: Potable.
5. Slump: Between 2 and 4 inches; except when a water-reducing admixture is used maximum slump shall be 6 inches and when a high range water reducing admixture is used maximum slump shall be 8 inches.
6. Water-reducing Admixture: ASTM C-494 Type A and on the NYSDOT's current "Approved List".
7. High Range Water-reducing Admixture: ASTM C-494 Type F and on the NYSDOT's current "Approved List".

E. Concrete Sealer:

1. Surebond/Safebond SB-7000 clear concrete sealer or equivalent for sidewalks.
2. Non-water based penetrating type protective sealer which is on the NYSDOT Material List for concrete pavement.

F. Concrete Hardener and Dustproofer: Magnesium-flurosilicate concrete hardener and dustproofer that bonds chemically with the concrete.

1. Lapidolith by Sonneborn Building Products, Chemrex, Inc., 889 Valley Park Dr., Shakopee, MN 55379, (800) 433-9517, or approved equivalent.

G. Fabric Reinforcement: 6 inch x 6 inch – W2.9 x W2.9, ASTM A-185, welded wire fabric, fabricated into flat sheets.

H. Closed Cell Polyethylene Foam Joint Filler: For use around penetrations. Flexible, chemical resistant, non-bleeding, non-staining, “strip-off” edge, by A.H. Harris & Sons, Inc. or approved equivalent.

I. Fiber Expansion Joint Filler: Resilient, flexible, non-extruding joint compound composed of cellular fibers securely bonded together and uniformly saturated with asphalt, by A.H. Harris & Sons, Inc. or approved equivalent.

J. Bedding: NYSDOT Subbase Course Type 2. See Section 312000 – “Excavation and Fill.”

K. Chamfer Strips: Wood, metal, PVC or rubber; one inch chamfer, unless stated otherwise in Construction Documents.

L. Epoxy Bonding Agent (Adhesive): 100 percent solids epoxy-resin-base bonding compound, complying with ASTM C 881, Types I, II, IV and V, Grade 2 (horizontal areas) or Grade 3 (overhead/vertical areas), and Class B (40-60 degrees Fahrenheit) or Class C (60 degree Fahrenheit and above).

1. SurePoxy HM Series by Kaufman Products, Inc., 3811 Curtis Avenue, Baltimore, MD 21226, (800) 637-6372.
2. Sikadur Hi-Mod 32 by Sika Corporation, 201 Polito Avenue, Lyndhurst, NJ 07071, (800) 933-7452.
3. Epogrip by Sonneborn/ BASF Building Systems, 889 Valley Park Drive, Shakopee, MN 55379, (800) 433-9517.
4. Approved Equal.

2.2 PRODUCTION (Amendments to ACI 301, Chapter 7):

A. Provide ready-mixed concrete, either central-mixed or truck-mixed.

PART 3 - EXECUTION

3.1 FORMWORK INSTALLATION

A. Design, construct, erect, brace, and maintain formwork according to ACI 301.

3.2 EMBEDDED ITEM INSTALLATION

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

3.3 STEEL REINFORCEMENT INSTALLATION

A. Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.

3.4 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Engineer.

3.5 CONCRETE PLACEMENT

A. Comply with ACI 301 for placing concrete.

B. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.

C. Consolidate concrete with mechanical vibrating equipment according to ACI 301.

3.6 FINISHING FORMED SURFACES

A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections exceeding 1/2 inch.

   1. Apply to concrete surfaces not exposed to public view.

B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defective areas. Remove fins and other projections exceeding 1/8 inch.

   1. Apply to concrete surfaces exposed to public view, to receive a rubbed finish.

C. Rubbed Finish: Apply the following rubbed finish, defined in ACI 301, to smooth-formed-finished as-cast concrete where indicated:

1. Smooth-rubbed finish.
2. Grout-cleaned finish.
3. Cork-floated finish.

D. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.7 FINISHING UNFORMED SURFACES

A. General: Comply with ACI 302.1R for screening, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

3.8 CONCRETE PROTECTING AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and with ACI 301 for hot-weather protection during curing.

B. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

C. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.

D. Curing Methods: Cure formed and unformed concrete for at least seven days by one or a combination of the following methods:

1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
   a. Water.
   b. Continuous water-fog spray.
   c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.

2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period, using cover material and waterproof tape.
3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three

hours after initial application. Maintain continuity of coating and repair damage during curing period.

3.9 FIELD QUALITY CONTROL

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

B. Inspections:

1. Steel reinforcement placement in accordance with ACI 318 Sections 3.5 and 7.1-7.7.
2. Verification of use of required design mixture.
3. Concrete placement, including conveying and depositing in accordance with ACI 318 Sections 5.9 and 5.10
4. Curing procedures and maintenance of curing temperature.
5. Verification of concrete strength before removal of shores and forms in accordance with ASTM C39.

C. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:

1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd., but less than 25 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof.
   a. When frequency of testing provides fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.

2. Slump: ASTM C 143; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
3. Air Content: ASTM C 231, pressure method, for normal-weight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
4. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F and below or 80 deg F and above, and one test for each composite sample.
5. Compression Test Specimens: ASTM C 31.
   a. Cast and laboratory cure cylinder specimens for each composite sample.

6. Compressive-Strength Tests: ASTM C 39; at a minimum test one set of two laboratory-cured specimens at 7 days and one set of two specimens at 28 days.
   a. Test one set of two field-cured specimens at 7 days and one set of two specimens at 28 days.
   b. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.

7. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.

8. Test results shall be reported in writing to Owner and Engineer, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
9. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Engineer but will not be used as sole basis for approval or rejection of concrete.
10. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Engineer. The cost for the additional testing shall be borne by the Contractor. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42 or by other methods as directed by Engineer.
11. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
12. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.

D.
END OF SECTION

SECTION 03 54 00 - SELF-LEVELING TOPPINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 General Requirments, apply to this Section.

1.2 SUMMARY

A. This Section includes floor patching / leveling over existing substrates to provide a smooth floor surface on interior surfaces only.

1.3 REFERENCES

A. ASTM C 109M, Compressive Strength Air-Cure Only

B. ASTM C348, Flexural Strength of Hydraulic-Cement Mortars

C. ASTM E84, Surface Burning Characteristics of Building Materials

D. ASTM F2170, Relative Humidity in Concrete Floor Slabs Using in situ Probes

E. ASTM F1869, Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride

F. ASTM 710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring

1.4 SUBMITTALS

A. Furnish product data, samples, laboratory test reports, and materials certificates as specified in Section "Resilient Tile Flooring."

1.5 QUALITY ASSURANCE

A. Perform work in accordance with ACI 301.

B. Maintain copy of manufacturer’s installation instructions on site, with criteria for preparation and application.

PART 2 - PRODUCTS

3.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering pre-packaged topping mixes that may be incorporated in the Work include, but are not limited to, the following:

1. K-15, Ardex Inc.
2. Mapei Novaplan II .
3. Other products equal to above.

B. Design mix to produce topping material with the following characteristics:

1. Compressive strength: Minimum 4000 psi at 28 days.

C. Absolutely no gypsum based products will be allowed on the project.

3.2 MIXING

A. Site-mix per-packaged materials in accordance with manufacturer's instructions.

B. Mix to a consistency to achieve self-leveling.

C. Do not add water unless otherwise instructed, in writing, in the manufacturer's installation instructions and approved by the Architect.

D. Do not add additional aggregate unless otherwise instructed, in writing, in the manufacturer's installation instructions for extending.

PART 3 - EXECUTION

3.1 CONDITION OF SURFACES

A. Topping Applied to Hardened Concrete: Remove exiting floor finishes as required. Remove dirt, loose material, oil, grease, paint, or other contaminants, leaving a clean surface. Remove high points and projections from concrete.

B. Non-porous subfloors such as ceramic and quarry tile as well as terrazzo should be clean and free of all waxes and sealers.

C. Joints: Mark locations of joints in base slab so that joints in top course will be placed directly over them.

3.2 PLACING AND FINISHING

A. Apply products in accordance with manufacturer's instructions on floor surfaces. Do not proceed with installation until unsatisfactory conditions are corrected. Screed level in accordance with following tolerances:

1. Tolerances: Maximum variation of surface flatness shall not exceed 1/8 inch in 10 feet.

B. Steel trowel any surfaces which are scheduled to receive ceramic tile or to be exposed.

C. Coordinate installation with adjacent work to ensure proper sequence of construction. Protect adjacent areas from contact due to mixing and handling of materials.

3.3 CURING AND PROTECTION

A. Cure and protect topping applications and finishes in accordance with manufacturer's recommendations.

3.4 PERFORMANCE

A. Failure of concrete topping to bond to substrate (as evidenced by a hollow sound when tapped), or disintegration or other failure of topping to perform as a floor finish, will be considered failure of materials and workmanship. Repair or replace toppings in areas of such failures, as directed.

3.5 WASTE MANAGEMENT

A. Coordinate with Section 017423.
   1. Separate and recycle cut-offs and waste materials and material packaging in accordance with Waste Management Plan and to the maximum extent economically feasible and place in designated areas for recycling.
   2. Set aside and protect materials suitable for reuse and/or remanufacturing.
   3. Separate and fold up metal banding; flatten and place along with other metal scrap for recycling in designated area.

END OF SECTION 03 54 00

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SECTION 04 01 20 - MAINTENANCE AND RESTORATION OF BRICK 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. The work of this Section consists of the provision of all plant, materials, labor and equipment and the like necessary and/or required for the complete execution of all maintenance and restoration of unit masonry consisting of brick masonry restoration, re-pointing and cleaning as required by this section, schedules, keynotes and drawings, including, but not limited to the following:

1. Unused anchor removal.
2. Repair cracked brickwork in which cracks extend more than three courses by removing cracked brick, all mortar from around cracked brick, and mortar from joints in which mortar is cracked and providing salvaged brick set in new mortar.
3. Repair cracked brickwork in which cracks extend no more than three courses by filling cracks with composite patching mortar.
4. Painting steel uncovered during the work.
5. Restoration mortars and re-pointing joints.
6. Rake cracks through mortal' joints and brick units and provide sealant.
7. Preliminary cleaning, including removing plant growth.
8. Anti-graffiti coating.
9. Cleaning exposed unit masonry surfaces.

B. Related Sections:
1. Division 04 Section “Restoration Mortars.”
2. Division 07 Section “Joint Sealants.”

1.3 DEFINITIONS

A. Very Low-Pressure Spray: Under 100 psi.

B. Low-Pressure Spray: 100 to 400 psi; 4 to 6 gpm.

C. Medium-Pressure Spray: 400 to 800 psi; 4 to 6 gpm.

D. High-Pressure Spray: 800 to 1200 psi; 4 to 6 gpm.

E. Saturation Coefficient: Ratio of the weight of water absorbed during immersion in cold water to weight absorbed during immersion in boiling water; used as an indication of resistance of masonry units to freezing and thawing.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include recommendations for application and use. Include test data substantiating that products comply with requirements.

B. Shop Drawings: For the following:

1. Provisions for expansion joints or other sealant joints.
2. Provisions for flashing, lighting fixtures, conduits, and weep holes as required.
3. Replacement and repair anchors. Include details of anchors within individual masonry units, with locations of anchors and dimensions of holes and recesses in units required for anchors.

C. Samples for Initial Selection: For the following:

1. Pointing Mortar: Submit sets of mortar for pointing in the form of sample mortar strips, 6 inches long by 1/4 inch wide, set in aluminum or plastic channels.
    a. Submit with precise measurements on ingredients, proportions, gradations, and sources of colored sands from which each Sample was made.
2. Patching Compound: Submit sets of patching compound Samples in the form of plugs (patches in drilled holes) in sample units of masonry representative of the range of masonry colors on the building.
3. Sealant Materials: See Division 07 Section "Joint Sealants."
4. Include similar Samples of accessories involving color selection.

D. Samples for Verification: For the following:

1. Each type of sand used for pointing mortar; minimum 1 lb of each in plastic screw-top jars.
    a. For blended sands, provide Samples of each component and blend.
    b. Identify sources, both supplier and quarry, of each type of sand.
2. Each type, color, and texture of pointing mortar in the form of sample mortar strips, 6 inches long by 3/8” wide, set in aluminum or plastic channels.
    a. Include with each Sample a list of ingredients with proportions of each. Identify sources, both supplier and quarry, of each type of sand and brand names of cementitious materials and pigments if any.
3. Each type of masonry patching compound in the form of briquettes, at least 3 inches long by 1-1/2 inches wide. Document each Sample with manufacturer and stock number or other information necessary to order additional material.
4. Sealant Materials: See Division 07 Section "Joint Sealants."
5. Accessories: Each type of anchor, accessory, and miscellaneous support.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: Qualification data for firm and personnel specified in “Quality Assurance” Article that demonstrates that both firm and personnel have capabilities and experience complying with requirements specified. For firm and foreman, provide a list of at least five completed projects similar in size and scope to the work required on this Project. For each project list project name, address, architect, conservator (if applicable), scope of contractor’s work, and other relevant information. Submit this information with the bid.

B. Quality-Control Program.

C. Restoration Program.

D. Cleaning Program.

1.6 QUALITY ASSURANCE

A. Restoration Specialist Qualifications: Award brick masonry restoration to a firm regularly engaged in restoration of brick masonry that can demonstrate to Owner's satisfaction that, within previous ten years, firm has successfully performed and completed in a timely manner at least five projects similar in scope and type to work required on this Project Retain first subparagraph below if required or customary in Project area. Firms often specialize in and compete for either masonry repair or cleaning work, and they typically have different crews for each.

1. Field Supervision: Brick masonry restoration shall be directly supervised by a full-time foreman with experience equal to or greater than that required of Masonry Restoration Specialist. Foreman shall read and speak English fluently. Foreman shall be on site daily for duration of work of this Section. Same foreman shall remain on Project throughout work unless his performance is deemed unacceptable. Restoration specialist firms shall maintain experienced full-time supervisors on Project site during times that clay masonry restoration and cleaning work is in progress.
2. Restoration Worker Qualifications: Brick masonry restoration shall be carried out by a steady crew of skilled mechanics who are thoroughly experienced with restoration of brick masonry and materials and methods specified and have a minimum of three years' experience with work on buildings similar to that required by this Section. In acceptance or rejection of work of this Section, no allowance will be made for workers' incompetence or lack of skill.
    a. When masonry units are being patched, assign at least one worker among those performing patching work who is trained and certified by manufacturer of patching compound to apply its products.

B. Source Limitations: Obtain each type of material for masonry restoration (face brick, cement, sand, etc.) from one source with resources to provide materials of consistent quality in appearance and physical properties.

C. Quality-Control Program: Prepare a written quality-control program for this Project to systematically demonstrate the ability of personnel to properly follow methods and use materials and tools without damaging masonry. Include provisions for supervising performance and preventing damage due to worker fatigue.

D. Restoration Program: Prepare a written, detailed description of materials, methods, equipment, and sequence of operations to be used for each phase of restoration work including protection of surrounding materials and Project site.

1. Include methods for keeping pointing mortar damp during curing period.
2. If materials and methods other than those indicated are proposed for any phase of restoration work, add to the Quality-Control Program a written description of such materials and methods, including evidence of successful use on comparable projects, and demonstrations to show their effectiveness for this Project and worker's ability to use such materials and methods properly.

E. Cleaning Program: Prepare a written cleaning program that describes cleaning process in detail, including materials, methods, and equipment to be used, protection of surrounding materials, and control of runoff during operations.

1. If materials and methods other than those indicated are proposed for any phase of restoration work, add to the Quality-Control Program a written description of such

materials and methods, including evidence of successful use on comparable projects, and demonstrations to show their effectiveness for this Project and worker's ability to use such materials and methods properly.

F. Cleaning and Repair Appearance Standard: Cleaned and repaired surfaces are to have a uniform appearance as viewed from 20 feet away by Architect. Perform additional paint and stain removal, general cleaning, and spot cleaning of small areas that are noticeably different, so that surface blends smoothly into surrounding areas.

G. Mockups: Prepare mockups of restoration and cleaning to demonstrate aesthetic effects and set quality standards for materials and execution and for fabrication and installation.

1. Masonry Repair: Prepare sample areas for each type of masonry material indicated to have repair work performed. If not otherwise indicated, size each mockup not smaller than 2 adjacent whole units or approximately 48 inches in least dimension. Demonstrate quality of materials, workmanship, and ability to blend with existing work. Include the following as a minimum:

    a. Replacement:
        1) Four brick units replaced.
    b. Patching: Three small holes at least 1 inch in diameter as directed for each type of masonry material indicated to be patched, so as to leave no evidence of repair.
2. Re-pointing: Rake out joints in 2 separate areas, each approximately 36 inches by 48 inches wide for each type of re-pointing required and re-point one of the areas.
3. Cleaning: Clean an area approximately 25 sq. ft. as indicated for each type of masonry and surface condition.
4. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
5. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

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

1. Review methods and procedures related to masonry restoration and cleaning including, but not limited to, the following:
    a. Construction schedule. Verify availability of materials, Restoration Specialist's personnel, equipment, and facilities needed to make progress and avoid delays.
    b. Materials, material application, sequencing, tolerances, and required clearances.

1.7 REFERENCE STANDARDS

A. Work of this Section shall comply with applicable requirements and recommendations of latest editions of the documents listed herein, except as modified by more stringent requirements of the Contract Documents and of applicable laws, codes, and regulations of authorities having jurisdiction. Where the language in any of the documents referred to herein is in the form of a recommendation or suggestion, such recommendations or suggestions shall be deemed to be mandatory under this Contract unless specifically indicated otherwise in Contract Documents. Provide a reference copy of each of the following standards at Project site during all periods when work of this Section is being performed. In each case in which there is a conflict between requirements of referenced standards; requirements of laws, codes, and regulations; and requirements of this Section, the most stringent or restrictive requirement shall govern.

1. ASTM International (ASTM)
    a. ASTM A 276, Standard Specification for Stainless Steel Bars and Shapes.
    b. ASTM A 580, Standard Specification for Stainless Steel Wire.

c. ASTM A 666, Standard Specification for Annealed or Cold' Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
d. ASTM A 780, Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.
e. ASTM A 951, Standard Specification for Masonry Joint Reinforcement.
f. ASTM C 62, Standard Specification for Building Brick.
g. ASTM C 67, Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile.
h. ASTM C 216, Standard Specification for Facing Brick.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project site in manufacturer's original and unopened containers, labeled with manufacturer's name and type of products.

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 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.

D. Store lime putty covered with water in sealed containers.

E. Store sand where grading and other required characteristics can be maintained and contamination avoided.

1.9 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 re-point mortar joints only when air temperature is between 40 and 90 deg F and is predicted to remain so for at least 7 days after completion of the Work unless otherwise indicated. Do not use any material in brick masonry restoration work unless air and masonry temperatures arc within range recommended by material manufacturer or specified herein. In case of conflict, the most restrictive requirement shall govern.

C. Cold-Weather Requirements: Comply with the following procedures for masonry repair and mortar-joint pointing unless otherwise indicated:
1. When air temperature is below 40 deg F heat mortar ingredients, masonry repair materials, and existing masonry walls to produce temperatures between 40 and 120 deg F
2. When mean daily air temperature is below 40 deg F provide enclosure and heat to maintain temperatures above 32 deg F within the enclosure for 7 days after repair and pointing.
3. Damage Caused by Freezing: Remove brick masonry restoration work determined by
4. Architect to have been damaged by freezing conditions. Replace work to comply with requirements of this Section.

D. 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 and above unless otherwise indicated.

E. Use of Epoxy Patching Adhesive: Apply epoxy patching adhesive only when temperature of brick to be patched, temperature of air, and temperature of patching adhesive are between 50 deg F and 85 deg F or range recommended for use by adhesive manufacturer, whichever is more restrictive.

F. Contract Drawings

1. The Drawings are two-dimensional representations of three-dimensional objects and do not show all surfaces. Perform work on all surfaces of projections, reveals, returns, and other elements and surfaces associated with areas on which work is indicated.
2. Where elements interface with existing work or work that is in place, field measure dimensions of existing and in-place elements before preparing shop drawings or beginning work.

G. For manufactured repair materials, perform work within the environmental limits set by each manufacturer.

H. Clean masonry surfaces only when air temperature is 40 deg F and above and is predicted to remain so for at least 7 days after completion of cleaning.

1.10 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, and in places can be only temporarily redirected around small areas of work. Plan and execute the Work accordingly.

B. Access for Observation and Approvals: Provide Architect access on a continuing basis to locations on which mock-ups are being carried out, on which work is ongoing, and where work has been completed to allow for observation and approvals. Provide pipe scaffolding and manpower to move, alter, and reconfigure scaffolding and planking; personnel lift and manpower to operate lift; or other means of access complying with all laws and regulations regarding safety and acceptable to Architect. Provide manpower and equipment to facilitate observation and approvals.

1. Extent of Access: Provide Architect hands-on access to each and every area of brick masonry that is restored as work of this Section. No approval of brick masonry restoration will be given before Architect is provided hands-on access to areas of brick masonry affected. Provide access for re-inspection of areas where work was not approved on first or subsequent inspections until Architect approves work.
2. Relocation of Means of Access: If Contractor moves scaffolding, lift, or other means of access before providing Architect with hands-on access to each and every surface of restored brick masonry and each and every surface of brick masonry that has been restored after previous work was rejected, Contractor shall reinstall means of access to provide for close-up inspection by Architect at no additional cost.

C. Knowledge of Site and Project Conditions: Before submitting bid, Bidders shall make themselves thoroughly familiar with the Drawings and Specifications, with the scope of this Project, and with all conditions at the Project site relating to requirements of this Section and limitations under which the work will be performed and shall determine or verify dimensions and quantities. Submission of a bid shall be considered conclusive evidence that Contractor is thoroughly familial' with Project requirements and site conditions and limitations.

D. Restoration of Damaged Masonry Units: Repair or replace all broken, lost, and damaged masonry units resulting from work of this Section to Architect’s satisfaction at no additional cost.

E. Protection of Building: Protect building elements and finishes from damage and from deterioration caused by work of this Section. Repair damage to materials and damage to finishes to Architect's satisfaction at no additional cost.

1. Exclusion of Water: Cover open joints and areas from which units have been removed during periods when work is suspended to ensure materials and finishes are not damaged by water penetration.
2. Prevention of Staining: Prevent grout, mortar, and patching materials from staining exposed faces of masonry.
3. Protection from Fire: Take all necessary precautions to prevent fire and spread of fire.

F. Restoration and Replacement of Damaged and Removed Interior Finishes: Repair, restore, or replace as required all interior finishes that are damaged or deteriorated due to exterior rehabilitation work. At the completion of the Work, all interior finishes shall be in a condition at least as good as or better than they were before work began. Comply with the requirements of Division 01 -"Execution and Closeout."

1.11 SEQUENCING AND SCHEDULING

A. Order replacement materials at earliest possible date to avoid delaying completion of the Work.

B. Order sand and portland cement for pointing mortar (based on testing) immediately after approval of mockups. Take delivery of and store at Project site a sufficient quantity to complete Project.

C. Perform masonry restoration work in the following sequence:

1. Remove plant growth.
2. Inspect for open mortar joints and repair before cleaning to prevent the intrusion of water and other cleaning materials into the wall.
3. Remove paint.
4. Clean masonry surfaces.
5. Where water repellents, specified in Division 07, are to be used on or near masonry work, delay application of these chemicals until after pointing.
6. Rake out mortar from joints surrounding masonry to be replaced and from joints adjacent to masonry repairs along joints.
7. Repair masonry, including replacing existing masonry with new masonry materials.
8. Rake out mortar from joints to be repointed.
9. Point mortar and sealant joints.
10. After repairs and repointing have been completed and cured, perform a final cleaning to remove residues from this work.
11. Inspect for open mortar joints and repair before cleaning to prevent the intrusion of water and other cleaning materials into the wall.

D. As scaffolding or other devices are removed, patch anchor holes used to attach scaffolding or other devices. Patch holes in masonry units to comply with "Masonry Unit Patching" Article. Patch holes in mortar joints to comply with "Repointing Masonry" Article.

PART 2 - PRODUCTS

2.1 MASONRY MATERIALS

A. Salvage Face Brick and Common Brick: Salvaged face brick and common brick if removal is necessary. Salvaged brick will be used including cut, or sawed shapes where required to

complete masonry restoration work. Sound existing brick salvaged during removal of brick masonry, cleaned of mortar, grout, and other contaminants, and thoroughly washed using clean water and fiber bristle brushes. Salvaged face brick as required.

1. Utilize salvaged brick for infill and repair.
2. Special Shapes:
   a. Mechanical chopping or breaking brick, or bonding pieces of brick together by adhesive, are not acceptable procedures for fabricating special shapes.

B. New Face Brick: If replacement face brick is required it shall comply with requirements of ASTM C 216, Grade SW, and shall match existing original face brick in hardness and weatherability, size, color, and surface texture and reflectance. Use new face brick matching existing original brick in work on all areas not on street facades.

1. Efflorescence: Provide brick that has been tested according to ASTM C 67 and is rated "not effloresced."

C. Common Brick: If replacement brick tor back-up construction is required it shall match existing brick in size and shall comply with requirements of ASTM C 62, Grade SW.

1. Efflorescence: Provide brick that has been tested according to ASTM C 67 and is rated "not effloresced."

2.2 MORTAR MATERIALS

A. Comply with requirements of Division 04 -"Restoration Mortars."

2.3 MANUFACTURED REPAIR MATERIALS

A. Masonry Patching Compound: Factory-mixed cementitious product that is custom manufactured for patching masonry.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
   a. Cathedral Stone Products, Inc.; Jahn M100 Terra Cotta and Brick Repair Mortar.
   b. Conproco Corporation; Mimic.
   c. Edison Coatings, Inc.; Custom System 45.
2. Use formulation that is vapor- and water permeable (equal to or more than the masonry unit), exhibits low shrinkage, has lower modulus of elasticity than the masonry units being repaired, and develops high bond strength to all types of masonry.
3. Use formulation having working qualities and retardation control to permit forming and sculpturing where necessary.
4. Formulate patching compound used for patching brick in colors and textures to match each masonry unit being patched. Provide not less than three colors to enable matching the color, texture, and variation of each unit.

2.4 TIES AND ANCHORS

A. Wire Anchors: 1I4-inch-diameter wire of AISI Type 302 stainless steel.

B. Brick Ties: 12 gage, 2-1/2-inch wide, crimped, Type 304 stainless steel buck anchors. Provide anchors of length to extend to a location 1-112 inches behind the outer face of the masonry unit in the outer wythe.

C. Brick Tie Anchors: I14-inch-diameter, 1-1/2 inch long nail drive anchor with Zamac body and Type 304 stainless steel drive screws. Provide "Zamac Hammer-Screw"® by Powers Fasteners, 2 Powers Lane, Brewster, NY 10509 (914-235-6300), or approved equal.

D. Miscellaneous Ties, Anchors, and Reinforcing: Of material indicated below and of size and configuration appropriate for use intended and approved by Architect.

1. Units That Are Not Welded: Type 302, Type 304, Type 304L, Type 316, or Type 316L stainless steel.
2. Units That Are Welded: Type 316L stainless steel.

2.5 REINFORCEMENT

A. General: Provide joint reinforcement as specified herein.

B. Joint Reinforcement: Complying with ASTM A 951 and as follows:

1. Material: AISI Type 304 stainless steel conforming to ASTM A 580.
2. Form: Welded truss design of9 gauge deformed stainless steel wire, consisting of two deformed longitudinal wires welded to a continuous diagonal cross wire at 16 inches o.c. Provide reinforcement with out-to-out spacing 1-112 to 2 inches less than the nominal thickness of the wall.
3. Corners: Provide special formed prefabricated pieces at comers.
4. Manufacturer: Subject to compliance with requirements, provide joint reinforcing by Dur-O-Wall, Hohmann & Barnard, Inc., or approved equal.

2.6 FLASHING

A. General: Refer to Sections flashings for Clay Tile, Copper Roofs, and Membrane Roofing requirements where intersecting masonry units.

B. Adhesives, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for priming substrates, bonding flashing sheets to each other and to substrates, terminating flashing at edges, and other uses as required to provide complete, watertight system.

2.7 MISCELLANEOUS MATERIALS

A. Injection Grout: Comply with requirements of Section 041 05 -"Restoration Mortars."

B. Sealant: Comply with requirements of Section 07900 -"Joint Sealants."

2.8 CLEANING MATERIALS

A. Water: Potable.

B. Hot Water: Water heated to a temperature of 140 to 160 deg F.

C. Job-Mixed Detergent Solution: Solution prepared by mixing 2 cups of tetrasodium polyphosphate, 1/2 cup of laundry detergent, and 20 quarts of hot water for every 5 gal. of solution required.

2.9 ACCESSORY MATERIALS

A. Liquid Strippable Masking Agent: Manufacturer's standard liquid, film-forming, strippable masking material for protecting glass, metal, and polished stone surfaces from damaging effects of acidic and alkaline masonry cleaners.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
   a. ABR Products, Inc.; Rubber Mask.
   b. Price Research, Ltd.; Price Mask.
   c. PROSOCO; Sure Klean Strippable Masking.

B. Masking Tape: Nonstaining, nonabsorbent material, compatible with pointing mortar, joint primers, sealants, and surfaces adjacent to joints; that will easily come off entirely, including adhesive.

C. Antirust Coating: Fast-curing, lead- and chromate-free, self-curing, universal modified-alkyd primer complying with MPI #79, Alkyd Anticorrosive Metal Primer or SSPC-Paint 20 or SSPC-Paint 29 zinc-rich coating.

1. Use coating requiring no better than SSPC-SP 2, "Hand Tool Cleaning surface preparation according to manufacturer's literature or certified statement.
2. Use coating with a VOC content of 420 g/L (3.5 lb/gal.) or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.10 ANTI- GRAFFITI COATING -**NOT USED**

A. Coat all existing and newly installed brick as shown on drawings with anti-graffiti coating.

B. Product: Edison Coating Inc. Spray – Block 40 strippable/sacrificial coating for hard surfaces, or equal as judged by the Architect.

2.11 MISCELLANEOUS PRODUCTS

A. Select materials and methods of use based on the following, subject to approval of a mockup:

1. Previous effectiveness in performing the work involved.
2. Little possibility of damaging exposed surfaces.
3. Consistency of each application.
4. Uniformity of the resulting overall appearance.
5. Do not use products or tools that could do the following:
   a. Remove, alter, or in any way harm the present condition or future preservation of existing surfaces, including surrounding surfaces not in contract.
   b. Leave a residue on surfaces.

PART 3 - EXECUTION

3.1 GENERAL

A. Restoration Specialist Firms: Subject to compliance with requirements 1.9 “Quality Assurance”.

B. Protection: Before leaving fresh or unfinished work, fully cover and protect wall against rain and wind in an approved manner. Before continuing, brush clean previously laid work.

C. Welting Bricks and Existing Masonry: Thoroughly wet brick and existing masonry prior to installation to ensure that brick and masonry are nearly saturated but free of surface water (saturated, surface dry) when mortar is applied.

D. Full Shoved Joints: Ensure that all bed, head, and collar joints in masonry are shoved full so that mortar fully contacts all surfaces of masonry units in joints and there are no voids in brickwork. Do not slush joints.

3.2 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.

1. 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.

B. 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.

C. Remove gutters**,** downspouts and metal fascias adjacent to masonry and store where indicated during masonry restoration and cleaning. Reinstall when masonry restoration and cleaning are complete.

1. Provide temporary rain drainage during work to direct water away from building.

3.3 UNUSED ANCHOR REMOVAL

A. Remove masonry anchors, brackets, wood nailers, and other extraneous items no longer in use unless identified as historically significant or indicated to remain.

1. Remove items carefully to avoid spalling or cracking masonry.
2. Where directed, if an item cannot be removed without damaging surrounding masonry, do the following:

    a. Cut or grind off item approximately 3/4 inch beneath surface and core drill a recess of same depth in surrounding masonry as close around item as practical.
    b. Immediately paint exposed end of item with two coats of antirust coating, following coating manufacturer's written instructions and without exceeding manufacturer's recommended dry film thickness per coat. Keep paint off sides of recess.

3. Patch the hole where each item was removed unless directed to remove and replace the masonry unit.

3.4 BRICK REMOVAL AND REPLACEMENT

A. Remove bricks that are damaged, spalled, or deteriorated. Carefully demolish or 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.

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, rotted wood, 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 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.

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. 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 re-pointing of surrounding area.
3. When mortar is sufficiently hard to support units, remove shims and other devices interfering with pointing of joints.

3.5 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 2, "Hand 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).

B. 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, notify Architect before proceeding.

3.6 BRICK MASONRY UNIT RESTORATION

A. General: Lay salvaged face brick, new face brick, and common brick plumb, level, and true to line in full beds of mortar with bond pattern matching original bond pattern and courses and joints meeting those of original brickwork and adjacent remaining masonry as applicable. Provide supports, anchors, and reinforcing to ensure solid, stable construction and flashing and weep holes to ensure that water is directed to exterior of wall above openings and penetrations.

B. Patch the following masonry units unless another type of replacement or repair is indicated:

1. Units indicated to be patched.
2. Units with holes.
3. Units with chipped edges or corners.
4. Units with small areas of deep deterioration.

C. Remove and replace existing patches unless otherwise indicated or approved by Architect.

D. Cutting Masonry Units: Where brick are to be cut to size, make cuts neatly with a power-driven saw. Do not expose cut face to weather.

E. Jointing: Jointing of rebuilt masonry shall match that of existing masonry. Each course shall align with and be flush with existing work. Joints shall be uniform, matching widths of existing joints.

F. Joints: Fill all joints in brick masonry completely full with mortar as each course is laid.

1. Bed Joints: Form bed joints in one of the following ways:
    a. Apply a thick layer of smooth or slightly furrowed mortar on top of units previously laid and shove brick in place.
    b. Apply a full coat of mortar to boltom of brick and shove it into place.
2. Head and Collar Joints: Form head and collar joints by applying a full coat of mortal' to entire end or entire side as case requires and then shoving mortar covered end andlor side of brick tightly against bricks previously laid. Apply 3/8- inch-thick coat of mortar to back of facing brick before brick is installed.
3. Preparation for Pointing Joints in Brick Masonry: Rake joints in exposed brick masonry to prepare for pointing as specified in Division 04 -"Masonry Pointing. "

G. Supports, Anchors, and Fasteners: Build in supports, anchors, and fasteners as shown on approved shop drawings. Anchor fasteners solidly into sound masonry.

H. Joint Reinforcement: Provide continuous joint reinforcing in bed joints as indicated on Drawings but at a spacing not to exceed 16 inches o.c. vertically.

I. Flashing: Install flashing and as specified and as shown on approved shop drawings.

1. Install embedded flashing in masonry at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated.
2. Prime masonry substrates and substrates of other materials as recommended by flashing membrane manufacturer for optimum installation and adhesion of flashing membrane.
3. Allow masonry to cure as recommended by flashing membrane manufacturer before priming or applying adhesive or self-adhesive membrane.
4. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Unless otherwise indicated, place 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.
5. Install metal flashing termination beneath flashing at exterior face of wall where sealant joints are indicated.

J. Disturbed Masonry Units: Remove masonry units disturbed after laying and relay in fresh mortar. If adjustments are required, remove masonry units and reset in fresh mortar; do not pound or tap masonry units to adjust.

K. Damaged Masonry Units: Remove and replace brick that are loose, chipped, broken, stained or damaged by freezing or for any other reason, or if units do not match adjoining units as intended. Furnish new units to match adjoining units and install in fresh mortar, pointed to eliminate evidence of replacement.

3.7 REPAIRING CRACKED BRICK MASONRY WHERE CRACKS EXTEND MORE THAN THREE COURSES

A. General: Remove cracked brick and mortar from joints around cracked brick and from all joints in which mortar is cracked and provide new brick matching existing brick set in new mortar.

B. Carefully remove brick to be replaced and mortar from joints around it and from joints in which mortar is cracked. Do not disturb adjacent brick. If bond of any brick is broken, remove brick and mortar around brick and reset brick.

C. Remove dirt and dust from hole using stiff bristle brush followed by clean compressed air.

D. Thoroughly wet brick to be inserted and surfaces at hole in masonry to receive brick to ensure that masol1l'Y is nearly saturated but surface dry at time of installation.

E. Ensure that all voids are filled with mortar by spreading mortal' on surfaces adjacent to hole and on surfaces of brick to be inserted so that excess mortal' is squeezed out of joints around brick as it is inserted.

F. Point joints to comply with requirements of Division 04 -"Masonry Pointing."

3.8 REPAIRING CRACKED BRICK MASONRY WHERE CRACKS EXTEND NO MORE THAN THREE COURSES

A. General: Rout out cracks in brick and fill with custom patching mortal' to match color and texture of adjacent surface.

B. Rout out cracks to a depth of 1/2 inch and a width of 1/4 inch. Do not damage brick surfaces.

C. Clean cracks thoroughly using fine brush followed by clean, oil-free compressed ail' to remove granular particles and dust.

D. Protect masonry at sides of crack from contact with sealant with masking tape or other approved method.

E. Provide backer rod to ensure sealant is of profile recommended by sealant manufacturer.

F. Install sealant to fully wet joint substrates and to completely fill top portion of joint.

G. Tool sealant flush with surface of adjacent masonry units.

H. Remove protection and clean away any sealant on masonry surfaces using solvent recommended by sealant manufacturer.

3.9 ROUTING AND FILLING CRACKS IN BRICK

A. General: Rout out cracks in brick and fill with custom patching mortal' to match color and texture of adjacent surface.

B. Rout out cracks to a depth of5/8 inch and a width of 1/8 inch. Do not damage brick surfaces.

C. Clean cracks thoroughly using fine brush followed by clean, oil-free compressed ail' to remove granular particles and dust.

D. Thoroughly rinse surfaces to ensure that substrate will not rapidly absorb water from patching mortar.

E. Brush crack with a mortar slurry coat and fill with specified composite mortal' matching color of adjacent cleaned brick.

F. Strike surface of repaired crack flush with face of brick. Finish surface off filled crack to match texture and finish of adjacent cleaned brick.

G. Protect installed mortar from too rapid drying to provide optimum conditions for mortar to cure.

3.10 POINTING

A. Point mortar joints in brick masonry to comply with the requirements of Division 04 -"Masonry Pointing."

3.11 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.

B. Preliminary Cleaning: Before beginning general cleaning, remove extraneous substances that are resistant to cleaning methods being used. Extraneous substances include paint, calking, asphalt, and tar.

1. Carefully remove heavy accumulations of material from surface of masonry with a sharp chisel. Do not scratch or chip masonry surface.
2. Remove paint and calking with alkaline paint remover.
    a. Comply with requirements in "Paint Removal" Article.
    b. Repeat application up to two times if needed.
3. Remove asphalt and tar with solvent-type paint remover.
    a. Comply with requirements in "Paint Removal" Article.
    b. Apply paint remover only to asphalt and tar by brush without prewetting.
    c. Allow paint remover to remain on surface for 10 to 30 minutes.
    d. Repeat application if needed.

3.12 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. Use only those cleaning methods indicated for each masonry material and location.

1. 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.
2. Use spray equipment that provides controlled application at volume and pressure indicated, measured at spray tip. Adjust pressure and volume to ensure that cleaning methods do not damage masonry.
    a. Equip units with pressure gages.
3. For water-spray application, use fan-shaped spray tip that disperses water at an angle of 25 to 50 degrees.
4. For heated water-spray application, use equipment capable of maintaining temperature between 140 and 160 deg F at flow rates indicated.
5. For steam application, use steam generator capable of delivering live steam at nozzle.

C. Perform each cleaning method indicated in a manner that results in uniform coverage of all surfaces, including corners, moldings, and interstices, and that produces an even effect without streaking or damaging masonry surfaces.

D. Water Application Methods:

1. Water-Soak Application: Soak masonry surfaces by applying water continuously and uniformly to limited area for time indicated. Apply water at low pressures and low volumes in multiple fine sprays using perforated hoses or multiple spray nozzles. Erect a protective enclosure constructed of polyethylene sheeting to cover area being sprayed.
2. Water-Spray Applications: Unless otherwise indicated, hold spray nozzle at least 6 inches from surface of masonry and apply water in horizontal back and forth sweeping motion, overlapping previous strokes to produce uniform coverage.

E. Steam Cleaning: Apply steam to masonry surfaces at the very low pressures indicated for each type of masonry material. Hold nozzle at least 6 inches from surface of masonry and apply steam in horizontal back and forth sweeping motion, overlapping previous strokes to produce uniform coverage.

F. After cleaning is complete, remove protection no longer required. Remove tape and adhesive marks.

3.13 FINAL CLEANING

A. After mortar has fully hardened, thoroughly clean exposed masonry surfaces of excess mortar and foreign matter; use wood scrapers, stiff-nylon or -fiber brushes, and clean water, spray applied at low pressure.

1. Do not use metal scrapers or brushes.
2. Do not use acidic or alkaline cleaners.

B. Wash adjacent woodwork and other non-masonry surfaces. Use detergent and soft brushes or cloths.

C. Clean mortar and debris from roof; remove debris from gutters and downspouts. Rinse off roof and flush gutters and downspouts.

D. Sweep and rake adjacent pavement and grounds to remove mortar and debris. Where necessary, pressure wash pavement surfaces to remove mortar, dust, dirt, and stains.

3.14 FIELD QUALITY CONTROL

A. Notify Owner’s and Architect's Project representatives in advance of times when lift devices and scaffolding will be relocated. Do not relocate lift devices and scaffolding until Owner’s and Architect’s Project representatives have had reasonable opportunity to make observations of work areas at lift device or scaffold location.

3.15 WASTE MANAGEMENT

A. Coordinate with Division 01.

1. Separate and recycle cut-offs and waste materials and material packaging in accordance with Waste Management Plan and to the maximum extent economically feasible and place in designated areas for recycling.
2. Set aside and protect materials suitable for reuse and/or remanufacturing.
3. Separate and fold up metal banding; flatten and place along with other metal scrap for recycling in designated area.

END OF SECTION 04 01 20

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SECTION 04 03 05.13 – RESTORATION MORTARS

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. The work performed under this Section includes the performance criteria, labor, materials, equipment, and services necessary for the complete execution work of restoration mortars and grout as called for on the Drawings, as specified herein and as required by schedules, keynotes and drawings, as specified herein, and as may be required by conditions and authorities having jurisdiction, including, but not limited to, the following:

1. Mortars for setting and pointing brick masonry.

1.3 QUALITY ASSURANCE

A. Restoration Specialist Qualifications: Award brick masonry restoration to a firm regularly engaged in restoration of brick masonry that can demonstrate to Owner's satisfaction that, within previous ten years, firm has successfully performed and completed in a timely manner at least five projects similar in scope and type to work required on this Project.

1. Field Supervision: Brick masonry restoration shall be directly supervised by a full-time foreman with experience equal to or greater than that required of Masonry Restoration Specialist. Foreman shall be on site daily for duration of work of this Section. Same foreman shall remain on Project throughout work unless his performance is deemed unacceptable. Restoration specialist firms shall maintain experienced full-time supervisors on Project site during times that clay masonry restoration and cleaning work is in progress.
2. Brick masonry restoration shall be carried out by a steady crew of skilled mechanics who are thoroughly experienced with restoration of materials and methods specified and have a minimum of three years' experience with work on buildings similar to that required by this Section. In acceptance or rejection of work of this Section, no allowance will be made for workers' incompetence or lack of skill.
    a. When masonry units are being patched, assign at least one worker among those performing patching work who is trained and certified by manufacturer of patching compound to apply its products.

B. Referenced Standards: Work of this Section shall comply with applicable requirements and recommendations of latest editions of the documents listed herein, except as modified by more stringent requirements of the Contract Documents and of applicable laws, codes, and regulations of authorities having jurisdiction. Where the language in any of the documents referred to herein is in the form of a recommendation or suggestion, such recommendations or suggestions shall be deemed to be mandatory under this Contract unless specifically indicated otherwise in Contract Documents. Provide a reference copy of each of the following standards

at Project site during all periods when work of this Section is being performed. In each case in which there is a conflict between requirements of referenced standards; requirements of laws, codes, and regulations; and requirements of this Section, the most stringent or restrictive requirement shall govern.

1. ASTM International (ASTM)
    a. ASTM C 144, Standard Specification for Aggregate for Masonry Mortar.
    b. ASTM C 150, Standard Specification for Portland Cement.
    c. ASTM C 207, Standard Specification for Hydrated Lime for Masonry Purposes.
    d. ASTM C 270, Standard Specification for Mortar' for Unit Masonry.

C. Source of Materials: Obtain each type of material required for restoration mortars from a single source to ensure a match in quality, performance, and appearance,

D. Knowledge of Site and Project Conditions: Before submitting bid, Bidders shall make themselves thoroughly familiar with the Drawings and Specifications, with the scope of this Project, and with all conditions at the Project site relating to requirements of this Section and limitations under which the work will be performed and shall determine or verify dimensions and quantities. Submission of a bid shall be considered conclusive evidence that Contractor is thoroughly familiar with Project requirements and site conditions and limitations.

E. Laboratory for Mortar Analysis: Laboratory regularly engaged in analysis of mortar used in historic buildings and accepted in writing by Architect.

1.4 ACTION SUBMITTALS

A. Product Data: Manufacturer's published technical data for each product to be used in work of this Section including material description, chemical composition (ingredients and proportions), physical properties, recommendations for application and use, test reports and certificates verifying that product complies with specified requirements, and Material Safety Data Sheets (MSDS).

B. Samples:

1. Existing Mortar: Samples of existing mortars from stone masonry, brick masonry, specific masonry to each project, to total one cubic inch taken from a minimum of three areas or as recommended by testing agency.

2. Aggregate from Existing Mortar: Samples of aggregate from analysis of existing mortars from masonry, each to total two cubic inches from a minimum of three areas or as recommended by testing agency. Provide sieve analysis (ASTM C 144) with samples.

3. Pointing Mortar: Cured mortar samples set in 1/2-inch by 6-inch plastic or aluminum channels for approval of color and texture. Samples shall match existing mortar. Provide the following:
    a. Mortar for each type of masonry.
4. Grouts: Cured samples of grouts for anchoring pins and patching cracked masonry units matching each masonry substrate requiring grout, minimum 3 inch diameter x 1/2 inch thick.
    a. Grout for each masonry type.
5. Sand for Pointing Mortars: Two-pound sample of each type of sand proposed for use in pointing mortars. Include sieve analysis (ASTM C 144).
6. Custom Patching Mortar for Patching Stone: 4-inch x 4-inch x I -inch cured samples of each type and color of mortar required for approval of color and texture. Samples shall match clean existing cast stone.

7. Custom Patching Mortar for Patching Brick: 4-inch x 4-inch x I -inch cured samples for approval of color and texture. Samples shall match clean existing brick.
8. Custom Mortar for Installing Stone Dutchmen: 4-inch x 4-inch x I -inch cured samples for approval of color and texture. Samples shall match clean existing cast stone.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: Qualification data for firm and personnel specified in “Quality Assurance” Article that demonstrates that both firm and personnel have capabilities and experience complying with requirements specified. For firm and foreman, provide a list of at least three completed projects similar in size and scope to the work required on this Project. For each project list project name, address, architect, conservator, supervising preservation agency, scope of contractor's work, and other relevant information.

1. Submit certification from composite patching mortar manufacturers that technicians proposed to perform the work have been trained and are certified in the application of the patching mortar.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products and materials to prevent damage, deterioration, or degradation and intrusion of foreign material.

B. Discard and remove from site deteriorated materials, contaminated materials, and products that have exceeded their expiration dates. Replace with fresh materials.

1.7 PROJECT CONDITIONS

A. General: Perform work only when temperature of products being used and all temperature and humidity comply with manufacturer's requirements and requirements of this Section. In case of conflict, the most stringent requirements shall govern.

B. Prohibited Materials: Masonry cements, masonry mortars, and ingredients not specifically specified in this Section and approved by Architect are strictly prohibited.

C. Proprietary Materials: Do not use proprietary patching mortars and adhesives unless temperatures are between 50 deg F and 80 deg F and will remain within that range for at least 48 hours after work has been completed unless work at other temperatures is specifically approved by manufacturer of patching mortar and by Architect.

D. Mortars: Do not mix or use mortars when either or both air temperature or masonry temperature is below 40 deg F or when either temperature is expected to drop below 40 deg F within 48 hours of mortar application unless Architect has approved both Contractor's work proposal for cold-weather masonry work and also specific masonry work to be done in each instance.

1. Masonry work in temperatures below 40 deg F shall comply with requirements of this Section, with requirements of sections in which mortar is used to set and point masonry, and with work proposal specifically approved by Architect.
2. Remove masonry work determined by Architect to have been damaged by freezing conditions and replace following requirements of this Section.

PART 2 - PRODUCTS

2.1 MORTAR AND GROUT PRODUCTS

A. White Portland Cement: ASTM C 150, Type I.

B. Portland Cement: ASTM C 150, Type I or Type II, non-staining. Do not use masonry cement.

C. Hydrated Lime: ASTM C 207, Type S.

D. Sand: Clean sharp sand, free of loam, silt, soluble salts, organic matter, and other deleterious substances and graded in compliance with ASTM C 144. Where mortar is to match existing original mortar, sand or other aggregate shall be selected to provide mortar matching color and texture of original mortar insofar as possible to ensure that a minimum amount of pigment is required to provide a color match. Sieve and mix sand and aggregates to provide mortar matching original mortar.

E. Water: Clean and free of substances deleterious to mortar, masonry, and embedded elements.

F. Pigments: Stable, non-fading, alkali-resistant, inorganic oxide pigments with a history of satisfactory performance in mortars containing lime.

G. Grout and Slurry for Restoration of Cracked, Broken, or Previously Grouted Masonry: Two-component, latex-modified cementitious compound, specifically manufactured for masonry restoration. Provide Custom System 45, available from Edison Chemical Systems, Inc., 25 Grant Street, Waterbury, CT 06704 (203-597-9727). Provide colors to match color of clean existing material being reinforced.

H. Composite Patching Mortar for Stone: Two-component, latex-modified cementitious compounds, specifically manufactured for masonry restoration. Provide Custom System 45, available from Edison Chemical Systems, Inc., 25 Grant Street, Waterbury, CT 06704 (203-597-9727). Provide color to match color of clean cast stone being patched.

I. Composite Patching Mortar for Brick: Two-component, latex-modified cementitious compounds, specifically manufactured for masonry restoration. Provide Custom System 45, available from Edison Chemical Systems, Inc., 25 Grant Street, Waterbury, CT 06704 (203-597-9727). Provide custom color to match color of cleaned brick being patched.

J. Admixture for Mortar for Setting Stone Dutchmen: Laticrete 4237 Grout and Mortar Admixture for "thin set" mortar as manufactured by Laticrete International Inc., or approved equal.

K. Prohibited Materials: No additives or admixtures other than those specified shall be used. No chlorides or aggressive corrosive chemicals shall be used.

2.2 MORTAR MIXES

1. Type "O" Mortar for Pointing Outer 3/4-Inch Depth of Joints in Brick and Stone Masonry ***if*** confirmed by mortar testing agency of historic mortars for the project.
    a. 1 part by volume white Portland cement, gray Portland cement, or a combination of white and gray Portland cement (Type I) as required to produce color of original mortar in masonry being pointed with no addition of pigment or with minimum addition of pigment.
    b. 2 parts by volume hydrated lime (Type S)

c. 7 parts by volume sand (selected to match sand in original mortar of masonry being pointed)
d. Oxide pigments as required to adjust color of mortar mix to as close a match to original mortar as possible using appropriate colored cements and aggregates to match original color of mortar in masonry being pointed but not to exceed 7 percent of the weight of the cement.
e. Do not use modern additives unless permitted in writing by Architect.

B. Mortars for Setting Dutchmen: Mortars specified hereinafter shall comply with ASTM C 270, "Standard Specification for Mortar for Unit Masonry." Mortar mixes may change and may require adjustment before and during construction in accordance with pre-construction conformance testing, field testing, and Architect's evaluation of testing and test results.
1. Slurry for Pre-treating Masonry to be Repaired: Grout and Slurry for Restoration of Cracked, Broken, or Previously Grouted Masonry as specified above.
2. "Thin Set" Mortar for Setting Stone Dutchmen: Use when mortar bed is less than 3/8-inch-thick to produce an initially tacky mortar exhibiting high strength properties when set.
a. 1 part by volume white Portland cement (Type I)
b. 3 parts by volume tine "00" sand (selected to match color of existing clean stone)
c. Temper to workable consistency with Laticrete 4237 polymer admixture mixed in accordance with manufacturer's recommendations for high strength I "thin set" mortar.

2.3 MIXING OF MORTAR

A. Measure mortar ingredients carefully using containers with fixed volumes so that proportions are controlled and maintained throughout all work periods.

B. Mix mortar in an approved type of power-operated batch mixer. Mix for time required to produce a homogeneous plastic mortal' but not less than five minutes: approximately two minutes for mixing dry materials and not less than three minutes for mixing after water has been added.

C. Use minimum amount of water to produce a workable consistency for mortar's intended purpose.
1. Mortar for Pointing: As dry a consistency as will produce a mortal' sufficiently plastic to be worked into joints.
2. Mortar for Slurry: Consistency as will be brushable.

D. Where mortar or grout is required in small batches of less than one cubic yard and Architect specifically approves, mortar may be mixed by hand in clean wooden or metal boxes prepared for that purpose provided that Architect approves mixing boxes and methods of mixing and transferring mortar.

E. After mixing, mortars for pointing or setting shall sit for 20 minutes prior to use to allow for initial shrinkage. Mortar shall be placed in final position within two hours of mixing. Re-tempering of partially hardened material is not permitted.

F. Mortar for grout shall be placed in final position within two hours of mixing. Re-tempering of partially hardened material is not permitted.

G. Custom Patching Mortars, Grouts, and Adhesives: Mix in strict accordance with manufacturer's written instructions.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install mortars, grouts, and patching mixtures as part of the work of the following

1. Divisions 04: Masonry Pointing, Maintenance of Stone Masonry, Cast Stone, Maintenance of Brick Masonry, Architectural Terra Cotta.

3.2 WASTE MANAGEMENT

A. Coordinate with Division 01.
1. Separate and recycle cut-offs and waste materials and material packaging in accordance with Waste Management Plan and to the maximum extent economically feasible and place in designated areas for recycling.
2. Set aside and protect materials suitable for reuse and/or remanufacturing.
3. Separate and fold up metal banding; flatten and place along with other metal scrap for recycling in designated area.

END OF SECTION 04 03 05.13

SECTION 04 03 05.16 – RESTORATION MASONRY REPOINTING

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. The work performed under this Section includes the performance criteria, labor, materials, equipment, and services necessary for the complete work of masonry re-pointing as shown on the Drawings, as specified herein and as required by schedules, keynotes and drawings, as specified herein, and as may be required by conditions and authorities having jurisdiction, including, but not limited to, the following:

1. Preparing and pointing joints in masonry.
2. Types of approved mortar removal tools
3. Required approvals for use of power tools on retooling.
4. Preparing and pointing rear portions of joints (deep pointing) in masonry.

B. Related Work Specified Elsewhere

1. Division 04: Restoration Mortars
2. Division 09: Joint sealants.

1.3 QUALITY ASSURANCE

A. Restoration Specialist Qualifications: Award brick masonry restoration to a firm regularly engaged in restoration of brick masonry that can demonstrate to Owner's satisfaction that, within previous ten years, firm has successfully performed and completed in a timely manner at least five projects similar in scope and type to work required on this Project.

1. Field Supervision: Brick masonry restoration shall be directly supervised by a full-time foreman with experience equal to or greater than that required of Masonry Restoration Specialist. Foreman shall be on site daily for duration of work of this Section. Same foreman shall remain on Project throughout work unless his performance is deemed unacceptable. Restoration specialist firms shall maintain experienced full-time supervisors on Project site during times that clay masonry restoration and cleaning work is in progress.
2. Brick masonry restoration shall be carried out by a steady crew of skilled mechanics who are thoroughly experienced with restoration of materials and methods specified and have a minimum of three years' experience with work on buildings similar to that required by this Section. In acceptance or rejection of work of this Section, no allowance will be made for workers' incompetence or lack of skill.
    a. When masonry units are being patched, assign at least one worker among those performing patching work who is trained and certified by manufacturer of patching compound to apply its products.

1.4 ACTION SUBMITTALS

A. Samples
   1. Mortar and grout.

B. Prepare mock-ups as specified in Article "Mock-Ups," below.

C. Work Description: Provide detailed description of proposed procedures for joint preparation and pointing of each masonry material and condition (including installation of lead joint covers). Work description for each condition shall include:
   1. Materials and methods: Proposed materials, methods, tools, and equipment to be used.
   2. Protection: Description, including drawings, outlining methods and procedures for protection of personnel, public, and existing construction during work of this Section.
   3. Alternate Methods and Materials (If Any): Description of proposed alternate methods and materials (if any) to those specified for any phase of masonry pointing work. Provide evidence of successful use on comparable projects and demonstrate effectiveness for use on this Project.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: Qualification data for firm and personnel specified in “Quality Assurance” Article that demonstrates that both firm and personnel have capabilities and experience complying with requirements specified. For firm and foreman, provide a list of at least three completed historic projects similar in size and scope to the work required on this Project. For each project list project name, address, architect and or conservator, supervising preservation agency, scope of contractor's work, and other relevant information.

1.6 MOCK-UPS

A. General: Before beginning general masonry pointing, prepare mock-ups to provide standards for work of this Section. Do not proceed with masonry pointing until Architect has approved mock-ups.
   1. Locate mock-ups as directed by Architect
   2. Notify Architect 48 hours prior to start of each mock-up.
   3. Architect will monitor mock-ups. Mock-ups not performed in presence of Architect will be rejected.
   4. Use crew that will execute the work and follow requirements of this Section.
   5. Allow mock-ups using mortar to dry for seven days to allow mortar to reach final color and allow potential problems to appear. Notify Architect when mock-ups are ready for review.
   6. Repeat mock-ups as necessary to obtain Architect’s approval.
   7. Protect approved mock-ups to ensure that they are without damage, deterioration, or alteration at time of Substantial Completion.
   8. Approved mock-ups in undamaged condition at time of Substantial Completion may be incorporated into the Work.
   9. Approved mock-ups will represent minimum standards for masonry pointing. Subsequent masonry pointing work that does not meet standards of approved mock-ups will be rejected and will require repointing.

B. Prepare the Following Mock-Ups
   1. Joint Preparation in each type of Masonry: One panel including at least 25 square feet plus 12 linear feet of joint.

2. Pointing of Joints in each type of Masonry: One panel including at least 25 square feet plus 12 linear feet of joint.

C. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

D. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products and materials to prevent damage, deterioration, or degradation and intrusion of foreign material.

B. Discard and remove from site deteriorated materials, contaminated materials, and products that have exceeded their expiration dates. Replace with fresh materials.

1.8 PROJECT CONDITIONS

A. General: Perform work only when temperature of products being used and air temperature and humidity comply with manufacturer's requirements and requirements of this Section. In case of conflict, the most stringent requirements shall govern.

B. Safety: Use all means necessary to protect all persons, whether or not involved in the work of this Section, from harm caused by or resulting from work of this Section.

C. Protection of Building and Property
1. Provide all protection and procedures necessary to protect masonry not being pointed and all other elements and materials from damage and from deterioration during work of this Section.
2. Repair damage to elements and materials caused by masonry pointing work, using mechanics experienced in the respective type of work, to Architect’s satisfaction at no additional cost.
3. Protect components of storm drainage systems against damage and blockage caused or accelerated by work of this Section.

D. Protection from Fire: Take all necessary precautions to prevent fire and to prevent spread of fire.

E. Dust: Minimize dissemination of dust to greatest extent possible.
1. Contractor shall hold Owner, Architect, and their consultants harmless from all claims relating to dust resulting from work of this Section.

F. Protection of Masonry Being Pointed: Use all necessary care to protect existing masonry from damage during work of this Section. Take special care in removing existing mortar to ensure that no arrises are damaged, chipped, or broken. Contractor shall replace or repair masonry units damaged by work of this Section as directed by and to complete satisfaction of the Architect at no additional cost to the Owner.

G. Staining: Prevent grout or mortar from staining face of masonry to be left exposed. Protect sills, ledges, and projections from mortar droppings. Immediately remove grout or mortar in contact with such masonry.

H. Protection from Rain: Protect pointed joints with heavy waterproof sheeting from direct attack by rain or other precipitation for at least 24 hours after mortar has been applied.

I. Contract Drawings: Drawings are two-dimensional representations of three- dimensional objects and do not show all surfaces. Perform work on all surfaces of projections, reveals, ornament, and other elements associated with areas on which work is indicated.

J. Prohibited Materials: Masonry cements, masonry mortars, and ingredients not specifically specified in this Section and approved by Architect are strictly prohibited.

K. Cold-Weather Requirements: Comply with the following procedures for masonry repair and mortar-joint pointing unless otherwise indicated:
1. When air temperature is below 40 deg F heat mortar ingredients, masonry repair materials, and existing masonry walls to produce temperatures between 40 and 120 deg F
2. When mean daily air temperature is below 40 deg F provide enclosure and heat to maintain temperatures above 32 deg F within the enclosure for 7 days after repair and pointing.
3. Damage Caused by Freezing: Remove brick masonry restoration work determined by
4. Architect to have been damaged by freezing conditions. Replace work to comply with requirements of this Section.

L. 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 and above unless otherwise indicated.

PART 2 - PRODUCTS

2.1 TOOLS

A. Hand Tools for Joint Preparation: Chisels, hammers, and mallets.
1. Thickness of Chisels: Chisels used in masonry joints shall have a maximum thickness of 5/8 times joint width extending back from tip of chisel at least two times depth at which chisel will be inserted into joint.
2. Special Tools: Provide special knives or special thin cutter blades for use in joints less than 1/8-inch wide.

B. Power Tools for Joint Preparation: Standard tools and equipment, modified tools and equipment, and custom designed and fabricated tools and equipment as required to remove mortar from narrow joints without damaging masonry and masonry units. Use power tools only under conditions described in Part 3, below and only if specifically approved by Architect in writing. Failure to demonstrate that use of selected power tools removes mortar without damaging masonry units will result in prohibition of use of power tools and requirement that mortar be removed using hand tools only. If, after approval of power tool use for mortar removal, masonry, or masonry units are damaged through use of power tools, the further use of power tools will be prohibited and mortar shall be removed using hand tools only.

1. Electric Grinders: Small, hand-held electric grinders with thin diamond or abrasive blades no greater than 1/16-inch-thick and a maximum of 4-1/2-inch diameter.
2. Pneumatic Grinders: Specially modified pneumatic die grinders with thin abrasive blades (0.060 inch thick).
3. Custom Pneumatic Head and Chisels Designed for Mortar Removal: Pneumatic head and thin carbide-tipped chisels specifically designed for removal of mortar from joints in historic masonry with air compressor, hoses, valves, and other equipment required to provide complete mortar removal system. Pneumatic head shall not have a retainer to hold chisels in place. Provide pneumatic head and chisels by Trow and Holden, Barre, VT (800-451-4349), or approved equal.

C. Brushes: Stiff, natural bristle brushes.

D. Pointing Trowels: Long, thin pointing trowels narrower than joints being pointed.
1. Fabricate special trowels for masonry pointing if necessary to ensure proper insertion and optimum compaction of mortar.

2.2 MORTAR

A. Comply with requirements of Division 04 -"Restoration Mortars." Mortar for each type of masonry shall match existing original mortar (in clean condition) in color, texture, and other visual qualities.

2.3 Miscellaneous materials

A. Joint Sealants: Comply with requirements of Division 07 -"Joint Sealants."

PART 3 - EXECUTION

3.1 GENERAL PREPARATION

A. Examine areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of work. Do not proceed until unsatisfactory conditions have been corrected.

B. Erect dust impervious barriers and take other measures necessary to prevent dust from traveling beyond work platform before using power grinders, pneumatic chisels, or hand methods that generate airborne dust.

3.2 JOINT PREPARATION

A. General: Remove mortar from joints to a depth of 3/4 inch or to sound mortar, whichever is greater. In all cases remove all deteriorated, weathered, and loose material.
1. Completely remove mortar from surfaces of masonry units adjacent to joint to ensure that new mortar bonds directly with masonry units.
2. Cut surface of mortar at rear of joint at a uniform depth from and parallel to wall surface.
3. Do not damage faces or arrises of masonry units during joint preparation. Cease joint preparation work if, in Architect’s judgment, masonry units are damaged. Do not resume

work until tools, workers, and methodology have been corrected to ensure that masonry units are not damaged and that work meets standard set by approved mock-up.

B. Mortar Removal Using Hand Tools: Use hand tools for removal of mortar from head joints in masonry work, all joints less than 6 inches long, and from other joints in which use of power tools might damage masonry units. Use hand tools to complete mortar removal from joints where power tools have been used to partially remove mortar.
   1. Joints 1/8-Inch or Less in Width: Rake mortar from joints manually with a sharp knife blade or cutter made for this purpose. Cutter may be used with or without aid of a hammer.
   2. Sharpening Tools: Sharpen chisels as required to maintain sharp edges that cut mortar and prevent damage to masonry units, but not less frequently than hourly.

C. Mortar Removal Using Power Tools
   1. Demonstrated Ability of Mechanics: Prior to beginning work, demonstrate that workers using power tools are proficient in use of power tools for joint preparation. Failure to demonstrate to Architect's satisfaction that each worker is proficient, and that power tool joint preparation does not result in damage to masonry units shall result in prohibition of use of power tools for joint preparation. If proficiency is not demonstrated, or if work in progress results in damage to masonry to remain, *all power tool work shall cease, and joints shall be prepared for pointing using only hand-powered tools*.
   2. Rotary Power Tools: With Architect's specific, prior written approval following successful demonstrations of skill by mechanics, power grinders and / or pneumatic grinders may be used to partially remove mortar from horizontal (bed) joints in masonry and from joints longer than 6 inches in masonry where there is no danger of cutting into adjacent masonry units.
      a. Limitations on Use of Electric Power Grinders: Do not use electric power grinders on joints less than 3/16-inch wide or less than 6 inches long or where ornament, elaborate profile, or other surface irregularity might make damage to masonry units likely.
      b. Limitations on Use of Modified Pneumatic Die Grinders: Do not use modified pneumatic die grinders with custom thin blades on joints less than1-1/2 times the width of the grinder blade.
      c. Extent of Mortar Removal Using Power Grinders: Use power grinder only to score one kerf cut in center of each joint to depth of mortar removal required. Remove remaining mortar using hand tools or, if approved, pneumatically powered chisels.
         1) Stop kerf at least 4 inches from inside corners and projecting elements. Remove remaining mortar using hand tools or pneumatically powered chisels.
      d. Jigs: Construct jigs to guide and limit power tools as required to prevent damage to masonry units.
   3. Pneumatic Heads with Chisels: With Architect's specific, prior written approval following successful demonstrations of skill by mechanics, pneumatically powered chisels may be used to remove mortar from joints in lieu of hand tools. If work using pneumatically powered chisels results in damage to masonry to remain, work using pneumatic chisels shall cease, and joints shall be prepared using only hand tools.

D. Cleaning: Remove loose mortar and foreign material from raked joints using a fine, stiff natural bristle brush. Remove remaining particles, dust, and dirt using filtered, oil- free compressed air. Ensure that dust and dirt are not blown back into previously cleaned joints.

E. Restoration of Damaged Masonry Units: Repair or replace masonry units damaged during joint preparation to Architect's satisfaction at no additional cost.

3.3 MORTAR APPLICATION

A. Wetting: Thoroughly wet masonry 24 hours prior to and again immediately before masonry pointing. Let surfaces dry slightly. At time of masonry pointing, surfaces shall be damp, so that they do not rapidly absorb moisture, but free of standing water (saturated, surface dry).
   1. Failure to Properly Wet Substrate: Evidence that masonry to be pointed has not been properly dampened to prevent water in the mortar from being too rapidly absorbed by the masonry will be cause for Restoration Consultant to reject pointing work. Remove and replace rejected pointing, including proper joint preparation, to meet requirements of this Section at no additional cost.

B. Masonry Pointing: Point joints as follows.
   1. Using a long, thin masonry pointing trowel, tightly pack mortar into joints in layers not exceeding 1/4-inch thick to fill joint to match original sound joints.
   2. Begin by filling areas from which mortar is missing to a depth greater than 3/4 inch in 1/4-inch-thick layers to within 3/4 inch of masonry surface to provide a uniform substrate for final masonry pointing. Fill final 3/4-inch depth continuously and uniformly in 1/4-inch-thick layers.
   3. Firmly iron each layer to compact mortar and ensure full bond between mortar and masonry units and a firm, solid joint.
   4. Allow each layer to reach thumbprint hardness before applying succeeding layer. Do not let previous layer dry out before applying succeeding layer. Construct uniform joints.
   5. Do not spread mortar over edges onto exposed surfaces of masonry units. Do not featheredge mortar.
   6. When stopping work at end of each day or for other reasons, stagger layers of mortar so that there will be no through joints in masonry pointing. Stagger joints in layers so that they are at least 3 inches from each other.
   7. Where applying new work to that of a prior day, dampen previous work as well as existing masonry to ensure good bond.

3.4 JOINT TOOLING

A. Tooling: After final layer of mortar is "leather hard," tool joints with a flat rule jointer, or as directed by Architect.

B. Profile: Tool joints to profile to match original joint profiles. Solidly compress mortar so that it adheres well to masonry on both sides of joints and forms a dense surface. Premature or late tooling will result in unacceptable finishes, which will be rejected.

3.5 CURING

A. Keep newly pointed joints damp for at least 48 hours after mortar has been inserted. Do not apply a direct stream of water to joints for at least 24 hours after mortar has been placed.

B. Ensure masonry temperature remains as required by specifications until mortar is thoroughly cured.

3.6 CLEANING AND REPAIR OF MORTAR JOINTS

A. Water Washing: Wash pointed masonry with clean filtered water and nonabrasive hand tools to remove mortar debris from masonry surfaces. Do not use chemical cleaners.

1. Wash within 48 hours following completion of masonry pointing.
2. Use blunt-edged wood scrapers, stiff natural bristle brushes, and rough towels along with water to remove mortar debris. Do not use wire brushes.

B. Repair of Pointed Joints: As cleaning progresses, examine joints to locate cracks, holes, and other defects. Carefully point up and fill such defects with mortar. Where joints are defective in opinion of Architect, cut out joints and refill with pointing mortar exercising extreme care to ensure that color matches that of adjacent masonry pointing work. Exposed joint surfaces shall be free from protruding mortar, holes, pits, depressions, and other defects.

3.7 DEEP POINT JOINTS IN MASONRY

A. General: Remove mortar to depth of masonry using wedges, shims, and/or other approved methods to prevent displacement of masonry during removal. Clean joints. Install mortar to fill deep portion of joints (portion of joint behind 3/4 inches from the plane of the wall). Point outer 3/4-inch depth of joint as specified above.

3.8 CORRECTIVE MEASURES

A. Defective Joints: Should a crack occur in any joint surface, should mortar fail to adhere to or pull away from masonry unit, or should there be other defects in pointed joints, remove mortar and repaint following requirements of this Section to Architect's satisfaction.

B. Should Architect determine that any masonry pointing work does not equal or exceed minimum standard established by approved mock-up, cut out mortar to a depth of 34 inch and repoint following requirements of this Section to Architect's satisfaction at no additional cost to Owner.

3.9 WASTE MANAGEMENT

A. Coordinate with Division 01.
1. Separate and recycle cut-offs and waste materials and material packaging in accordance with Waste Management Plan and to the maximum extent economically feasible and place in designated areas for recycling.
2. Set aside and protect materials suitable for reuse and/or remanufacturing.
3. Separate and fold up metal banding; flatten and place along with other metal scrap for recycling in designated area.

END OF SECTION 04 03 05.16

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SECTION 04 20 00 - 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:
1. Concrete masonry units.
2. Face brick.
3. Common (building) brick.
4. Mortar and grout.
5. Steel reinforcing bars.
6. Masonry-joint reinforcement.
7. Ties and anchors.
8. Embedded flashing.
9. Miscellaneous masonry accessories.

B. Related Requirements:

C. 04 10 00 - Masonry Mortars and Grout

1.3 DEFINITIONS

A. CMU(s): Concrete masonry unit(s).

B. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For the following:
1. Masonry Units: Show sizes, profiles, coursing, and locations of special shapes.
2. Reinforcing Steel: Detail bending, lap lengths, and placement of unit masonry reinforcing bars. Comply with ACI 315. Show elevations of all reinforced walls at ¼” per ft scale.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For testing agency.

B. Material Certificates: For each type and size of the following:

1. Masonry units.
   a. Include data on material properties and material test reports substantiating compliance with requirements.
2. Cementitious materials. Include name of manufacturer, brand name, and type.
3. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.
4. Grout mixes. Include description of type and proportions of ingredients.
5. Reinforcing bars.
6. Joint reinforcement.
7. Anchors, ties, and metal accessories.

C. 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/C 91M for air content.
   2. Include test reports, according to ASTM C 1019, for grout mixes required to comply with compressive strength requirement.

1.6 QUALITY ASSURANCE

A. Testing Agency Qualifications: Qualified according to ASTM C 1093 for testing indicated.

B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.

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.

1.8 FIELD CONDITIONS

A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
   1. Extend cover a minimum of 24 inches 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.
   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.

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.
   1. Determine net-area compressive strength of masonry from average net-area compressive strengths of masonry units and mortar types (unit-strength method) according to TMS 602/ACI 530.1/ASCE 6.

2.3 UNIT MASONRY, GENERAL

A. Masonry Standard: Comply with TMS 602/ACI 530.1/ASCE 6 except as modified by requirements in the Contract Documents.

B. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated. Do not use units where such defects are exposed in the completed Work and will be within 20 feet vertically and horizontally of a walking surface.

2.4 CLAY MASONRY UNITS

A. General: Comply with the following requirements applicable to each form of brick required.

   1. Provide special extruded shapes where indicated and as follows:

a. For applications requiring brick of form, color, texture and size on exposed surfaces that cannot be produces by sawing standard brick sizes.
b. For applications where stretcher units cannot accommodate special conditions including those at corners.

2. Provide units without cores or frogs and with all exposed surfaces finished for ends of headers and similar applications that expose brick surfaces that otherwise would be concealed from view.

B. Face Brick Standard: Match existing face brick – provide samples to Architect for approval. ASTM C216 and as follows:

1. Grade and Unit Compressive Strength: Provide units of grade and minimum average net area compressive strength indicated below:
   a. Grade SW.
   b. 3000 psi.
2. Type FBX.
3. Size: Provide bricks manufactured to the following actual dimensions within the tolerances specified in ASTM C 216:

   a. Ambassador: 3-5/8 inches thick by 2-1/4 inches high by 15-5/8 inches long.

4. Shape units during manufacture as indicated below:

   a. Extruded.

5. Application: Use where brick is exposed, unless otherwise indicated.
6. Provide face brick of matching color, texture and size as existing adjacent brickwork.
7. Color and Texture: Match existing.
8. Subjects to compliance with requirements, provide product by one of the following:

   a. Glen-Gery Corporation, Sommerville, NJ.
   b. The Belden Brick, Canton, OH.

C. Building (Common) Brick: ASTM C 62 and as follows:

1. Match face brick on adjacent wall – provide samples to Architect for approval.

2. Grade and Unit Compressive Strength: Provide units of grade and minimum average net area compressive strength indicated below:

   a. Grade MW or Grade SW.
   b. 3000 psi.

3. Size: Provide bricks manufactured to the following actual dimensions within the tolerances specified in ASTM C 216:

   a. Match existing

4. Application: Use where brick is indicated for concealed locations.

2.5 CONCRETE MASONRY UNITS

A. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.

1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
2. Provide bullnose-edged units for outside corners unless otherwise indicated.

B. CMUs: ASTM C 90.
1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 2800 psi.
2. Density Classification: Lightweight except at exposed units at exterior walls.
3. Size (Width): Manufactured to dimensions 3/8 inch less-than-nominal dimensions.
4. Exposed Faces: Provide color and texture matching the range represented by Architect's sample.

2.6 CONCRETE AND MASONRY LINTELS

A. General: Provide one of the following:

B. Masonry Lintels: Prefabricated or built-in-place masonry lintels made from bond beam CMUs matching adjacent CMUs in color, texture, and density classification, with reinforcing bars placed as indicated and filled with coarse grout. Cure precast lintels before handling and installing. Temporarily support built-in-place lintels until cured.

2.7 MORTAR AND GROUT MATERIALS

A. Portland Cement: ASTM C 150/C 150M, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.
1. Alkali content shall not be more than 0.1 percent when tested according to ASTM C 114.

B. Hydrated Lime: ASTM C 207, Type S.

C. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.

D. Aggregate for Mortar: ASTM C 144.
1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
2. For joints less than 1/4 inch thick, use aggregate graded with 100 percent passing the No. 16 sieve.

E. Aggregate for Grout: ASTM C 404.

F. Water: Potable.

2.8 REINFORCEMENT

A. Uncoated Steel Reinforcing Bars: ASTM A 615/A 615M or ASTM A 996/A 996M, Grade 60.

B. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells and to hold reinforcing bars in center of cells. Units are formed from 0.148-inch steel wire, hot-dip galvanized after fabrication. Provide units designed for number of bars indicated.

C. Masonry-Joint Reinforcement, General: Ladder type complying with ASTM A 951/A 951M.
   1. Interior Walls: Hot-dip galvanized carbon steel.
   2. Exterior Walls: Hot-dip galvanized carbon steel.
   3. Wire Size for Side Rods: 0.148-inch diameter.
   4. Wire Size for Cross Rods: 0.148-inch diameter.
   5. Spacing of Cross Rods: Not more than 16 inches o.c.
   6. Provide in lengths of not less than 10 feet, with prefabricated corner and tee units.

2.9 TIES AND ANCHORS

A. General: Ties and anchors shall extend at least 1-1/2 inches into masonry but with at least a 5/8-inch cover on outside face.

B. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated:
   1. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A 82/A 82M, with ASTM A 153/A 153M, Class B-2 coating.
   2. Steel Sheet, Galvanized after Fabrication: ASTM A 1008/A 1008M, Commercial Steel, with ASTM A 153/A 153M, Class B coating.
   3. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

C. Adjustable Anchors for Connecting to Structural Steel Framing: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.
   1. Anchor Section for Welding to Steel Frame: Crimped 1/4-inch-diameter, hot-dip galvanized steel wire.
   2. Tie Section: Triangular-shaped wire tie made from 0.187-inch- diameter, hot-dip galvanized steel wire.

2.10 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.
   1. Do not use calcium chloride in mortar or grout.
   2. Use portland cement-lime mortar unless otherwise indicated.

B. 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.

C. 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.
   1. For reinforced masonry, use Type S.
   2. For interior nonload-bearing partitions, use Type N.

D. 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 TMS 602/ACI 530.1/ASCE 6 for dimensions of grout spaces and pour height.
   2. Proportion grout in accordance with ASTM C 476, Table 1 or paragraph 4.2.2 for specified 28-day compressive strength indicated, but not less than 2500 psi.

3. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C 143/C 143M.

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 would impair mortar bond.

B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

A. Build chases and recesses to accommodate items specified in this and other Sections.

B. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match construction immediately adjacent to opening.

C. 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.

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 or minus 1/4 inch.
   2. For location of elements in plan, do not vary from that indicated by more than plus or minus 1/2 inch.
   3. For location of elements in elevation, do not vary from that indicated by more than plus or minus 1/4 inch in a story height or 1/2 inch 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, or 1/2-inch 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, 1/4 inch in 20 feet, or 1/2-inch maximum.
   3. For vertical lines and surfaces do not vary from plumb by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2-inch 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, 1/4 inch in 20 feet, or 1/2-inch maximum.
5. For lines and surfaces, do not vary from straight by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2-inch maximum.
6. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet, or 1/2-inch maximum.
7. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch.

C. Joints:
1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch.
2. For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch.
3. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch or minus 1/4 inch.
4. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch.

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; do not use units with less-than-nominal 4-inch horizontal face dimensions at corners or jambs.

C. Lay concealed masonry with all units in a wythe in running bond. Bond and interlock each course of each wythe at corners. Do not use units with less-than-nominal 4-inch 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 solid grout 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.

3.5 MORTAR BEDDING AND JOINTING

A. Lay hollow 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.

B. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.

C. Cut joints flush where indicated to receive waterproofing unless otherwise indicated.

3.6 MASONRY-JOINT REINFORCEMENT

A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere. Lap reinforcement a minimum of 6 inches.
1. Space reinforcement not more than 8 inches o.c. in foundation walls and parapet walls.
2. Provide reinforcement not more than 8 inches above and below wall openings and extending 12 inches 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 returns, offsets, column fireproofing, pipe enclosures, and other special conditions.

3.7 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. Anchor masonry with anchors embedded in masonry joints and attached to structure as detailed on the drawngs.

3.8 LINTELS

A. Provide lintels where shown and where openings of more than 12 inches for brick-size units and 24 inches for block-size units are shown without structural steel or other supporting lintels.

B. Provide concrete or masonry lintels where indicated. Provide loose steel lintels, concrete, or masonry lintels where lintel no type is specified.

C. Provide minimum bearing of 8 inches at each jamb unless otherwise indicated.

3.9 FLASHING/WEEP HOLES

A. Install flashings as follows:

B. General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges and other obstructions to the downward flow of water in the wall and where indicated.

C. Prepare masonry surfaces so that they are smooth and free from imperfections that could puncture flashing. Place through-wall flashing on sloping bed of mortar and cover with mortar. Seal penetrations in flashing with adhesive/sealant/tape as recommended by flashing before covering with mortar.

D. Install flashing as follows:

1. At lintels and shelves, extend flashing a minimum of 4 inches into masonry at each end. Extend flashing from exterior face of outer wythe of masonry, through the outer wythe, turned up a minimum of 4 inches, and into the inner wythe.
2. At heads and sills, extend flashing as specified above unless otherwise indicated but turn up ends not less than 2 inches to form a pan.
3. Install flashing in masonry veneer walls as specified above but carry flashing up face of back up at wall at least 8 inches.
4. Interlock end joints of ribbed sheet metal flashings by overlapping ribs not less than 1-1/2 inches or as recommended by flashing manufacturer and seal lap with elastomeric sealant complying with requirements of Division 7 Section “Joint Sealers” for application indicated.
5. Turn down sheet metal flashings at exterior face of masonry to form drip.

E. Install weep holes in the head joints in exterior wythes of the first course of masonry immediately above embedded flashing and as follows:
1. Form weepholes with product specified in Part 2 of this Section.
2. Space weep holes 32 inched o.c.

F. Install regelts and nailers for flashing and other related construction where shown to built into masonry.

3.10 FIELD QUALITY 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 60 inches.
3. Do not use mortar to fill cmu cores. Use of mortar is cause for immediate rejection and replacement of the work.

3.11 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 [**B**] [**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. of wall area or portion thereof.

E. Concrete Masonry Unit Test: For each type of unit provided, according to ASTM C 140 for compressive strength.

F. Mortar Aggregate Ratio Test (Proportion Specification): For each mix provided, according to ASTM C 780.

G. Grout Test (Compressive Strength): For each mix provided, according to ASTM C 1019.

H. Prism Test: For each type of construction provided, according to ASTM C 1314 at 28 days.

3.12 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:
   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 concrete masonry by applicable cleaning methods indicated in NCMA TEK 8-4A.

END OF SECTION 042200

SECTION 042000 – UNIT MASONRY

PART 1 GENERAL

1.1 PROJECT CONDITIONS

A. Environmental Requirements:

1. Protect masonry and materials against freezing at temperatures below 40 degrees F.
2. Do not use frozen materials or materials coated with ice or frost.
3. Do not lower freezing point of mortar by use of antifreeze agents or other admixtures. Do not use calcium chloride in mortar.

PART 2 PRODUCTS

2.1 CONCRETE MASONRY UNITS

A. Hollow Load-Bearing Units: ASTM C 90, Type I.

2.2 MORTAR AND MASONRY GROUT

A. Mortar: ASTM C 270, proportion specifications. Types as follows:

1. Type S for concrete masonry units.

B. Grout: ASTM C 476, fine or coarse as most suitable for the particular job conditions.

2.3 ACCESSORIES

A. Masonry Wall Reinforcement: Joint reinforcement factory fabricated from cold-drawn steel wire, truss or ladder design, 9 gage deformed steel wire longitudinal rods welded to 9 gage steel wire cross ties spaced 16 inches on center; width 1-1/2 to 2 inches less than wall thickness. Furnish factory-fabricated corner and tee sections for corners and wall intersections.

1. Finish for Exterior Walls: 1.5 oz per sq ft hot dipped galvanized after fabrication.
2. Finish for Interior Walls: 0.8 oz per sq ft mill galvanized.

B. Bar Reinforcement: ASTM A 615, Grade 60, deformed steel bars.

PART 3 EXECUTION

3.1 PREPARATION

A. Lay out walls and partitions with one course of unit masonry, or other suitable means, to define the spaces, locations of doors and other openings, and to serve as a guide for other trades in the installation of conduits, pipes, etc.

B. Allow other trades sufficient opportunity to install built-in work before proceeding with the walls and partitions. Do not cover pipes, conduit, or ductwork in masonry until directed by the Owner's Representative.

C. Wet brick that absorb 20 drops of water (placed in a one inch circle) in less than 90 seconds.

D. Clean off supporting surface under first course of masonry just prior to laying the masonry units.

E. Protection:

1. Protect face materials against staining.
2. Protect newly laid masonry from exposure to precipitation, excessive drying, freezing, soiling, backfill, and other harmful elements.
3. Cover top of walls with non-staining waterproof covering when Work is not in progress. Place with minimum 2 foot overhang of protective covering on each side of wall and securely anchor.

3.2 INSTALLATION

A. Install masonry units plumb and true to line with level courses accurately spaced.

1. Install masonry units in running bond unless otherwise indicated.
2. Take special care when laying masonry units to be left exposed, or upon which high-build glazed coating, paint, or thin set tile will be applied. Surface plane tolerance for such Work: 1/8 inch in 10 feet in all directions.

B. Adjust units to final position while mortar is soft and plastic. Remove units disturbed after mortar has stiffened; clean units and joints of mortar and re-lay in fresh mortar.

C. Lay only dry concrete masonry units.

D. Where cutting of masonry units is necessary, cut with a power saw. Lay out Work to avoid use of less than half-size units.

E. Lay hollow units with full mortar coverage on horizontal and vertical face shell surfaces. Bed webs in mortar in starting course on footings and foundation walls, in all courses of piers, columns and pilasters, where adjacent to cells or cavities to be reinforced or filled with concrete or mortar, and within 1'-6" of each side of openings.

F. Lay solid units with full mortar coverage on horizontal and vertical joint surfaces.

3.3 JOINTS

A. Construct uniform mortar joints, 3/8 inch thick unless otherwise indicated.

B. Strike joints flush in surfaces to be plastered, stuccoed, or covered with other masonry or other surface applied finish other than smear and high-build glazed coating.

C. Cut joints flush and tool slightly concave on both sides of other walls and partitions, including inner wythe of exterior cavity walls.

3.4 HORIZONTAL JOINT REINFORCEMENT

A. Reinforce horizontal joints with continuous masonry wall reinforcement spaced every 16 inches vertically except as follows:
1. Space 8 inches vertically in parapet walls.
2. Also reinforce horizontal joints immediately above and below openings for a distance of 2’-0” beyond opening in both directions.

C. Lap ends of adjoining strips of reinforcement 6 inches or more.

D. Install factory fabricated corner and tee sections at corners and wall intersections respectively.

3.5 CLEANING

A. Cut off mortar projections remaining from tooling joints and dry-brush masonry before the end of each day’s work.

B. Additional Cleaning for Brickwork:
1. Clean with stiff brushes and water.
2. If staining or soiling persists, reclean with stiff brushes and a solution of trisodium phosphate, detergent, and water (1/2 cup of trisodium phosphate and 1/2 cup of detergent to each gallon of water). Rinse with clean water.

END OF SECTION 042000

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SECTION 05 12 00 – STRUCTURAL STEEL

PART 1 - GENERAL

1.1 SCOPE

A. The extent of Structural Steel is as shown on the Contract Documents and as herein specified. The General and Supplementary Conditions and Division 1 Specification sections apply to work of this section.

1.2 ENERAL PROVISIONS

A. Standard Specifications and Codes issued by professional organizations and governmental agencies are specified hereinafter by basic designations and only the latest editions and revisions thereto shall apply to the work of this Section.

B. Applicable Standard Specifications and Codes:

1. The 2015 International Building Code with Current New York State Supplement.

2. Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings issued by the American Institute of Steel Construction. (AISC).

3. AWS D1.1 “Structural Welding Code – Steel” issued by the American Welding Society (AWS).

4. “Specification for Structural Joints Using ASTM A325 or A490 Bolts” issued by the AISC.

5. Painting Manual, Volume 2, “Systems and Specifications”, as issued by the Steel Structures Painting Council (SSPC).

6. "Code of Standard Practice for Steel Buildings and Bridges" as issued by the AISC.

C. In case of any conflict between the referenced standards and these specifications, the one having more stringent requirements shall prevail.

D. Coordination: Carry out the work of this Section in coordination and cooperation with contiguous work of other trades and/or Contracts involved.

1.3 SHOP DRAWINGS

Retain "Preinstallation Conference" Paragraph below if Work of this Section is extensive or complex enough to justify a preinstallation conference.

A. Submit Shop Drawings for the Architect's approval in accordance with the provisions of Section 013300.

B. The submittals shall include the following:

1. Erection plans: Shall be submitted for approval as early as possible.

2. Standard and special details: Submit standard and special details for approval as soon as possible.

3. Shop drawings shall indicate type, size and dimensions of all welds, and shall include details of the surface preparation and shop painting.

4. The details shall be made in such a way as to avoid having steel connections, bracing, etc. interfere with architectural details or in any way reduce the areas of shafts, openings, clearances, etc.

5. Shop drawings submitted electronically shall follow proper channels of submission as established with the owner and the design team. In addition, provisions of the General Conditions, as well as Section 013300 shall be followed as established for hard copy submissions. Shop drawings shall be submitted under a separate cover, include the title block and clearly identify the project on each drawing. Provide all other pertinent information and include the general contractor's review comments and review status on the electronic submission.

C. No fabrication shall be undertaken until respective shop drawings are marked "No Exception Taken" or "No Exception Except as Noted".

1.4 ALTERATIONS AND ADDITIONS TO EXISTING STEEL STRUCTURE

A. The Contractor shall verify existing conditions before submitting shop drawings for approval, including:

1. Dimensions and elevations.

2. Sizes.

3. Acceptable condition (not deteriorated or damaged).

B. The Contractor shall notify the Architect of any varying or interfering conditions affecting the alterations or additions so that the design may be adjusted to suit.

C. The Contractor shall carefully fit new connections to safe and acceptable tolerances.

D. Cutting of existing steel shall be done with extreme care. Do not over cut. Shore and brace whenever safety is questionable.

Verify available warranties and warranty periods for fire extinguishers with manufacturers.

PART 2 - PRODUCTS

See Editing Instruction No. 1 in the Evaluations for cautions about named manufacturers and products. For an explanation of options and Contractor's product selection procedures, see Section 01 60 00 "Product Requirements."

2.1 MATERIALS

A. Structural Steel shall conform to the following unless otherwise noted:

1. Channels, angles, plates and bars – ASTM A36

2. Round HSS – ASTM A53, Grade B

3. Square and rectangular HSS - ASTM A500, Grade B

4. HP shapes – ASTM A572, Grade 50

5. All others – ASTM A992, Grade 50

B. Bolts shall be ASTM A325, or A490. A307 may be used, if approved by the Structural Engineer of Record.

C. High Strength Bolts:

1. Bolts: Use ASTM A325 or A490 bolts manufactured by Infasco or approved equal. ASTM F1852 twist-off type tension control bolts produced by manufacturer may be used if approved by the Structural Engineer of Record.

2. Hardened washers: Use ASTM F436 washers manufactured by Infasco or approved equal.

3. Heavy hex nuts: Use only ASTM A563 heavy hex nuts manufactured by Infasco or Unytite Inc.

4. Galvanized Bolts: Where shown or noted as galvanized, bolts nuts and washers shall be hot-dip galvanized in compliance with ASTM A153. Nuts shall be lubricated in accordance with ASTM A563. Rotational capacity tests shall be performed on each assembly lot.

D. Filler Metal:

1. Electrodes: As required for matching base metal as specified in AWS “Structural Welding Code-Steel”.

2. The electrodes and flux used for submerged arc welding shall be provided by the same manufacturer. The flux shall be free of contamination from dirt, mill scale and other foreign material. Fused flux used in welding shall not be reused.

3. Filler metal for welding of new to existing steel shall be determined based on the test results conducted by a testing laboratory approved by the Structural Engineer of Record.

E. Paint for Shop Coat, except as otherwise required for compatibility with finish paints as specified in Section 099000, shall be “Azeron H.S. Primer No. 88-555” by Tnemec, or a comparable suitable product by DuPont or Glidden.

PART 3 - EXECUTION

3.1 DESIGN AND WORKMANSHIP

A. Unless otherwise specified or indicated, the design, fabrication and erection of steel work included in this Contract shall conform to the Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings, by the American Institute of Steel Construction, and the regulations of the Building Code, including all amendments made thereto, whichever is the more restrictive.

B. Existing Conditions:

1. Visit the project site and advise the Architect of any discrepancy or conflict. Field verify existing construction requirements, existing conditions, restrictions and clearances which may affect structural steel erection.

2. Examine the substrates, adjoining construction and the conditions under which the work is to be installed. Do not proceed until unsuitable conditions have been corrected. Consider all conditions which will affect satisfactory erection of the structural steel.

C. Erection:

1. Check the alignment and elevations of all column supports and location of all anchor bolts with transit and level instruments before starting erection. Notify and obtain Structural Engineer of Record's approval of methods proposed for correcting errors prior to proceeding with corrections.

2. Drift pins may be used only to align the erected parts. They shall not be used in such manner as to distort or damage the steel.

3. Make all necessary provisions for temporary shoring and bracing with connections of sufficient strength to sustain the imposed loads and for completion of erection where structural members are temporarily left out for erection at a later date.

4. Base and Bearing Plates:
   a. Clean concrete and masonry bearing surfaces of deleterious materials and roughen as necessary to provide adequate bond. Clean bottom surface of base and bearing plates immediately prior to erection.
   b. Set loose and attached base plates and bearing plates for structural members on wedges or other adjusting devices.
   c. Tighten anchor bolts after supported members have been positioned and plumbed. Do not remove wedges or shims. Cut off protruding parts flush with edges of base or bearing plates prior to packing with grout.
   d. Pack grout solidly between bearing surfaces and steel or plates. Ensure that no voids remain. Finish exposed surfaces, protect installed materials, and allow to cure as per manufacturer's specifications.

3.2 HIGH STRENGTH BOLTING

A. High Strength Bolts shall be installed as per "Specification for Structural Joints using ASTM A325 or A490 Bolts".

3.3 WELDING

A. Materials and Workmanship:

1. Welding shall be done in accordance with the Building Department and Fire Department Regulations and the requirements of the AWS “Structural Welding Code-Steel”, referenced herein.

2. Peening: Used only after permission for its use is obtained from the Architect.

3. Protection, storage and drying of welding electrodes shall be as specified in AWS “Structural Welding Code-Steel”.

4. Groove welds shall be complete penetration welds unless otherwise shown.

B. Welders and Welding Operators:

1. Welders and welding operators to be employed for this work must be qualified as prescribed in AWS “Structural Welding Code-Steel” and carry current certification as required by the Department of Buildings.

2. All costs for qualifying welders will be borne by the Contractor.

3.4 SURFACE PRAPARATION AND PAINTING

A. All steel shall be cleaned in accordance with SSPC SP-2 "Hand Tool Cleaning", except as specified below for "Architectural Steel”.

B. After fabrication, steel shall receive a shop coat of paint to provide 2.0 - 4.0 mils dry film thickness, except for the following:

1. Members to be encased in concrete.

2. Areas within 2" of field welds.

3. Contact surfaces of high-strength bolted connections.

4. Surfaces receiving shear studs rebar dowels, etc.

5. Milled surfaces (protect with an approved rust- inhibitive coating readily removable prior to erection, or of a type not requiring removal).

6. Members which will receive cementitious fireproofing.

7. Members to be galvanized.

C. After erection all damaged areas in the shop-coat, loosened scale, rust, exposed surfaces of bolts, nuts and washers, and all field welds and unpainted areas shall be cleaned to the same standards as for the shop coat and spot painted with the same paint used for the shop coat, at same film thickness.

D. Steel surfaces which will be inaccessible after erection and are not concrete encased shall be painted prior to erection with an additional coat of shop paint.

END OF SECTION 05 12 00

SECTION 05 31 00 – STEEL DECKING

PART 1 - GENERAL

1.1 REQUIREMENTS

A. Provide metal decking in accordance with the Contract Documents.

1.2 SCOPE

A. The extent of Steel Decking is as shown on the Contract Documents and as herein specified. The General and Supplementary Conditions and Division 1 Specification sections apply to work of this section.

B. Work included but not limited to:

1. Metal deck shown on drawings, including required shoring.

2. Steel flashing between metal deck and adjacent construction, and all other miscellaneous items and accessories required for the completion of metal deck work.

3. Cutting and reinforcing of openings in metal deck.

1.3 GENERAL PROVISIONS

A. Standard Specifications and Codes issued by professional organizations and governmental agencies are specified hereinafter by basic designations and only the latest editions and revisions thereto shall apply to the work of this Section.

B. Applicable Standard Specifications and Codes:

1. The Building Code of New York State, latest edition.

2. "Specification for the Design of Cold-Formed Steel Structural Members" issued by the American Iron and Steel Institute.

3. "Code for Welding in Building Construction" issued by the American Welding Society.

C. In case of any conflict between the referenced standards and these specifications, the one having more stringent requirements shall prevail.

D. Tests of weight of zinc coating shall conform to ASTM A90. Test panels shall be not less than 3” x 6” cut from fabricated deck units equivalent to those to be furnished. A sample of the zinc-coated accessories shall be tested by the same method. Contractor shall submit copies of test reports to Architect for approval.

E. Coordination: Carry out the work of this Section in coordination and cooperation with contiguous work of other trades and/or Contracts involved.

F. Inspection in Mill, Shop and Field: The material to be furnished shall be subject to inspection and tests in the mill, shop, and field by the Owner's inspectors, at no cost to the Contractor. However, inspection in the mill, shop or field will not relieve the Contractor of the responsibility to furnish satisfactory materials.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Metal Deck: Depths and gages are shown on the drawings. The types, design and function of metal decks shown are specified to products as manufactured by Canam USA (manufacturers of United Steel Deck products). Equivalent products meeting design requirements will be accepted if approved by the Architect prior to the award of the Contract.

B. Finish Flashing: Of not less than 18 gauge galvanized sheet steel, except as approved for a particular use, to close openings between floor units and columns, beams and girders where required.

C. Finishes: Composite metal deck shall be phosphatized / painted only on the side that will not be in contact with concrete. All other deck, closures, etc. shall be galvanized.

2.2 ACCESSORIES

A. Provide minimum 18 gauge galvanized end closures and change of direction plates, minimum 18 gauge side closure plates.

B. Include hanger tabs to be suspended from bottom of metal deck units. The hanger tabs shall be spaced 4'-0” on center, each way, designed to support maximum allowable load of 40 lbs. per hanger.

C. Surface Finishes: Accessories shall receive, before being formed, a zinc coating conforming to ASTM A525, wiped coating designation G90.

D. Where bottom of deck is above top flange of beam, provide permanent supporting seat or filler, 18 gage minimum.

PART 3 - EXECUTION

3.1 DELIVERY, STORAGE, AND HANDLING

A. Metal deck, miscellaneous items and accessories shall be delivered, stored, handled and installed, so as not to be damaged or deformed. Failure to wire brush and paint rusted areas immediately upon detection shall be cause for rejection. Decking stored at the site before erection shall be stacked on platforms or pallets and covered with tarpaulins or other suitable covering to provide weather tight enclosure while affording proper air circulation. The decking shall not be used for storage or as a working platform until the sheets have been securely fastened in position and shall not be damaged or overloaded during the entire construction period.

3.2 ERECTION

A. Metal deck shall be installed according to the manufacturer's recommendations. Deck units shall be in lengths to span over three or more supports wherever possible.

B. The deck shall be fastened to supporting steel by electric arc welding. Care shall be exercised in the selection of electrodes and amperage to provide positive welds and prevent high amperage blow holes. Welds shall be made from the top side of the deck with the welder following close behind the placement crew.

C. Puddle welds shall be at least 3/4" diameter or an elongated weld having an equal perimeter. Fillet welds, when used, shall be approximately 1" long. Weld metal shall penetrate all layers of deck material at end laps and side joints and have good fusion to the supporting members.

D. The minimum weld spacing shall be such as to hold the deck against a 30psf gross uplift and to provide lateral stability to the top flange of the supporting structural members. The weld spacing between the adjacent attachment points shall not exceed 12" on center. The adjacent sheets shall be fastened together at maximum spacing of 24” on center.

E. All portions of Metal Deck omitted due to the installation of hoists or for future installation of mechanical equipment, chutes or other requirements shall be installed or patched and be repaired by this Contractor as directed by the Contractor at no additional cost to the Owner.

F. Closures and Flashings:

1. Furnish, install and weld into position, flashings of not less than No. 18 gauge sheet steel except as approved for a particular use, to close openings between floor units and columns, beams and girders where required.

2. Provide where required, minimum 18 gauge galvanized end closure, side closure and change of direction plates. The appropriate gage shall be designed by a structural engineer in contractor’s employ and shown on the shop drawings submitted for Architect’s approval.

3.3 CUTTING AND PATCHING

A. Do all cutting and fitting as may be necessary to provide openings around columns, ducts and other penetrations required in connection with decking. All cutting and fitting shall be performed in accordance with the design drawings and approved shop drawings.

B. In addition to the above, cut out and notch for pipes, conduits, etc. which will penetrate the metal deck and which are indicated on the Heating, Ventilating, Air Conditioning, Plumbing, Drainage, and Electrical drawings.

C. Reinforce all openings to produce rigid installations in conformance with required design loads in the installed work.

3.4 HANGER TABS

A. Provide hanger tabs or tab extenders in such numbers and locations as required for ceiling suspension systems and mechanical and electrical requirements. Contractor shall carefully coordinate number and location of hanger tabs with the respective trades of the ceiling

construction. Unless otherwise directed, hanger tabs or tab extenders shall be spaced at 4'-0" on center, each way.

B. END OF SECTION 05 31 00

SECTION 05 40 00 - COLD FORMED METAL FRAMING

PART 1 - GENERAL

1.1 SCOPE

A. All light gage steel studs, track, joists, trusses, bridging and related accessories as indicated on the Contract Drawings and specified herein, plus all supplementary parts necessary to complete light gage metal work, whether or not definitely shown on drawings or specified herein.

1.2 QUALITY ASSURANCE

A. Inspection and Quality Control:
   1. Contractor shall provide effective full-time quality control over all fabrication and erection activities.
   2. As directed by Architect, Owner's testing agency may inspect the maintenance of a quality control program, including spot checking weldments and welding procedure in accordance with A.W.S. standards.
   3. Steel framing manufacturer shall provide a qualified representative for periodic on-site review of fabrication and installation in accordance with manufacturer's recommendations.
   4. Inspection by Owner's testing agency is not intended to be comprehensive or complete.
   5. Full responsibility for quality control shall remain with Contractor.

B. Standards:
   1. Work shall meet the requirements of the latest edition of the following standards.
      a. The Building Code of State of New York.
      b. American Iron and Steel Institute (A.I.S.I.) Design and Cold Formed Steel Structural Members.
      c. American Welding Society (A.W.S. D.1.3, Structural Welding Code -- Sheet Steel).
      d. American Society for Testing and Materials (A.S.T.M.).
      e. American Institute of Steel Construction (A.I.S.C.) Manual of Steel Construction.
      f. All pertinent Federal, State and Local codes.
   2. The most stringent requirements shall govern in conflicts between specified codes and standards.
      a. Erection plans showing locations and marks of members. Fabrication drawings showing details at every member.
      b. Member gages, spacings and sizes.
      c. Shop and field assembly details including cuts and connections.
      d. Type and location of welds, bolts and other fastening devices.

1.3 PRODUCT HANDLING

A. Protection:
   1. Upon delivery, material shall be protected from rain and snow by impervious covering or shelter.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Framing members shall be manufactured and supplied by Marino Ware or approved equal and be of the type and size as shown on the plans.

2.2 MATERIAL

A. Members:
1. Members shall be formed from steel having a G-60 galvanized coating meeting the requirements of ASTM C-955.
2. Studs and Joists of 12,14 and 16 gage thicknesses shall be formed from steel conforming to ASTM A653 HSLAS Type A, with a minimum yield of 50,000 psi.
3. Except as specified above, all steel shall conform to ASTM A653 SS Grade with a minimum yield of 33,000 psi.

B. Properties:
1. The physical and structural properties listed Marino Ware shall be considered the minimum permitted for framing members. Specifically, the following minimum properties, calculated in accordance with the latest A.I.S.I. Specification shall be provided: Ix (in.4), Area (in.2), rx (in.), Fy (KSI), Resisting Moment (in.-lb.).

C. Substitutions:
1. Any substitutions must be approved in writing ten days prior to bid date by the Architect.

2.3 FABRICATION

A. Framing components may be preassembled into panels prior to erecting. Prefabricated panels shall be square, with components attached in a manner as to prevent racking.

B. Framing components shall be cut squarely for attachment to perpendicular members, or as required for an angular fit against abutting members. Members shall be held positively in place until properly fastened.

C. Provide insulation equal to that specified elsewhere in double jamb studs and double header members which will not be accessible to the insulation contractor.

D. Axially Loaded Studs:
1. Studs shall have full bearing against inside track web, prior to stud and track attachment.
2. Splices in axially loaded studs shall not be permitted.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

A. Inspection:
1. Prior to installation inspect work of all other trades. Verify that all such work is complete an accurate to the point where this installation may properly commence in strict accordance with framing shop drawings.

B. Discrepancies:
   1. Immediately notify Architect of all discrepancies.
   2. Do not proceed with installation in areas of discrepancies until such discrepancy has been fully resolved.

3.2 ERECTION

A. Walls:
   1. Erect framing and panels plumb, level and square in strict accordance with the approved shop drawings.
   2. Handling and lifting of prefabricated panels shall be done in a manner as to not cause distortion in any member.
   3. Track shall be securely anchored to the supporting structure as shown on the fabrication and erection drawings.
   4. At track butt joints, abutting pieces of track shall be securely anchored to a common structural element or they shall be butt-welded or spliced together.
   5. Studs shall be plumbed, aligned and securely attached to the flange or webs of both upper and lower tracks.
   6. Wall stud bridging shall be attached in a manner to prevent stud rotation. Bridging rows shall be spaced according to the manufacturer's recommendation. Without supportive data, the minimum bridging shall be at mid-height of walls. Installation of bridging must be completed before any loads are applied to the system.
   7. Temporary bracing shall be provided until erection is completed.

B. Cold Formed Steel Joists:
   1. Joists shall be located directly over bearing studs or a load distribution member shall be provided at the top track.
   2. Provide web stiffeners at reaction points where indicated by plans.
   3. Joist bridging shall be installed at 3'-0" o.c. maximum intervals.
   4. Proper attachments of diaphragm rated products, such as plywood or metal deck, will prevent rotation of the compression flange of the joists. These may be used in lieu of the top flat strap. Installation of these products and the balance of the mechanical bridging components must be completed before any loads are applied to the joists.
   5. Install 16 gage solid bridging in first two and last two joist spaces. Starting at third joist space, install V-bar bridging at bottom, extending for 10'-0" run. Follow with solid bridging in one space. Repeat to completion, with each 10'-0" run of strap bridging followed by one space of solid bridging.
   6. Solid bridging shall not be less than 2" maximum reduction to section depth.
   7. End blocking shall be provided where joist ends are not otherwise restrained from rotation.

3.3 CONNECTIONS

A. Provide close fitting joints cut flush with adjacent structural steel supports, cut, drill, punch and tap for the installation and attachment of other work to miscellaneous metal work as follows:
   1. Joints:
      Make joints as strong and rigid as adjoining sections. Make welds continuous along entire line of contract, except where spot welding is indicated. Grind exposed weld flush and smooth. Where bolted or riveted connections are indicated, such connection may be welded. Seat studs squarely in track with stud web and flange abutting track web.
   2. Welding:
      Perform welding in accordance with AWS D1.1 and AWS D1.3.

3. Screws: Screws and screwed connections shall conform to the AISI Cold-formed Steel Specification.

B. Anchorage:
Except where otherwise specified, members shall be fastened to structural steel by welded or bolted connections and to masonry with toggle bolts. Fastening to wood plugs in concrete or masonry will not be permitted. Drill holes for toggle bolts to the exact diameter of the bolt, using a rotary drill for concrete and a percussion drill for other masonry. Screws shall be threaded full length to the head of the screw.

3.4 WASTE MANAGEMENT

A. Coordinate with Division 01.

1. Separate and recycle cut-offs and waste materials and material packaging in accordance with Waste Management Plan and to the maximum extent economically feasible and place in designated areas for recycling.
2. Set aside and protect materials suitable for reuse and/or remanufacturing.
3. Separate and fold up metal banding; flatten and place along with other metal scrap for recycling in designated area.

END OF SECTION 05 40 00

SECTION 05 50 00 - 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. The Work of this Section consists of the provision of all plant, labor, materials, equipment, testing and services necessary to complete the work of metal fabrications as shown on the schedules, keynotes, drawings, as specified herein, and as may be required by conditions and authorities having jurisdiction, including, but not limited to, the following (NOT ALL USED):

1. Steel framing and supports for mechanical and electrical equipment.
2. Steel framing and supports for applications where framing and supports are not specified in other Sections.
3. Prefabricated non-penetrating metal roof railings.

B. Products furnished, but not installed, under this Section include the following:

1. Loose steel lintels.
2. Anchor bolts, steel pipe sleeves, slotted-channel inserts, 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.

C. Related Requirements:

1. Division 03 "Cast-in-Place Concrete" for installing anchor bolts, steel pipe sleeves, slotted-channel inserts, wedge-type inserts, and other items cast into concrete.
2. Division 04 "Unit Masonry" for installing loose lintels, anchor bolts, and other items built into unit masonry.
3. Division 05 "Structural Steel Framing," "Metal Stairs" for cast and extruded treads and nosings, "Pipe and Tube Railings," "Decorative Metal," "Decorative Metal Railings."

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 each type of product indicated.

B. Shop Drawings: Show fabrication and installation details for metal fabrications.

1. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For professional engineer.

B. Mill Certificates: Signed by stainless-steel manufacturers, certifying that products furnished comply with requirements.

C. Welding certificates.

D. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.

E. Research/Evaluation Reports: For post-installed anchors, from ICC-ES.

1.6 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - 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.

B. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication and indicate measurements on Shop Drawings.
1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating metal fabrications without field measurements. Coordinate wall and other contiguous construction to ensure that actual dimensions correspond to established dimensions.
2. Provide allowance for trimming and fitting at site.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.

1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

2.2 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 and Type 316L (exterior).

D. Stainless-Steel Bars and Shapes: ASTM A 276, Type 304, Type 316L (exterior).

E. Rolled-Steel Floor Plate: ASTM A 786/A 786M, rolled from plate complying with ASTM A 36/A 36M or ASTM A 283/A 283M, Grade C or D.

F. Rolled-Stainless-Steel Floor Plate: ASTM A 793.

2.3 FASTENERS

A. General: Unless otherwise indicated, provide Type 304 (interior) Type 316 (exterior) 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.

1. Provide stainless-steel fasteners for fastening aluminum.
2. Provide stainless-steel fasteners for fastening stainless steel.

B. 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.

C. 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.

D. 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.

E. 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.

F. 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) and Group 2 (A4) stainless-steel bolts, ASTM F 593 (ASTM F 738M), and nuts, ASTM F 594 (ASTM F 836M).

2.4 MISCELLANEOUS MATERIALS

A. Shop Primers: Provide primers that comply with Division 09 "Painting." `

B. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.

1. Use primer containing pigments that make it easily distinguishable from zinc-rich primer.

C. Water-Based Primer: Emulsion type, anticorrosive primer for mildly corrosive environments that is resistant to flash rusting when applied to cleaned steel, complying with MPI#107 and compatible with topcoat.

D. Epoxy Zinc-Rich Primer: Complying with MPI#20 and compatible with topcoat.

E. Shop Primer for Galvanized Steel: Primer formulated for exterior use over zinc-coated metal and compatible with finish paint systems indicated.

F. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.

G. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187/D 1187M.

H. 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.

I. 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).

2.5 FABRICATION, GENERAL

A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch (1 mm) unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

D. Form exposed work with accurate angles and surfaces and straight edges.

E. Weld corners and seams continuously to comply with the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.

G. Fabricate seams and other connections that are exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.

I. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.

J. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, 1/8 by 1-1/2 inches (3.2 by 38 mm), with a minimum 6-inch (150-mm) embedment and 2-inch (50-mm) hook, not less than 8 inches (200 mm) from ends and corners of units and 24 inches (600 mm) o.c., unless otherwise indicated.

2.6 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. Fabricate units from slotted channel framing where indicated.
2. Furnish inserts for units installed after concrete is placed.

C. Fabricate supports for operable partitions from continuous steel beams of sizes indicated with attached bearing plates, anchors, and braces as indicated. Drill or punch bottom flanges of beams to receive partition track hanger rods; locate holes where indicated on operable partition Shop Drawings.

D. Galvanize miscellaneous framing and supports where indicated.

E. Prime miscellaneous framing and supports with zinc-rich primer where indicated.

2.7 SHELF ANGLES

A. Fabricate shelf angles from steel angles of sizes indicated and for attachment to concrete framing. Provide horizontally slotted holes to receive 3/4-inch (19-mm) bolts, spaced not more than 6 inches (150 mm) from ends and 24 inches (600 mm) o.c., unless otherwise indicated.

1. Provide mitered and welded units at corners.
2. Provide open joints in shelf angles at expansion and control joints. Make open joint approximately 2 inches (50 mm) larger than expansion or control joint.

B. For cavity walls, provide vertical channel brackets to support angles from backup masonry and concrete.

C. Galvanize and prime shelf angles located in exterior walls.

D. Prime shelf angles located in exterior walls with zinc-rich primer.

E. Furnish wedge-type concrete inserts, complete with fasteners, to attach shelf angles to cast-in-place concrete.

2.8 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. Galvanize and prime loose steel lintels located in exterior walls.

C. Prime loose steel lintels located in exterior walls with zinc-rich primer.

D. Shop paint galvanized lintels.

2.9 FINISHES, GENERAL

A. Finish metal fabrications after assembly.

B. Finish exposed surfaces to remove tool and die marks and stretch lines, and to blend into surrounding surface.

2.10 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.

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 not indicated to be galvanized unless they are to be embedded in concrete, sprayed-on fireproofing, or masonry, or unless otherwise indicated.

1. Shop prime with universal shop primer unless zinc-rich primer is indicated.

D. 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."

E. 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.

2.11 PREFABRICATED NON-PENETRATING METAL ROOF RAILINGS

A. Manufacturers: Subject to compliance with requirements, provide products by on of the following:
1. Kee Safety, (Basis of Design: KeeGuard Safety Rail-Safety Guardrail)
2. Tractel Ltd
3. FIXFAST USA

B. Substitutions: Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 – Product Requirements.

C. Systems
1. Non-penetrating metal roof railing.
   a. Standards: System shall have top and mid rail in accordance with OSHA Standards - 29 CFR 1910.29 (b)(1)(2).
   b. Structural Load: 200 lb (90.7 kg), minimum, in any direction to all components in accordance with OSHA Regulation 29 CFR 1926.502.

c. Height: 42 inches (1067 mm), minimum.
d. Railings: 1-5/8 inch (41 mm) O.D. hot rolled pickled electric weld tubing, free of sharp edges and snag points.
e. Mounting Bases: Class 30 gray iron material cast with four receiver posts. Provide rubber pads on bottom of bases.
f. Receiver Posts: Shall have a positive locking system into slots that allow rails to be mounted in any direction. Friction locking systems are not allowed. Receiver posts shall have drain holes.
g. Accessories:
1) Roof Pads: Provide the following pad under each base to protect roof membrane:
a) Approved Product: BUR Pad.

D. Finishes
1. Finish: Factory finished powder coat paint.
2. Color: Black

E. Warranty
1. Warranty: Provide manufacturer's two (2) year warranty.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. 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.

B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.

C. Field Welding: Comply with the following requirements:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

D. 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.

E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

F. 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.

3.2 INSTALLING MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.

B. Anchor supports for operable partitions and overhead grilles securely to, and rigidly brace from, building structure.

C. Support steel girders on solid grouted masonry, concrete, or steel pipe columns. Secure girders with anchor bolts embedded in grouted masonry or concrete or with bolts through top plates of pipe columns.

1. Where grout space under bearing plates is indicated for girders supported on concrete or masonry, install as specified in "Installing Bearing and Leveling Plates" Article.

D. Install pipe columns on concrete footings with grouted baseplates. Position and grout column baseplates as specified in "Installing Bearing and Leveling Plates" Article.

1. Grout baseplates of columns supporting steel girders after girders are installed and leveled.

3.3 ADJUSTING AND CLEANING

A. 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.

B. Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in Division 09.

C. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780/A 780M.

3.4 WASTE MANAGEMENT

A. Coordinate with Section 01 74 19.

1. Separate and recycle cut-offs and waste materials and material packaging in accordance with Waste Management Plan and to the maximum extent economically feasible and place in designated areas for recycling.
2. Set aside and protect materials suitable for reuse and/or remanufacturing.

3. Separate and fold up metal banding; flatten and place along with other metal scrap for recycling in designated area.

END OF SECTION 05 50 00

SECTION 05 52 13 PIPE AND TUBE RAILINGS (CIVIL)

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. Handrails: Aluminum pipe and tube for handrails.

1.3 COORDINATION

A. Coordinate installation of anchorages for railings. 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.

B. Do not support railings temporarily by any means that do not satisfy structural performance requirements.

1.4 ACTION SUBMITTALS

A. Product Data: For the following:

1. Manufacturer's product lines of mechanically connected railings and connectors.

2. Railing brackets and fasteners.

3. Grout, anchoring cement, and anodizing products.

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

1.5 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For pipe and tube railings, for tests performed by a qualified testing agency, according to ASTM E 894 and ASTM E 935.

B. Evaluation Reports: For post-installed anchors, from ICC-ES.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Structural Performance: Railings shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:

1. Handrails:

a. Uniform load of > 50 lbf/ ft. applied in any direction.

b. Concentrated load of > 200 lbf applied in any direction.

c. Uniform and concentrated loads need not be assumed to act concurrently.

2. Mid Rail and End Return: Shall withstand > 200 lbf load without loosening.

B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.

1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.2 METALS, GENERAL

A. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.

B. Brackets, Flanges, and Anchors: Cast or formed metal of same type of material and finish as supported rails unless otherwise indicated.

2.3 ALUMINUM

A. Aluminum, General: Provide alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with not less than the strength and durability properties of alloy and temper designated below for each aluminum form required.

B. Extruded Structural Pipe and Round Tubing: ASTM B 429, Alloy 6063-T6.

1. Provide Standard Weight (Schedule 40) pipe unless otherwise indicated.

2.4 FASTENERS

A. General: Provide the following:

1. Aluminum Railings: Type 304 stainless-steel fasteners.

2. Provide exposed fasteners with finish matching appearance, including color and texture, of railings.

B. Fasteners for Anchoring Railings to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring railings to other types of construction indicated and capable of withstanding design loads.

C. Fasteners for Interconnecting Railing Components:

1. Provide concealed fasteners for interconnecting railing components and for attaching them to other work, unless exposed fasteners are unavoidable or are the standard fastening method for railings indicated.

2. Provide flat-head machine screws for exposed fasteners unless otherwise indicated.

D. Post-Installed Anchors: Torque-controlled expansion anchors capable of sustaining, without failure, a load equal to 6 times the load imposed when installed in unit masonry and 4 times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.

1. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 stainless-steel bolts, ASTM F 593, and nuts, ASTM F 594.

2.5 MISCELLANEOUS MATERIALS

A. Nonshrink, Nonmetallic Grout: Factory-packaged, non-staining, noncorrosive, nongaseous, pre-mixed grout complying with ASTM C 1107 and consisting of non-metallic aggregate, cement and water reducing and plasticizing additives. Provide grout specifically recommended by manufacturer for interior and exterior applications.

B. Anchoring Cement: Factory-packaged, nonshrink, nonstaining, hydraulic-controlled expansion cement formulation for mixing with water at Project site to create pourable anchoring, patching, and grouting compound.

1. Water-Resistant Product: At exterior locations provide formulation that is resistant to erosion from water exposure without needing protection by a sealer or waterproof coating and that is recommended by manufacturer for exterior use.

2.6 FABRICATION

A. General: Fabricate railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage, but not less than that required to support structural loads.

B. Shop assemble railings to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.

C. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

D. Form work true to line and level with accurate angles and surfaces.

E. Fabricate connections that are exposed to weather in a manner that excludes water. Provide weep holes where water may accumulate.

F. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items.

G. Connections: Fabricate railings with welded connections unless otherwise indicated.

H. Welded Connections: Fabricate railings to interconnect members with concealed internal welds that eliminate surface grinding, using manufacturer's standard system of sleeve and socket fittings.

I. Nonwelded Connections: Connect members with concealed mechanical fasteners and fittings. Fabricate members and fittings to produce flush, smooth, rigid, hairline joints.

1. Fabricate splice joints for field connection using an epoxy structural adhesive if this is manufacturer's standard splicing method.

J. Form Changes in Direction as Follows:

1. As detailed.

2. By radius bends of radius indicated or by inserting prefabricated elbow fittings of radius indicated.

K. For changes in direction made by bending, use jigs to produce uniform curvature for each repetitive configuration required. Maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.

L. Close exposed ends of railing members with prefabricated end fittings.

M. Brackets, Flanges, Fittings, and Anchors: Provide flanges, miscellaneous fittings, and anchors to interconnect railing members to other work unless otherwise indicated.

N. Provide inserts and other anchorage devices for connecting railings to concrete or masonry work. Fabricate anchorage devices capable of withstanding loads imposed by railings. Coordinate anchorage devices with supporting structure.

2.7 ALUMINUM FINISHES

A. 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 unacceptable. 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.

B. Clear Anodized: AAMA 611, AA-M12-C22-A21.

2.8 RAILING SYSTEM (HANDRAILS)

A. Basis of Design Product: Subject to compliance with requirements, provide railing system, as manufactured by Superior Aluminum Products, 555 E. Main St., PO Box 430, Russia, OH 45363, 937-526-4065, www.superioraluminum.com or comparable product by one of the following.

1. Thompson Fabricating, LLC, Birmingham, AL.

2. Campbellsville Industries, Inc, Campbellsville, KY.

3. Or an approved equivalent.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Install railing in accordance with manufacturer's installation instructions to configurations indicated on Drawings and approved shop drawings.

B. Install railing posts plumb and level.

C. Do not install bent, bowed, or otherwise damaged panels. Remove damaged components from site and replace.

D. Fit exposed connections together to form tight, hairline joints.

E. Perform cutting, drilling, and fitting required for installing railings. Set railings accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.

1. Do not weld, cut, or abrade surfaces of railing components that are coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.

2. Set posts plumb within a tolerance of 1/16 inch in 3 feet.

3. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet.

F. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

1. Coat, with a heavy coat of bituminous paint, concealed surfaces of aluminum that are in contact with grout, concrete, masonry, wood, or dissimilar metals.

G. Adjust railings before anchoring to ensure matching alignment at abutting joints.

H. Fastening to In-Place Construction: Use anchorage devices and fasteners where necessary for securing railings and for properly transferring loads to in-place construction.

3.2 RAILING CONNECTIONS

A. Nonwelded Connections: Use mechanical or adhesive joints for permanently connecting railing components. Seal recessed holes of exposed locking screws using plastic cement filler colored to match finish of railings.

B. Expansion Joints: Install expansion joints at locations indicated but not farther apart than required to accommodate thermal movement. Provide slip-joint internal sleeve extending 2 inches beyond joint on either side, fasten internal sleeve securely to one side, and locate joint within 6 inches of post.

3.3 ANCHORING POSTS

A. Form or core-drill holes as shown on the contract drawings. Clean holes of loose material, insert posts, and fill annular space between post and concrete with nonshrink, nonmetallic grout or anchoring cement, mixed and placed to comply with anchoring material manufacturer's written instructions.

B. Cover anchorage joint with flange of same metal as post, welded to post after placing anchoring material or attached to post with set screws.

C. All posts grouted in concrete must have one 1/4“diameter weep hole, 1/2“above post collar, in the plane of the rail.

3.4 ADJUSTING AND CLEANING

A. Clean by washing thoroughly with clean water and soap and rinsing with clean water.

3.5 PROTECTION

A. Protect finishes of railings from damage during construction period with temporary protective coverings approved by railing manufacturer. Remove protective coverings at time of Substantial Completion.

END OF SECTION 05 52 13

SECTION 06 10 00 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. The Work of this Section consists of the provision of all plant, labor, materials, equipment, testing and services necessary to complete the work of rough carpentry as shown on the schedules, keynotes, drawings, as specified herein, and as may be required by conditions and authorities having jurisdiction, including, but not limited to, the following:

1. Wood Preservative Treated Lumber.
2. Fire Retardant Treated Lumber.
3. Misc. Lumber.
4. Plywood backing panels.
5. Un-Treated roof related solid blocking, beveled siding, and plywood.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product.

1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements.
2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements.
3. Data for each type of fastener and anchor.

B. Mockups:

1. Construct 4 foot long mockups of each roof blocking assembly, to show how it will fit, get fastened to, and relate to adjoining building components.

2. Obtain the Architect’s approval of each mock up before proceeding with the work. Remove and replace mockups that are rejected; approved mockups may be left in place and incorporated into the finished project.

1.3 INFORMATIONAL SUBMITTALS

A. Material Certificates: For dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the ALSC Board of Review.

B. Evaluation Reports: For the following, from ICC-ES:

1. Wood-preservative-treated wood.
2. Fire-retardant-treated wood.
3. Powder-actuated fasteners.
4. Expansion anchors.
5. Metal framing anchors.

1.4 QUALITY ASSURANCE

A. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

A. Certified Wood: Materials shall be produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship".

B. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.

1. Factory mark each piece of lumber with grade stamp of grading agency.
2. For exposed lumber indicated to receive a stained or natural finish, mark grade stamp on end or back of each piece or omit grade stamp and provide certificates of grade compliance issued by grading agency.
3. Provide dressed lumber, S4S, unless otherwise indicated.

C. Maximum Moisture Content of Lumber: 15 percent for 2-inch nominal thickness or less, 19 percent for more than 2-inch nominal thickness unless otherwise indicated.

D. Roof blocking:
1. Construction grade Douglas Fir, kiln dried to 15%
2. Utility grade beveled cedar or redwood siding, or equivalent synthetic lumber products.
3. APA rated CDX plywood panels, assembled with exterior glue.

2.2 WOOD-PRESERVATIVE-TREATED LUMBER

A. Preservative Treatment by Pressure Process: AWPA 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. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium. Do not use inorganic boron (SBX) for sill plates.

B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or that does not comply with requirements for untreated material

C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.

D. Application: Treat all rough carpentry unless otherwise indicated.

1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.
3. Wood framing and furring attached directly to the interior of below-grade exterior masonry or concrete walls.
4. Wood framing members that are less than 18 inches above the ground in crawlspaces or unexcavated areas.
5. Do not treat roof related blocking or plywood.

2.3 FIRE-RETARDANT-TREATED MATERIALS

A. General: Where fire-retardant-treated materials are indicated, use materials complying with requirements in this article, that are acceptable to authorities having jurisdiction, and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.

B. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: 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 beyond the centerline of the burners at any time during the test.

1. Use treatment that does not promote corrosion of metal fasteners.

2. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated lumber and plywood by pressure process after being subjected to accelerated weathering according to ASTM D 2898. Use for exterior locations and where indicated.
3. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D 3201 at 92 percent relative humidity. Use where exterior type is not indicated.

C. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Kiln-dry plywood after treatment to a maximum moisture content of 15 percent.

D. Identify fire-retardant-treated wood with appropriate classification marking of qualified testing agency.

E. Application: Treat all rough carpentry items indicated on Drawings, and the following:

1. Concealed blocking.
2. Plywood backing panels.

F. Allowable Design Loads: Provide products with allowable design loads, as published by manufacturer, which meet or exceed those of basis-of-design products. 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.

2.4 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

B. Provide miscellaneous lumber for support or attachment of other construction in the following locations **(whether indicated on the plans or not):**

1. All wall mounted counters, shelf millwork units of any kind, and items furnished by the owner requiring wood blocking.
2. Any recessed items requiring wood blocking for attachment and or leveling.
3. Any and all construction elements requiring anchoring to walls and or structure.

C. For items of dimension lumber size, provide Construction or No. 2 grade lumber of any species.

D. For concealed boards, provide lumber with 15 percent maximum moisture content and any of the following species and grades:

1. Mixed southern pine; No. 2 grade; SPIB.
2. Eastern softwoods; No. 2 Common grade; NeLMA.
3. Northern species; No. 2 Common grade; NLGA

2.5 PLYWOOD BACKING PANELS

A. Equipment Backing Panels: DOC PS 1, fire-retardant treated, in thickness indicated or, if not indicated, not less than 3/4-inch nominal thickness.

2.6 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.

B. Power-Driven Fasteners: NES NER-272.

C. Bolts: Steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers.

D. Fasteners for roof related blocking shall be hot dipped galvanized steel; or steel with a proprietary rust inhibiting coating. Utilize minimum #12 diameter screws where ever possible; nails if used, shall have annular ring shanks. Do not use “dry-wall” screws to assemble roof related wood blocking. Anchors bolts shall have be formed of 1/2 inch diameter steel. Drilled anchors shall have 1/4 inch diameter shanks.

2.7 METAL FRAMING ANCHORS

A. Manufacturers: Subject to compliance with requirements, provide products by the following provide products by one of the following available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Cleveland Steel Specialty Co.
2. KC Metals Products, Inc.
3. Phoenix Metal products, Inc.
4. Simpson Strong-Tie Co., Inc.
5. USP Structural Connectors.

B. Allowable Design Loads: Provide products with allowable design loads, as published by manufacturer that meet or exceed those indicated. 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.

C. Galvanized-Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 coating designation.

1. Use for interior locations unless otherwise indicated.

D. Hot-Dip, Heavy-Galvanized Steel Sheet: ASTM A 653/A 653M; structural steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G185 coating designation; and not less than 0.036 inch thick.

1. Use for wood-preservative-treated lumber and where indicated.

2.8 MISCELLANEOUS MATERIALS

A. Sill-Sealer Gaskets: Glass-fiber-resilient insulation, fabricated in strip form, for use as a sill sealer; 1-inch nominal thickness, compressible to 1/32 inch; selected from manufacturer's standard widths to suit width of sill members indicated.

B. Sill-Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch thick, selected from manufacturer's standard widths to suit width of sill members indicated.

C. Flexible Flashing: Composite, self-adhesive, flashing product consisting of a pliable, butyl rubber or rubberized-asphalt compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall thickness of not less than 0.025 inch (0.6 mm).

D. Adhesives for Gluing Furring and Sleepers to Concrete or Masonry: Formulation complying with ASTM D 3498 that is approved for use indicated by adhesive manufacturer.

1. Adhesives shall have a VOC content of 70 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

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 furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.

B. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.

C. Framing with Engineered Wood Products: Install engineered wood products to comply with manufacturer's written instructions.

D. Install fire-retardant treated plywood backing panels with classification marking of testing agency exposed to view.

E. Metal Framing Anchors: Install metal framing anchors to comply with manufacturer's written instructions. Install fasteners through each fastener hole.

F. Do not splice structural members between supports unless otherwise indicated.

G. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.

H. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.

I. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, 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.

J. Roof Blocking:

1. Stagger joints in built up assemblies at least 2 feet to obtain maximum strength. Provide the appropriate shapes needed and adjust wood members to suit existing conditions for full bearing and secure attachment. Discard defective material, and pieces which are too small, and fabricate the work with a minimum of joints and an optimum joint arrangement.

2. Securely attach roof blocking to resist a pull of 275 pounds per lineal foot in any direction. Countersink all fasteners flush.

3. Space fasteners to achieve adequate holding power, generally as follows:
   a. Anchor bolts embedded in concrete, anchors drilled into concrete or masonry, screws into a steel deck or structural steel member, or screws into wood framing: 12 inches on center.
   b. Nails into wood: 8 inches on center.
   c. Install two rows of fasteners on blocking wider than 5 inches.
4. Install blocking neatly scribed and cut to fit within 1/4 inch of adjoining materials. Install blocking, shims and similar supports for the proper attachment of subsequent work.

3.2 PROTECTION

A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

B. 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.

C. Do not allow roof blocking to get wet while stored or during installation; remove and replace any roof related blocking that gets wet.

3.3 WASTE MANAGEMENT

A. Coordinate with Section 01 74 19.

1. Separate and recycle cut-offs and waste materials and material packaging in accordance with Waste Management Plan and to the maximum extent economically feasible and place in designated areas for recycling.
2. Set aside and protect materials suitable for reuse and/or remanufacturing.
3. Separate and fold up metal banding; flatten and place along with other metal scrap for recycling in designated area.

END OF SECTION 06 10 00

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SECTION 06 16 00 - SHEATHING

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. The Work of this Section consists of the provision of all plant, labor, materials, equipment, testing and services necessary to complete the work of sheathing as shown on the schedules, keynotes, drawings, as specified herein, and as may be required by conditions and authorities having jurisdiction, including, but not limited to, the following:

1. Wall sheathing.
2. Roof sheathing.
3. Fasteners.
4. Sheathing joint and penetration treatment.

B. Related Requirements:

1. Division 06 "Rough Carpentry".
2. Division 07 “Thermal and Moisture Protection”
3. Division 07 “EPDM Roofing”

C. **FOR ROOF SHEATHING, REFER TO SPECIFICATION SECTION 07 53 23**.

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 plywood complies 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 plywood complies with requirements. Include physical properties of treated materials.
3. For fire-retardant treatments, include physical properties of treated plywood both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D 5516.
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.

1.4 INFORMATIONAL SUBMITTALS

A. Evaluation Reports: For following products, from ICC-ES:

1. Preservative-treated plywood.
2. Fire-retardant-treated plywood.

1.5 QUALITY ASSURANCE

A. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant-treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Stack panels flat with spacers beneath and between each bundle to provide air circulation. Protect sheathing from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics: For assemblies with fire-resistance ratings, provide materials and construction identical to those of assemblies tested for fire resistance per ASTM E 119 by a testing and inspecting agency acceptable to authorities having jurisdiction.

1. Fire-Resistance Ratings: Indicated by design designations from UL's "Fire Resistance Directory."

2.2 WOOD PANEL PRODUCTS

A. Certified Wood: For the following wood products, provide materials produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship":

1. Plywood.
2. Particleboard underlayment.
3. Hardboard underlayment.

B. Plywood: Either DOC PS 1 or DOC PS 2 unless otherwise indicated.

C. Thickness: As needed to comply with requirements specified, but not less than thickness indicated.

D. Factory mark panels to indicate compliance with applicable standard.

2.3 PRESERVATIVE-TREATED PLYWOOD

A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2for 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. 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 items indicated on Drawings and plywood in contact with masonry or concrete or used with roofing, flashing, vapor barriers, and waterproofing.

2.4 FIRE-RETARDANT-TREATED PLYWOOD

A. General: Where fire-retardant-treated materials are indicated, use materials complying with requirements in this article that are acceptable to authorities having jurisdiction and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.

B. Fire-Retardant-Treated Plywood by Pressure Process: 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 treatment that does not promote corrosion of metal fasteners.
2. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated plywood by pressure process after being subjected to accelerated weathering according to ASTM D 2898. Use for exterior locations and where indicated.
3. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D 3201 at 92 percent relative humidity. Use where exterior type is not indicated.
4. Design Value Adjustment Factors: Treated lumber plywood shall be tested according ASTM D 5516 and design value adjustment factors shall be calculated according to ASTM D 6305. Span ratings after treatment shall be not less than span ratings specified. For roof sheathing and where high-temperature fire-retardant treatment is indicated, span ratings for temperatures up to 170 deg F (76 deg C) shall be not less than span ratings specified.

C. Kiln-dry material after treatment to a maximum moisture content of 15 percent. Do not use material that is warped or does not comply with requirements for untreated material.

D. Identify fire-retardant-treated plywood with appropriate classification marking of qualified testing agency.

E. Application: Treat plywood indicated on Drawings, and the following:

1. Roof and wall sheathing within 48 inches (1220 mm) of fire walls.
2. Roof sheathing.
   a. Refer to Specification Section 07 53 23 for Gypsum Roof Sheathing. Plywood sheathing may be considered by Architect's Roofing Consultant. Acceptance will depend on condition.

2.5 WALL SHEATHING

A. Glass-Mat Gypsum Wall Sheathing: ASTM C 1177/1177M.

1. Products: Subject to compliance with requirements, provide the following:

   a. CertainTeed Corporation; GlasRoc.
   b. G-P Gypsum Corporation; Dens-Glass Gold.
   c. National Gypsum Company; Gold Bond e(2)XP.
   d. Temple-Inland Inc.; GreenGlass
   e. United States Gypsum Co.; Securock.

2. Type and Thickness: Type X, 5/8 inch (15.9 mm) thick.
3. Size: 48 by 96 inches (1219 by 2438 mm) for vertical installation.

2.6 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.

1. For roof and wall sheathing, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.

B. Nails, Brads, and Staples: ASTM F 1667.

C. Power-Driven Fasteners: NES NER-272.

D. Wood Screws: ASME B18.6.1.

E. Screws for Fastening Wood Structural Panels to Cold-Formed Metal Framing: ASTM C 954, except with wafer heads and reamer wings, length as recommended by screw manufacturer for material being fastened.

1. For wall and roof sheathing panels, provide screws with organic-polymer or other corrosion-protective coating having a salt-spray resistance of more than 800 hours according to ASTM B 117.

F. Screws for Fastening Gypsum Sheathing to Cold-Formed Metal Framing: Steel drill screws, in length recommended by sheathing manufacturer for thickness of sheathing to be attached, with organic-polymer or other corrosion-protective coating having a salt-spray resistance of more than 800 hours according to ASTM B 117.

1. For steel framing less than 0.0329 inch (0.835 mm) thick, use screws that comply with ASTM C 1002.
2. For steel framing from 0.033 to 0.112 inch (0.84 to 2.84 mm) thick, use screws that comply with ASTM C 954.

2.7 SHEATHING JOINT-AND-PENETRATION TREATMENT MATERIALS

A. Sealant for Glass-Mat Gypsum Sheathing: Elastomeric, medium-modulus, neutral-curing silicone joint sealant compatible with joint substrates formed by gypsum sheathing and other materials, recommended by sheathing manufacturer for application indicated and complying with requirements for elastomeric sealants specified in Section 079200 "Joint Sealants."

2.8 MISCELLANEOUS MATERIALS

A. Adhesives for Field Gluing Panels to Framing: Formulation complying with APA AFG-01 or ASTM D 3498 that is approved for use with type of construction panel indicated by manufacturers of both adhesives and panels.

1. Adhesives shall have a VOC content of 70 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement. Arrange joints so that pieces do not span between fewer than three support members.

B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.

C. Securely attach to substrate by fastening as indicated, 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."

D. Use common wire nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections. Install fasteners without splitting wood.

E. Coordinate wall and roof sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.

F. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.

G. Coordinate sheathing installation with installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast.

3.2 GYPSUM SHEATHING INSTALLATION

A. Comply with GA-253 and with manufacturer's written instructions.

1. Fasten gypsum sheathing to cold-formed metal framing with screws.
2. Install boards with a 3/8-inch (9.5-mm) gap where non-load-bearing construction abuts structural elements.
3. Install boards with a 1/4-inch (6.4-mm) gap where they abut masonry or similar materials that might retain moisture, to prevent wicking.

B. Apply fasteners so heads bear tightly against face of sheathing, but do not cut into facing.

C. Horizontal Installation: Install sheathing with V-grooved edge down and tongue edge up. Interlock tongue with groove to bring long edges in contact with edges of adjacent boards without forcing. Abut ends of boards over centers of studs, and stagger end joints of adjacent boards not less than one stud spacing. Attach boards at perimeter and within field of board to each steel stud.

1. Space fasteners approximately 8 inches (200 mm) o.c. and set back a minimum of 3/8 inch (9.5 mm) from edges and ends of boards.

D. Vertical Installation: Install board vertical edges centered over studs. Abut ends and edges of each board with those of adjacent boards. Attach boards at perimeter and within field of board to each stud.

1. Space fasteners approximately 8 inches (200 mm) o.c. and set back a minimum of 3/8 inch (9.5 mm) from edges and ends of boards.

E. Seal sheathing joints according to sheathing manufacturer's written instructions.

1. Apply elastomeric sealant to joints and fasteners and trowel flat. Apply sufficient amount of sealant to completely cover joints and fasteners after troweling. Seal other penetrations and openings.
2. Apply glass-fiber sheathing tape to glass-mat gypsum sheathing joints and apply and trowel silicone emulsion sealant to embed entire face of tape in sealant. Apply sealant to exposed fasteners with a trowel so fasteners are completely covered. Seal other penetrations and openings.

3.3 WASTE MANAGEMENT

A. Coordinate with Section 01 74 19.
1. Separate and recycle cut-offs and waste materials and material packaging in accordance with Waste Management Plan and to the maximum extent economically feasible and place in designated areas for recycling.
2. Set aside and protect materials suitable for reuse and/or remanufacturing.
3. Separate and fold up metal banding; flatten and place along with other metal scrap for recycling in designated area.

END OF SECTION 06 16 00

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SECTION 06 40 23 - INTERIOR ARCHITECTURAL WOODWORK

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. A. This Section includes the following:
   1. Custom built wood cabinets (casework).
   2. Custom built plastic-laminate-covered cabinets (plastic-covered casework).
   3. Plastic laminate countertops.

B. Related Sections: The following Sections contain requirements that relate to this Section:
   1. Division 6 Section "Rough Carpentry" for exposed framing and for furring, blocking, shims, and miscellaneous concealed interior woodwork.
   2. Division 6 Section "Finish Carpentry" for interior carpentry exposed to view that is not specified in this Section.
   3. Division 9 Section "Painting" for field finishing of installed interior architectural woodwork.
   4. Division 12 Section “Special Casework and Laboratory Equipment” for special casework and epoxy resin countertops. (NOT USED)

1.3 DEFINITIONS

A. Interior architectural woodwork includes wood furring, blocking, shims, and hanging strips for installing woodwork items unless concealed within other construction prior to woodwork installation.

1.4 SUBMITTALS

A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

B. Product data for each type of product and process specified and incorporated into items of architectural woodwork during fabrication, finishing, and installation.

C. Shop drawings showing location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.
   1. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcing specified in other Sections.
   2. Show locations and sizes of cutouts and holes for plumbing fixtures, faucets, soap dispensers, and other items installed in architectural woodwork.

D. Samples for initial selection of the following in the form of manufacturer's color charts consisting of actual units or sections of units showing the full range of colors, textures, and patterns available for each type of material indicated.
   1. Shop-applied transparent finishes.
   2. Plastic laminates.

E. Samples for verification of the following:
   1. Lumber with transparent finish, 50 sq. in., for each species and cut, finished on one side and one edge.
   2. Laminate-clad panel products, 8 by 10 inches, for each type, color, pattern, and surface finish, with separate samples of unfaced panel product used for core.
   3. Solid laboratory countertop materials, 6 inches square.
   4. Exposed cabinet hardware, one unit for each type and finish.

F. Product certificates signed by woodwork fabricator certifying that products comply with specified requirements.

G. Qualification data for firms and persons specified in the "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.

1.5 QUALITY ASSURANCE

A. Fabricator Qualifications: Firm experienced in producing architectural woodwork similar to that indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units without delaying the Work.

B. Installer Qualifications: Arrange for interior architectural woodwork installation by a firm that can demonstrate successful experience in installing architectural woodwork items similar in type and quality to those required for this Project.

C. Quality Standard: Except as otherwise indicated, comply with the following standard:
   1. AWI Quality Standard: "Architectural Woodwork Quality Standards" of the Architectural Woodwork Institute for grades of interior architectural woodwork, construction, finishes, and other requirements.

      a. Provide AWI Certification Labels or Certificates of Compliance indicating that woodwork meets requirements of grades specified.
   2. The Contract Documents contain selections chosen from options in the Quality Standard as well as additional requirements beyond those of the Quality Standard. Comply with such selections and requirements in addition to the Quality Standard.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Protect woodwork during transit, delivery, storage, and handling to prevent damage, soilage, and deterioration.

B. Do not deliver woodwork until painting and similar operations that could damage, soil, or deteriorate woodwork have been completed in installation areas. If woodwork must be stored in other than installation areas, store only in areas whose environmental conditions meet requirements specified in "Project Conditions."

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install woodwork until building is enclosed, wet-work is completed, and HVAC system is operating and will maintain temperature and relative humidity at occupancy levels during the remainder of the construction period.

B. Field Measurements: Where woodwork is indicated to be fitted to other construction, check actual dimensions of other construction by accurate field measurements before fabrication, and show recorded measurements on final shop drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
   1. Verify locations of concealed framing, blocking, reinforcements, and furring that support woodwork by accurate field measurements before being enclosed. Record measurements on final shop drawings.
   2. Where field measurements cannot be made without delaying the Work, guarantee dimensions and proceed with fabricating woodwork without field measurements. Provide allowance for trimming at site and coordinate construction to ensure that actual dimensions correspond to guaranteed dimensions.

1.8 COORDINATION

A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that interior architectural woodwork can be supported and installed as indicated.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Provide materials that comply with requirements of the AWI quality standard for each type of woodwork and quality grade indicated and, where the following products are part of interior woodwork, with requirements of the referenced product standards that apply to product characteristics indicated:

B. Lumber: DOC PS 20 and the following grading rules:
   1. NeLMA: Northeastern Lumber Manufacturers' Association, "Standard Grading Rules for Northeastern Lumber."
   2. NLGA: National Lumber Grades Authority, "Standard Grading Rules for Canadian Lumber."

C. Factory mark each piece of lumber with grade stamp of inspection agency indicating grade, species, moisture content at time of surfacing, and mill.
   1. For exposed lumber, mark grade stamp on end or back of each piece, or omit grade stamp and provide certificates of grade compliance issued by inspection agency.

D. Hardboard: AHA A135.4.

E. MDF: ANSI A208.2, Grade 130 made with binder containing no urea-formaldehyde resin.

F. Particleboard: ANSI A208.1, Grade M-2, made with binder containing no urea-formaldehyde resin.

G. Melamine-Faced Particleboard: Particleboard complying with ANSI A208.1, Grade M-2, finished on both faces with thermally fused, melamine-impregnated decorative paper and complying with requirements of NEMA LD3, Grade VGL, for test methods 3.3, 3.4, 3.6, 3.8, and 3.10.
   1. Color: White.

H. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated, or if not indicated, as required by woodwork quality standard.
   1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering high-pressure decorative laminates that may be incorporated in the Work include, but are not limited to, the following:
      a. Wilsonart
      b. Formica Corporation.
      c. Laminart.
      d. Nevamar Corp.
      e. Pioneer Plastics Corp.
      f. Westinghouse Electric Corp.; Specialty Products Div.
      g. Ralph Wilson Plastics Co.

I. Adhesive for Bonding Plastic Laminate: Contact cement.

J. Adhesive for Bonding Plastic Laminate: Aliphatic resin.

2.2 CABINET HARDWARE AND ACCESSORY MATERIALS

A. General: Manufacturer's standard units complying with ANSI A156.9, of type, material, size, and finish as selected from manufacturer's standard choices.
   1. Exposed Hardware Finishes: For exposed hardware, provide manufacturer’s standard satin finished or brushed aluminum.

B. Hardware Standard: Comply with BHMA A156.9 for items indicated by reference to BHMA numbers or referenced to this standard.

C. For concealed hardware provide manufacturer's standard finish that complies with product class requirements of BHMA A156.9.

D. Clear, Tempered Float Glass for Doors: ASTM C 1048, Kind FT, Condition A, Type I, Class 1, Quality q3; manufactured by horizontal (roller hearth) process, with exposed edges seamed before tempering, 6 mm thick, unless otherwise indicated.

E. Clear, Tempered Float Glass for Shelves: ASTM C 1048, Kind FT, Condition A, Type I, Class 1, Quality q3; with exposed edges seamed before tempering, 6 mm thick, unless otherwise indicated.

2.3 INSTALLATION MATERIALS

A. Furring, Blocking, Shims, and Hanging Strips: Softwood or hardwood lumber, kiln dried to less than 15 percent moisture content.

B. Screws: Select material, type, size, and finish required for each use. Comply with ASME B18.6.1 for applicable requirements.

   1. For metal framing supports, provide screws as recommended by metal-framing manufacturer.

C. Nails: Select material, type, size, and finish required for each use. Comply with FS FF-N-105 for applicable requirements.

D. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide nonferrous metal or hot-dip galvanized anchors and inserts on inside face of exterior walls and elsewhere as required for corrosion resistance. Provide toothed steel or lead expansion bolt devices for drilled-in-place anchors.

2.4 FABRICATION, GENERAL

A. Interior Woodwork Grade: Provide interior woodwork complying with the referenced quality standard and of the following grade:
1. Grade: Custom.

B. Wood Moisture Content: Comply with requirements of referenced quality standard for wood moisture content in relation to relative humidity conditions existing during time of fabrication and in installation areas.

C. Fabricate woodwork to dimensions, profiles, and details indicated. Ease edges to radius indicated for the following:

1. Corners of cabinets and edges of solid-wood (lumber) members 3/4 inch thick or less: 1/16 inch.
2. Edges of rails and similar members more than 3/4 inch thick: 1/8 inch.
3. Corners of cabinets and edges of solid-wood (lumber) members and rails: 1/16 inch.

D. Complete fabrication, including assembly, finishing, and hardware application, before shipment to Project site to maximum extent possible. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.

E. Shop-cut openings, to maximum extent possible, to receive hardware, appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Smooth edges of cutouts and, where located in countertops and similar exposures, seal edges with a water-resistant coating.

F. Install glass to comply with applicable requirements of Division 8 Section "Glazing" and of FGMA "Glazing Manual." For glass in wood frames, secure glass with removable stops.

2.5 WOOD CABINETS (CASEWORK) WITH TRANSPARENT FINISH

A. Quality Standard: Comply with AWI Section 400 requirements for wood cabinets. Joints of cabinets shall be multiple doweled, glued and screwed, with full frame top and solid bottom.

1. Grade: Custom.

B. AWI Type of Cabinet Construction: Reveal overlay.

C. Wood Species for Exposed Surfaces: Red oak, rift sawn/cut, unless noted otherwise.
1. Matching of Veneer Leaves: Slip match.
2. Veneer Matching Within Panel Face: Balance match.

D. Semiexposed Surfaces: Provide surface materials indicated below:

1. Surfaces Other than Drawer Bodies: Match species and cut indicated for exposed surfaces.
2. Drawer Sides and Backs: Solid hardwood lumber, same species indicated for exposed surfaces, shop finished.
3. Drawer Bottoms: ¼ inch tempered hardboard.

2.6 PLASTIC LAMINATE FACE CASEWORK

A. Face Style: Reveal overlay.

B. Face Frame: 1-by-1-5/8-inch solid wood frame rails and stiles with glued mortise and tenon joints.

C. Concealed Surfaces: Sound and dry solid wood, plywood, or particleboard without defects affecting strength, utility, or stability.

D. Sides, Dividers, Tops, Bottoms, Shelves, and Stretchers: Plastic laminate GP 28 on 1/2-inch-thick particleboard. Provide stretchers for top of base cabinet.

E. Back Panels: 1/4-inch-thick hardboard with thermoset decorative panels on interior surfaces fastened to rear edge of end panels and to top and bottom rails.

F. Exposed Edge Treatment: Edge doors and drawer fronts with 3mm PVC edge banding. Color and finish to match plastic laminate of exposed faces.

G. Semi-Exposed Edge Treatment: Edge top of drawer body with high-impact plastic tee edging. Edge remaining casework surfaces with plastic laminate GP 28 matching adjoining plastic laminate in color, pattern, and finish.

H. Doors, Drawer Fronts, Fixed Panels, Toeboards, and Ends: Plastic laminate meeting NEMA GP 28 standard for vertical grade on 3/4-inch-thick particleboard.

I. Drawers: Fabricate with front, bottom, and back rabbeted in sides and secured with glue and mechanical fasteners as follows:
1. Subfronts, Sides, and Backs: 1/2-inch-thick particleboard.
2. Bottoms: Not less than 1/2-inch-thick particleboard.
3. Drawer Suspension: Provide for a minimum capacity of 75 lbf, with twin-track, side-mounted, drawer-glide suspension with nylon rollers. Provide self-closing feature and positive stop.

J. Joinery: Rabbet backs flush into end panels and secure with concealed mechanical fasteners. Connect tops and bottoms of wall cabinets and bottoms and stretchers of base cabinets to ends and dividers with mechanical fasteners. Rabbet tops, bottoms, and backs into end panels.

2.7 COUNTERTOPS, PLASTIC LAMINATE

A. General: Comply with ANSI A161.2.

1. Solid color plastic laminate.

B. Plastic Laminate Substrate: Comply with ASTM D 1037.

1. Particleboard: Comply with ANSI A208.1, 45-lb/cu. ft. density, not less than 3/4 inch thick.
2. Medium-Density Fiberboard: Comply with ANSI A208.2, not less than 3/4 inch thick.

C. Plastic Laminate Substrate for Countertop with Sink: Exterior grade plywood or phenolic resin particleboard complying with ASTM D 1037.

D. Backer Sheet: Provide BK 20 backer sheet wherever the unsupported countertop area exceeds 4 sq. ft. and substrate is 3/4 inch thick; 6 sq. ft. and substrate is 1 inch thick; 8 sq. ft. and substrate is 1-1/8 inch or thicker.

E. Countertop, Backsplash, and Endsplash Plastic Laminate: NEMA GP 50 standard.

F. Configuration: Provide countertops with the following front style, cove, and backsplash style:

1. Front Style: Self-edge.
2. Cove: Applied.
3. Backsplash and Endsplash Style: Square edge without scribe.

2.8 SHOP FINISHING OF WOOD CABINETS FOR TRANSPARENT FINISH

A. Quality Standard: Comply with AWI Section 1500, unless otherwise indicated.

1. Grade: Provide finishes of same grades as items to be finished.

B. General: The entire finish of wood cabinets is specified in this Section, regardless of whether shop applied or applied after installation.
1. Shop Finishing: To the greatest extent possible, finish cabinets at the fabrication shop. Defer only final touch up, cleaning, and polishing until after installation.

C. Preparations for Finishing: Comply with referenced quality standard for sanding, filling countersunk fasteners, sealing concealed surfaces, and similar preparations for finishing architectural woodwork, as applicable to each unit of work.

1. Backpriming: Apply one coat of sealer or primer compatible with finish coats to concealed surfaces of woodwork, including backs of trim, cabinets, paneling, and ornamental work and the underside of countertops. Apply 2 coats to back of paneling. Concealed surfaces of plastic laminate-clad woodwork do not require backpriming when surfaced with plastic laminate or thermoset decorative overlay.

D. Open Finish for Open-Grain Woods: Do not apply filler to open-grain woods.

E. Transparent Finish: Comply with requirements indicated below for grade, finish system, staining, and sheen, with sheen measured on 60-degree gloss meter per ASTM D 523.

1. Grade: Custom.
2. AWI Finish System TR-4: Conversion varnish.
3. Staining: None required.
4. Sheen: Semigloss 55-75 gloss units.

PART 3 - EXECUTION

3.1 PREPARATION

A. Condition woodwork to average prevailing humidity conditions in installation areas before installing.

B. Before installing architectural woodwork, examine shop-fabricated work for completion and complete work as required, including back priming and removal of packing.

3.2 INSTALLATION

A. Quality Standard: Install woodwork to comply with AWI Section 1700 for the same grade specified in Part 2 of this Section for type of woodwork involved.

B. Install woodwork plumb, level, true, and straight with no distortions. Shim as required with concealed shims. Install to a tolerance of 1/8 inch in 96 inches

C. Scribe and cut woodwork to fit adjoining work and refinish cut surfaces or repair damaged finish at cuts.

D. Anchor woodwork to anchors or blocking built in or directly attached to substrates. Secure to grounds, stripping and blocking with countersunk, concealed fasteners and blind nailing as required for complete installation. Use fine finishing nails for exposed nailing, countersunk and filled flush with woodwork and matching final finish where transparent finish is indicated.

E. Cabinets: Install without distortion so that doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete the installation of hardware and accessory items as indicated.
   1. Install cabinets with no more than 1/8 inch in 96-inch sag, bow, or other variation from a straight line.
   2. Maintain veneer sequence matching of cabinets with transparent finish.

F. Tops: Anchor securely to base units and other support systems as indicated. Calk space between backsplash and wall with specified sealant.
   1. Install countertops with no more than 1/8 inch in 96-inch sag, bow, or other variation from a straight line.

G. Complete the finishing work specified in this Section to the extent not completed at shop or before installation of woodwork. Fill nail holes with matching filler where exposed. Apply specified finish coats, including stains and paste fillers if any, to exposed surfaces where only sealer/prime coats were applied in the shop.

H. Refer to Division 9 Sections for final finishing of installed architectural woodwork.

3.3 ADJUSTING AND CLEANING

A. Repair damaged and defective woodwork where possible to eliminate functional and visual defects; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.

B. Clean, lubricate, and adjust hardware.

C. Clean woodwork on exposed and semiexposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

3.4 PROTECTION

A. Provide final protection and maintain conditions in a manner acceptable to fabricator and Installer that ensures that woodwork is without damage or deterioration at the time of Substantial Completion.

3.5 WASTE MANAGEMENT

A. Coordinate with Division 01.
   1. Separate and recycle cut-offs and waste materials and material packaging in accordance with Waste Management Plan and to the maximum extent economically feasible and place in designated areas for recycling.
   2. Set aside and protect materials suitable for reuse and/or remanufacturing.
   3. Separate and fold up metal banding; flatten and place along with other metal scrap for recycling in designated area.

3.6 CABINET HARDWARE AND ACCESSORY SCHEDULE

A. BHMA numbers are used below to designate hardware requirements, except as otherwise indicated.

B. Butt Hinges: 2-3/4-inch, 5-knuckle steel hinges made from 0.095-inch-thick metal, and as follows:
   1. Semiconcealed Hinges for Overlay Doors: B01521.
   2. Rockford Process Control- #IH-375-26D
   3. Dull Chrome

C. Pulls: Contemporary Aluminum Edge Pull.
   1. Richelieu Hardware-Contemporary Edge Pull, 9595 -7 9/16”
   2. Stainless steel

D. Catches: As follows:
   1. Magnetic Catches: B03141.
   2. Push-in Magnetic Catches: B03131.
   3. Friction Catches: B03033.
   4. Ball Friction Catches: B03013.

E. Adjustable Shelf Standards: B04071.
   1. Shelf Rests for Standards: B04081.
   2. KV or equal -Heavy-duty stainless-steel single slotted adjustable shelf brackets and fasteners and shelf rests

F. Drawer Suspension: Epoxy coated self-closing drawer slides with nylon rollers, 2 stage positive stops, and rated for the following loads:
   1. Drawer Slides: 75 lbf.
   2. Self-closing

G. Door Locks: E07121. (ALL DOORS)

H. Drawer Locks: E07041. (ALL DRAWERS)

END OF SECTION 06 40 23

SECTION 07 13 26 SELF-ADHERING SHEET WATERPROOFING

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. The work performed under this Section includes the performance criteria, materials, production, and erection of Self-Adhering Sheet Waterproofing for the project and consists of the provision of all plant, materials, labor and equipment and the like necessary and/or required for the complete execution of all Self-Adhering Sheet Waterproofing as required by schedules, keynotes and drawings, as specified herein, and as may be required by conditions and authorities having jurisdiction including, but not limited to the following:

1. Modified bituminous sheet (below grade at outside face of foundations walls),
2. Bonded HDPE sheet for vertical applications.
3. Synthetic plastic hydrophilic expanding concrete water-stop.

B. Related Requirements:
1. Division 03 Concrete
2. Division 04 Masonry
3. Division 07 Thermal and Moisture Protection
4. Division 08 Openings

1.3 PREINSTALLATION MEETINGS

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

1. Review weather barrier requirements including surface preparation, substrate condition and pretreatment, minimum curing period, forecasted weather conditions, special details and sheet flashings, installation procedures, testing and inspection procedures, and protection and repairs.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, and tested physical and performance properties.
2. Include manufacturer's written instructions for evaluating, preparing, and treating substrate.

B. Shop Drawings: Show locations and extent of sheet waterproofing and details of substrate joints and cracks, sheet flashings, penetrations, inside and outside corners, tie-ins with adjoining waterproofing, and other termination conditions.

C. Samples: For each exposed product and for each color and texture specified, including the following products:

1. Mockup for each type of sheet waterproofing.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Field quality-control reports.

C. Sample Warranties: For special warranties.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by waterproofing manufacturer.

B. Mockups: Build mockups to verify selections made under Sample submittals and to set quality standards for installation.

1. Build for each typical waterproofing installation including accessories to demonstrate surface preparation, crack and joint treatment, corner treatment, and protection.
2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 FIELD CONDITIONS

A. Environmental Limitations: Apply waterproofing within the range of ambient and substrate temperatures recommended by waterproofing manufacturer. Do not apply waterproofing to a damp or wet substrate.

1. Do not apply waterproofing in snow, rain, fog, or mist.

B. Maintain adequate ventilation during preparation and application of waterproofing materials.

1.8 WARRANTY

A. Manufacturer's Warranty: Manufacturer's standard materials-only warranty in which manufacturer agrees to furnish replacement waterproofing material for waterproofing that does not comply with requirements or that fails to remain watertight within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Source Limitations for Waterproofing System: Obtain waterproofing materials an protection course, and molded-sheet drainage panels from single source from single manufacturer.

2.2 MANUFACTURERS

A. Basis of Design: CCW MiraDRI 860/861 Sheet Membrane Waterproofing as manufactured by Carlisle Coatings and Waterproofing Incorporated, 900 Hensley Lane, Wylie, Texas 75098, Phone: (800) 527-7092 Fax: (972) 442-0076.

B. Other products, as approved by Architect

1. CETCO Building Materials Group, a subsidiary of AMCOL International Corp;

2. Envirosheet., Meadows, W.R.,Inc; SealTight Mel-Rol.

2.3 PRODUCTS

A. Self-Adhesive Sheet Membrane Waterproofing: Shall be CCW MiraDRI 860/861consisting of a 56 mil rubberized asphalt membrane laminated to 4 mil cross-laminated polyethylene film, and shall meet or exceed the following requirements:

1. Tensile Strength: 325 psi minimum, ASTM D 412
2. Ultimate Elongation: 350% minimum, ASTM D 412
3. Puncture Resistance: 60 lbs. minimum, ASTM E 154
4. Permeance: 0.05 Perm maximum, ASTM E 96 (B)
5. Low Temperature Flexibility: Unaffected at -45^{O}F, ASTM D 1970, 1" mandrel
6. Tensile to Film: 5000 psi, ASTM D 882
7. Thickness: 60 mils, ASTM D 3767
8. Hydrostatic Head: 230 ft., ASTM D 751
9. Water Absorption: 0.1% by wt., ASTM D 570

B. For application temperatures between 25 and 65^{O}F, use CCW-861 Sheet Membrane and CCW-
702. For application temperatures above 40°F use CCW MiraDRI 860 sheet membrane and
CCW-702, CCW-714 primer, or CCW-AWP.

2.4 ACCESSORY PRODUCTS

A. Surface Primer: Shall be CCW-702LV Solvent-Based Contact Adhesive, 702WB or Cav-Grip. B.

B. Mastic: Shall be CCW-704 Mastic.

C. Sealants: Shall be CCW-703 Vertical Grade Liquiseal^{7} Membrane, one component approved sealant by CCW, CCW-201 two-component Polyurethane Sealant or CCW LM-800XL

D. Backing Rod: Shall be closed-cell polyethylene foam rod.

E. Protection Course: Shall be CCW Protection Board-H or CCW 300H for horizontal surfaces or CCW Protection Board-V or CCW 200V for vertical surfaces.

F. Drainage Composite: Shall be CCW MiraDRAIN 6200 as recommended by the manufacturer for each condition.

G. Perimeter Drainage System: Where required shall be CCW QuickDRAIN™.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Before any waterproofing work is started the waterproofing applicator shall thoroughly examine all surfaces for any deficiencies. Should any deficiencies exist, the architect, owner, or general contractor shall be notified in writing and corrections made.

B. Condition of Concrete Surfaces:
1. The concrete surfaces shall be of sound structural grade and shall have a smooth finish, free of fins, ridges, protrusions, rough spalled areas, loose aggregate, exposed course aggregate, voids or entrained air holes. Rough surfaces shall receive a well-adhered parget coat.
2. Concrete shall be cured by water curing method. Any curing compounds must be of the pure sodium silicate type and be approved by the Carlisle representative.
3. Concrete shall be cured at least 7 days and shall be sloped for proper drainage.
4. Voids, rock pockets and excessively rough surfaces shall be repaired with approved non- shrink grout or ground to match the unrepaired areas.
5. Two-stage drains shall have a minimum 3 inch flange and be installed with the flange flush and level with the concrete surface.
6. Surfaces at cold joints shall be on the same plane.

3.2 SURFACE PREPARATION

A. Clean, prepare, and treat substrates according to manufacturer's written instructions. Provide clean, dust-free, and dry substrates for waterproofing application. The concrete surface must be thoroughly clean, dry and free from any surface contaminates or cleaning residue that may harmfully affect the adhesion of the membrane.

B. Install a 3/4" face, 45 degree cant of CCW-201 Polyurethane Sealant or CCW LM-800XL at all angle changes and inside corners including penetrations through the deck, walls, curbs, etc.

C. All cracks over 1/16" in width and all moving cracks under 1/16" in width shall be routed out to 1/4" minimum in width and depth and filled flush with an approved sealant by CCW or CCW-201 polyurethane sealant.

D. All expansion joints less than 1" wide shall be cleaned, primed, fitted with a backing rod and caulked with CCW-201 Polyurethane Sealant. For larger joints, contact Carlisle representative.

E. Allow all sealant to cure at least overnight.

F. Stir Primer. Apply a thin film of primer 10" wide, centered over sealed cracks and joints, hairline cracks, and cold joints. Apply primer 8" on each side of all corners. Prime concrete around drain flanges. Allow primer to dry per manufacturer=s recommendations.

G. Install an 8" wide strip of CCW MiraDRI 860/861centered over joints and cracks. Install a 12" wide strip of CCW MiraDRI 860/861centered over the axis of all corners.

H. Terminate membrane around drains per CCW MiraDRI 860 series details. Terminate the membrane under the clamping ring. Seal all edges with CCW-704 Mastic. Do not interfere with weep holes.

3.3 MODIFIED BITUMINOUS SHEET-WATERPROOFING APPLICATION

A. Priming: Clean surfaces to remove residual dust before priming. Stir primer. Apply by spray or roller at a rate recommended by manufacturer. Allow to dry per manufacturer=s recommendation.

B. Horizontal surfaces: Install sheet membrane from low to high point, so that laps will shed water. Overlap edge seams 2½”, end laps 5". Stagger end seams. Roll in place with an 18 to 24" wide, 100 lb. (min.) resilient roller. Ensure that all laps are firmly adhered and that there are no gaps or fishmouths.

C. Vertical Surfaces: Apply in lengths of 8' or less. Overlap edge seams 2½”. On walls over 8' high, apply in 8' sections, starting at the lowest point with the higher section overlapping the lower section 5". Roll in place using firm pressure with a hand roller.

D. Terminations: Consult Carlisle 860-9 Details for proper terminations. Roll terminating edges firmly. Apply CCW-704 mastic to all terminations and >T= joints. Apply CCW-704 Mastic or CCW-703-V Liquiseal to laps at angle changes, extending 9" in each direction.

3.4 INTEGRITY TESTING

A. Test is required for all expanded warranties beyond the standard material warranty of horizontal applications.

B. The test can be done with Electronic Vector Mapping or flood testing. Flood testing requires 2” minimum head of water for a period of 24 hours

3.5 PROTECTION COURSE

A. VERTICAL APPLICATION: Install CCW QuickDRAIN Perimeter Drainage System as the first course of drainage composite immediately after membrane has been installed on vertical surfaces. Install CCW MiraDRAIN Drainage Composite (consult CCW for recommendation), CCW Protection Board-V Protection Course or CCW 200V on remainder. Stop drainage composite 6" below final grade level.

B. HORIZONTAL APPLICATION: Install CCW MiraDRAIN Drainage Composite (consult CCW for recommendation) or CCW Protection Board-H Protection Course or CCW 300HV immediately after flood testing on horizontal surfaces. If flood testing is delayed, install a temporary covering to protect the CCW MiraDRI 860/861membrane from damage by other trades.

3.6 PROTECTION, REPAIR, AND CLEANING

A. Do not permit foot or vehicular traffic on unprotected membrane.

B. Protect waterproofing from damage and wear during remainder of construction period from damage due to UV light, harmful weather exposures, physical abuse, and other causes. Provide temporary coverings where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

C. Correct deficiencies in or remove waterproofing that does not comply with requirements; repair substrates, reapply waterproofing, and repair sheet flashings.

D. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

3.7 WASTE MANAGEMENT

A. Coordinate with Section 01 74 19.

1. Separate and recycle cut-offs and waste materials and material packaging in accordance with Waste Management Plan and to the maximum extent economically feasible and place in designated areas for recycling.
2. Set aside and protect materials suitable for reuse and/or remanufacturing.
3. Separate and fold up metal banding; flatten and place along with other metal scrap for recycling in designated area.

END OF SECTION 07 13 26

SECTION 07 21 00 - THERMAL INSULATION

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. This section includes the performance criteria, materials, production, and erection of Thermal Insulation for the project. The work performed under this Section consists of the provision of all plant, materials, labor and equipment and the like necessary and/or required for the complete execution of all Thermal Insulation as required by the this section, schedules, keynotes and drawings including, but not limited to the following:

1. Foam-plastic board insulation.
2. Mineral-wool blanket insulation.
3. Glass fiber blanket insulation.
4. Sprayed polyurethane foam insulation

B. Related Requirements:

1. Division 04 “Masonry”
2. Division 07 “Thermal and Moisture Protection”
3. Division 09 “Finishes”

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

1.4 INFORMATIONAL SUBMITTALS

A. Product test reports.

B. Research/evaluation reports.

PART 2 - PRODUCTS

2.1 MATERIAL, GENERAL

A. Source Limitations: Obtain insulation materials from single source from single manufacturer.

B. Must meet NYS Energy Code requirements.

2.2 FOAM-PLASTIC BOARD INSULATION – ABOVE GRADE

A. **FOR USE ON ABOVE GRADE CAVITY WALLS**: Exterior Insulation: Glass-fiber-reinforced enhanced polyisocyanurate foam core sheathing faced with nominal 4 mil embossed blue acrylic-coated aluminum on one side and 1.25 mil embossed aluminum on the other side, complying with ASTM C1289 and meeting the following physical properties:
1. ASTM C1289 Type 1, Class 2
2. Compressive Strength (ASTM D1621): 25 psi, minimum.
3. Aged Thermal Resistance (ASTM C518, measured at Mean Temp of 75F): [R-6.5 at 1 inch] [RSI 1.06 per 25 mm] of thickness [with 15 year thermal warranty]
4. Flexural Strength (ASTM C203): Minimum 55 psi.
5. Water Absorption (ASTM C209): Maximum.0.1 percent by volume.
6. Water Vapor Permeance (ASTM E96): <0.03 perms.
7. Maximum Use Temperature: 250 degrees F.
8. Panel Size: 4'-0" wide x 8'-0" long, square edge, shiplap
9. Thickness and Stabilized R-Value: Nominal 2 inch thickness, R-13.0
10. Wall assembly must comply with NFPA 285 - 2012

B. Manufacturers subject to compliance with requirements, provide products by one of the following:
1. Basis of Design: Dow Chemical Company "THERMAX ci Exterior Insulation.
2. Other comparable products as approved by Architect

C. Accessories:
1. Fasteners: Provide insulated sheathing manufacturer's recommended polymer or other corrosion protective coated steel screw fasteners for anchoring sheathing to metal wall framing. Fastener length and size based on wall sheathing thickness.
a. Basis of Design: Rodenhouse, Inc. 2 inch diameter "Thermal-Grip" CI prong washer with "Grip-Deck" ceramic- coated, self-drilling screw.
b.Use the Grip-Lok auto-feed fastening system for high speed application

D. Flashing: Provide insulation manufacturer's recommended board treatment for sealing joints, seams, and veneer tie penetrations through the insulation layer.
a. Acceptable Products:
1) Dow Chemical Company LIQUIDARMOR-CM commercial liquid flashing and sealant.
2) Dow Chemical Company "WEATHERMATE Straight Flashing 4 inch"width with butyl rubber adhesive

E. Wall Opening Flashing: Provide insulated sheathing manufacturer's recommended flashing sealing window and door wall openings.
a. Acceptable Products:
1) Dow Chemical Company LIQUIDARMOR-CM commercial liquid flashing and sealant
2) Dow Chemical Company "WEATHERMATE Straight Flashing 6 inch and 9 inch", with butyl rubber adhesive, at straight opening heads, jambs and sills
3) When greater widths are required for through wall flashings butyl rubber adhesive is recommended.

F. Penetration Filler: Provide insulated sheathing manufacturer's recommended polyurethane foam for sealing penetrations of insulated sheathing.
a. Acceptable Products:
1) Dow Chemical Company "GREAT STUFF PRO Gaps & Cracks" single Component polyurethane insulating foam sealant.
2) Dow Chemical Company "GREAT STUFF PRO Window & Door" single-component polyurethane low-pressure foam sealant

G. Gap Air Infiltration Filler: Two Component, Quick Cure Polyurethane Foam:
1. Acceptable Products:
a) Dow Chemical Company FROTH-PAK Foam Insulation two component, quick-cure polyurethane foam
i) NFPA 286 Approval for Exposed use to the interior of the building without the need for a15-min thermal barrier
ii) ASTM E-84 Class A

H. Flexible polyethylene foam gasket strip to reduce air infiltration between a concrete foundation and sill plate.
a. Acceptable Products: The Dow Chemical Company "STYROFOAM Sill Seal Foam Gasket

2.3 FOAM -PLASTIC BOARD INSULATION – BELOW GRADE

A. **FOR USE BELOW GRADE AND UNDER SLAB:** Rigid closed-cell Extruded-Polystyrene Board Insulation for Perimeter Foundation Wall Installations

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Basis of Design: Dow Chemical Company Perimate Square Edge
   b. DiversiFoam Products.
   c. Owens Corning.
   d. Pactiv Building Products.
2. Wall assembly must comply with NFPA 285 - 2012.
3. ASTM C578-92 Type IV, 25 psi (ASTM D 1621-73)
4. Density 1.6 lb/cu. Ft. min
5. Thickness 2" unless otherwise indicated
6. UL classification: D369.
7. Thermal resistance: 5-year aged R-values of 5.4 and 5.0 min., $^{o}F\text{-}ft^2\text{-}h/Btu^2/inch$ at $40^{o}F$ and $75^{o}F$ respectively (ASTM C 518-91).
8. Water absorption: Max. 0.3% by volume (ASTM C 272-91).

2.4 MINERAL-WOOL BOARD INSULATION

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Fibrex Insulations Inc.
2. Isolatek International.
3. Owens Corning.
4. Roxul Inc.

5. Thermafiber.

B. Unfaced, Mineral-Wool Board Insulation (at cavity wall edge of slab, fire-safing conditions): ASTM C 612; with maximum flame-spread and smoke-developed indexes of 15 and zero, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.

C. Foil-faced, Mineral-Wool Board Insulation (at storefront wall edge of slab and spandrel panel locations): ASTM C612; faced on one side with foil-scrim or foil-scrim-polyethylene vapor retarder; with maximum flame-spread and smoke – developed indexes of 25 and 5, respectively, per ASTM E84.

2.5 GLASS-FIBER BLANKET INSULATION

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. CertainTeed Corporation.
2. Guardian Building Products, Inc.
3. Johns Manville.
4. Knauf Insulation.
5. Owens Corning.

B. Unfaced, Glass-Fiber Blanket Insulation: ASTM C 665, Type I; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.

2.6 MINERAL-WOOL BLANKET INSULATION

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Fibrex Insulations Inc.
2. Owens Corning.
3. Roxul Inc.
4. Thermafiber.

B. Unfaced, Mineral-Wool Blanket Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.

2.7 SPRAYED POLYURETHANE FOAM INSULATION

A. Spray Polyurethane Foam Installer shall be certified by spray foam manufacturer.

B. Pre-Installation Meeting to review spray polyurethane foam methods and procedures related to application, including manufacturer’s installation guidelines.

C. Mock-up illustrating typical conditions. Conduct the following tests on the mockup panel:
1. Core density

2. Adhesion between transition sheet membrane and substrate
3. Cohesion or adhesion between sprayed insulation and substrate

D. Ventilate area to receive insulation by introducing fresh air and exhausting air continuously during any 24 hours after application to maintain non-toxic, unpolluted, safe working condition.

E. Protect workers as recommended by insulation manufacturer.

F. Protect adjacent surfaces and equipment from damage by overspray, fall-out and dusting of insulation materials.

G. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Basis of Design: Dow Chemical Styrofoam Spray Polyurethane Foam Insulation (MX Series)
2. Certa Spray Closed Cell Foam Insulation by CertainTeed
3. Icynene ProSeal MD-C-200v3
4. Substitutions: Approved equal

H. Spray Polyurethane Foam: Two-component spray polyurethane cellular plastic foam, complying with the following methods and meeting the following physical properties:

1. Core Density (ASTM D1622): Minimum 2pcf
2. Thermal Resistance (ASTM C518): 140degreeF/90day Aged R-Value, measured at 75F mean Temp: Minimum R6.0/inch.
3. Flame Spread (ASTM E84, Class A): 25 or less.
4. Smoke Developed (ASTM E84, Class A): 450 or less.
5. Compressive Strength minimum (ASTM D1621, 10% parallel to rise): (20 psi)(182 kPa).
6. Closed Cell Content (ASTM D2856): minimum 95 percent.
7. Water Absorption by Volume maximum. (ASTM D2842): 2.5 percent.
8. Wall assembly must comply with NFPA 285 - 2012

I. For oily steel surface like Z-bar, roof deck, curtain wall pan, aluminum tube or PVC pipes cleaning, etching or a primer may be needed before spraying polyurethane foam. Water Vapor Permeability maximum. (ASTM E96): [2.5 perm-inches] [3.6 ng/(Pa.s.m)].

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Comply with insulation manufacturer's written instructions applicable to products and applications indicated.

B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.

C. Extend insulation to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

D. Provide sizes to fit applications indicated and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness.

3.2 INSTALLATION OF BELOW-GRADE INSULATION

A. On vertical surfaces, set insulation units using manufacturer's recommended adhesive according to manufacturer's written instructions.

1. If not otherwise indicated, extend insulation a minimum of 36 inches (915 mm**)** below exterior grade line.

B. On horizontal surfaces, loosely lay insulation units according to manufacturer's written instructions. Stagger end joints and tightly abut insulation units.

1. If not otherwise indicated, extend insulation a minimum of 36 inches (915 mm**)** in from exterior walls.

C. Cut insulation to fit snugly around pilasters, projections, curves and irregularities on the wall surface. Fill voids with insulation.

3.3 INSTALLATION OF CAVITY-WALL INSULATION

A. Foam-Plastic Board Insulation: Install 2” diameter daubs of adhesive spaced approximately 12 inches (610 mm) o.c. both ways on inside face, and as recommended by manufacturer. Fit courses of insulation between wall ties and other obstructions, with edges butted tightly in both directions. Press units firmly against inside substrates.

1. Supplement adhesive attachment of insulation by securing boards with two-piece wall ties designed for this purpose and specified in Section 042000 "Unit Masonry."

2. Wedge insulation from outside wythe of construction with small fragments of masonry materials spaced 24" o.c. both ways.

3. Make insulation continuous. Fill all voids

3.4 INSTALLATION OF INSULATION FOR FRAMED CONSTRUCTION

A. Apply insulation units to substrates by method indicated, complying with manufacturer's written instructions. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.

B. Foam-Plastic Board Insulation: Seal joints between units by applying adhesive, mastic, or sealant to edges of each unit to form a tight seal as units are shoved into place. Fill voids in completed installation with adhesive, mastic, or sealant as recommended by insulation manufacturer.

C. Glass-Fiber or Mineral-Wool Blanket Insulation: Install in cavities formed by framing members according to the following requirements:

1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
3. Maintain 3-inch (76-mm) clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.
4. For metal-framed wall cavities where cavity heights exceed 96 inches (2438 mm), support unfaced blankets mechanically and support faced blankets by taping flanges of insulation to flanges of metal studs.
5. Vapor-Retarder-Faced Blankets: Tape joints and ruptures in vapor-retarder facings, and seal each continuous area of insulation to ensure airtight installation.

    a. Exterior Walls: Set units with facing placed toward as indicated on Drawings.
    b. Interior Walls: Set units with facing placed as indicated on Drawings.

D. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation using the following materials:

1. Loose-Fill Insulation: Compact to approximately 40 percent of normal maximum volume equaling a density of approximately 2.5 lb/cu. ft. (40 kg/cu. m).
2. Spray Polyurethane Insulation: Apply according to manufacturer's written instructions.

3.5 INSTALLATION OF INSULATION FOR CONCRETE SUBSTRATES

A. Install board insulation on concrete substrates by adhesively attached, spindle-type insulation anchors as follows:

1. Fasten insulation anchors to concrete substrates with insulation anchor adhesive according to anchor manufacturer's written instructions. Space anchors according to insulation manufacturer's written instructions for insulation type, thickness, and application indicated.
2. Apply insulation standoffs to each spindle to create cavity width indicated between concrete substrate and insulation.
3. After adhesive has dried, install board insulation by pressing insulation into position over spindles and securing it tightly in place with insulation-retaining washers, taking care not to compress insulation below indicated thickness.
4. Where insulation will not be covered by other building materials, apply capped washers to tips of spindles.

3.6 INSTALLATION OF STOREFRONT-WALL INSULATION

A. Install board insulation in storefront-wall construction where indicated on Drawings according to curtain-wall manufacturer's written instructions.

1. Hold insulation in place by securing metal clips and straps or integral pockets within window frames, spaced at intervals recommended in writing by insulation manufacturer to

hold insulation securely in place without touching spandrel glass. Maintain cavity width of dimension indicated between insulation and glass.

2. Install insulation where it contacts perimeter fire-containment system to prevent insulation from bowing under pressure from perimeter fire-containment system.

3.7 INSTALLATION OF VAPOR RETARDERS

A. Place vapor retarders on side of construction indicated on Drawings. Extend vapor retarders to extremities of areas to protect from vapor transmission. Secure vapor retarders in place with adhesives or other anchorage system as indicated. Extend vapor retarders to cover miscellaneous voids in insulated substrates, including those filled with loose-fiber insulation.

B. Seal vertical joints in vapor retarders over framing by lapping no fewer than two studs.

1. Fasten vapor retarders to wood framing at top, end, and bottom edges; at perimeter of wall openings; and at lap joints. Space fasteners 16 inches (406 mm) o.c.
2. Before installing vapor retarders, apply urethane sealant to flanges of metal framing including runner tracks, metal studs, and framing around door and window openings. Seal overlapping joints in vapor retarders with vapor-retarder tape according to vapor-retarder manufacturer's written instructions. Seal butt joints with vapor-retarder tape. Locate all joints over framing members or other solid substrates.
3. Firmly attach vapor retarders to metal framing and solid substrates with vapor-retarder fasteners as recommended by vapor-retarder manufacturer.

C. Seal joints caused by pipes, conduits, electrical boxes, and similar items penetrating vapor retarders with vapor-retarder tape to create an airtight seal between penetrating objects and vapor retarders.

D. Repair tears or punctures in vapor retarders immediately before concealment by other work. Cover with vapor-retarder tape or another layer of vapor retarders.

3.8 INSTALLATION OF FOAM INSULATION

A. Verify existing conditions are ready to receive work.

B. Ensure surfaces are free of frost, oil, grease, oxidation, dirt, loose paint, loose scale, or other deleterious material that would impair bond.

C. Ensure that items required to penetrate sprayed insulation are installed prior to installation of sprayed insulation.

D. Clean area of work prior to application of sprayed insulation. Beginning of application implies acceptance of existing conditions.

E. Mask and cover adjacent areas to protect from overspray.

F. Apply any required primers for special conditions as recommended by manufacturer. Prepare surfaces within the exterior soffit at the pool to receive sprayed foam insulation where indicated.

G. Cover wide joints with transition sheet membrane as specified in Section 07 27 50.

H. Seal any voids between the existing precast concrete T's and adjoining building components.

I. Must be installed by manufacturer's Approved Applicator at time of bidding.

J. Apply SPF in accordance with ASTM C1029 and manufacturer's installation guidelines: complying with preparation methods.

K. Apply sprayed foam insulation in consecutive layers of not less than ½ inch and not more than 2 inch thick each to achieve total thickness required (total thickness as indicated per application) for a minimum R value of 25. For light gage steel and extruded polystyrene board first layer should be a skim coat of (12 mm) (½ inch) before adding extra layers. Ensure the substrate is well supported.

L. Avoid formation of sub-layer air pockets.

M. Apply product in overlapping layers, so as to obtain a smooth, uniform surface.

N. Maintain 3 inch clearance around chimneys, heating vents, steam pipes, recessed lighting fixtures and other heat sources.

O. Do not apply Product to inside of exit openings or electrical junction boxes.

P. Conduct field inspection and testing in accordance with manufacturers and general contractors instructions.

Q. Test completed application daily for core density and cohesion/adhesion to substrate. Record results daily in daily work records.

R. Site Tolerances: Maximum Variation in Applied Thickness: minus 1/4 inch, plus 5/8 inch.

S. Remove overspray from non-prescribed surfaces without causing damage to surfaces.

T. Remove protective covers from adjacent surfaces.

U. Protect completed installation from damage Repair as required.

V. Any open flame or welding shall not be in contact with the Spray Polyurethane Foam.

W. All plastic insulation must be protected from interior occupancy space by an approved thermal barrier to meet the requirements of local Building Codes.

3.9 WASTE MANAGEMENT

A. Coordinate with Section 01 74 19.
   1. Separate and recycle cut-offs and waste materials and material packaging in accordance with Waste Management Plan and to the maximum extent economically feasible and place in designated areas for recycling.
   2. Set aside and protect materials suitable for reuse and/or remanufacturing.
   3. Separate and fold up metal banding; flatten and place along with other metal scrap for recycling in designated area.

END OF SECTION 07 21 00

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SECTION 07 27 13 – FIRE RESISTANT, SELF-ADHERING MEMBRANE AIR & VAPOR BARRIERS

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 SECTION INCLUDES

A. A self-adhered membrane and accessory products of fire-resistant composition for use as an air and vapor barrier in exterior walls.

B. Materials and installation to bridge and seal the following air leakage pathways and gaps:
1. Connections of the walls to the roof air barrier
2. Connections of the walls to the foundations
3. Seismic and expansion joints
4. Openings and penetrations of window frames, door frames, store front, curtain wall
5. Barrier pre-cast concrete and other envelope systems
6. Door frames Piping, conduit, duct and similar penetrations
7. Masonry ties, screws, bolts and similar penetrations
8. All other air leakage pathways through the walls

1.3 RELATED SECTIONS

A. Section 03 30 00 Cast-in-place Concrete

B. Section 04 20 00 Unit Masonry

C. Section 07 21 00 Thermal Insulation

D. Section 07 53 23 EPDM Roofing

E. Section 07 921 00 Joint Sealants

F. Section 08 12 55 Fiberglass Reinforced Polyester Doors

G. Section 08 41 13 Aluminum Framed entrances and storefronts

H. Section 09 29 00 Gypsum Board

1.4 REFERENCES

A. American Association of Textile Chemists and Colorists (AATCC) Test Method 127. “Water Resistance – Hydrostatic Pressure Test”

B. American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Standard 90.1-2010 “Energy Standard for Buildings Except Low-Rise Residential Buildings”

C. ASTM C 920 Standard Specification for Elastomeric Joint Sealants

D. ASTM C 1305 Standard Test Method for Crack Bridging Ability of Liquid-Applied Waterproofing Membrane

E. ASTM D 882 Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers – Tension

F. ASTM D 1876 Standard Test Method for Peel Resistance of Adhesive

G. ASTM D 1970 Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep slope roofing Underlayment for Ice Dam Protection

H. ASTM D 4073 Standard Test Method for Tensile-Tear Strength of Bituminous Roofing Membranes

I. ASTM D 4541 Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers

J. ASTM E 84 Standard Test Method for Surface Burning Characteristics of Building Materials

K. ASTM E 96 Standard Test Methods for Water Vapor Transmission of Materials.

L. ASTM E 154 Standard Test Methods for Water Vapor Retarders used in Contact with Earth under Concrete Slabs, on Walls or as Ground Cover

M. ASTM E 783 Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors

N. ASTM E 1105 Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform or Cyclic Static Air Pressure Difference.

O. ASTM E 1354 Standard Test Method for Heat and Visible Smoke Release Rates for Materials and Products Using an Oxygen Consumption Calorimeter

P. ASTM E 2178 Standard Test Method for Air Permeance of Building Materials

Q. ASTM E 2357 Standard Test Method for Determining Air Leakage of Air Barrier Assemblies

R. National Fire Protection Association (NFPA) 285 Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components

1.5 MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review air-barrier requirements and installation, special details, mockups, air-leakage and bond testing, air-barrier protection, and work scheduling that covers air barriers.

1.6 SUBMITTALS

A. Product Data: For each type of product.

1. Include manufacturer's written instructions for evaluating, preparing, and treating substrate; technical data; and tested physical and performance properties of products.

B. At bid submission, provide evidence to the Architect of installer qualification by the air & vapor barrier manufacturer.

C. Shop drawings showing locations and extent of air & vapor barrier and details of all typical conditions.

D. Manufacturer’s list and description of wall assemblies, incorporating product, tested per NFPA 285

E. Manufacturer's technical data sheets and material safety data sheets for product and accessories.

F. Manufacturer's installation instructions.

G. Certification of compatibility by manufacturer, listing all materials on the project with which the product and accessories may come into contact.

H. Sample of product and transition membrane, minimum 2 inch by 3 inch size.

1.7 PERFORMANCE REQUIREMENTS

A. Installed product and accessories constitute a continuous air barrier, as described in ASHRAE Standard 90.1-2010 Section 5.4.3.1

B. Installed product and accessories shall perform as a liquid water drainage plane flashed to discharge to the exterior any incidental condensation or water penetration.

C. Installed product and accessories shall exhibit an air leakage rate, infiltration and exfiltration modes, measured after pressure cycling, not to exceed 0.2 L/s*m^2 at 75 Pa (0.040 CFM/ft^2 at 1.57 PSF) according to ASTM E 2357.

D. Installed product and accessories shall perform as a vapor barrier, installed on the predominantly warm side of the insulation.

E. For Type I, II, III and IV construction: Installed product and accessories shall be evaluated to NFPA 285 in wall assemblies of Project.

F. Product shall consist of nominal 0.040 inch (40 mils) thickness composite membrane consisting of an aluminum-faced cross-laminated high density polyethylene sheet laminated with a styrene-butadiene-styrene modified asphalt adhesive.

G. Product shall meet the following requirements:

REQUIREMENT	RESULT	TEST METHOD
Air Permeance	Not more than 0.02 L/s*m^2 at 75 Pa (0.004 CFM/ft^2 at 1.57 PSF)	ASTM E-2178
Tensile Strength	Not less than 40 lb_f per inch	ASTM D-882
Puncture Resistance	Not less than 50 lb_f	ASTM E 154
Tear Initiation and Propagation	Not less than 30 lb_f, machine direction and cross direction	ASTM D 4073
Low Temperature Flexibility	No cracking at minus 20 degrees F, 1 inch mandrel	ASTM D 1970
Fastener Sealability	No water leaking through fastener penetration after 24 h.	ASTM D 1970
Water Resistance	Membrane specimen including a lap shall resist a 55 cm (22 inch) column of water for 5 hours, no leaking or wet through.	AATCC-127, modified static head generated with 5”diameter PVC pipe sealed to specimen
Pull Adhesion	Not less than 16 lb_f per square inch (or report value at substrate failure) on glass-faced gypsum sheathing and concrete masonry unit, substrate prepared with contact adhesive	ASTM D 4541, modified 4 inch puck
Lap Adhesion	Not less than 5 lb_f per inch of width	ASTM D 1876
Water Vapor Permeance	Not more than 0.1 Perm	ASTM E-96, Method B
Surface Burning Characteristics.	Flame Spread Index: Not more than 25 Smoke Generation Index: Not more than 450	ASTM E 84, sample tested at full coverage, cement board substrate, including surface preparation
Measurement of Heat Release Rate by Cone Calorimeter	Effective Heat of Combustion of 0 MJ/kg or less Peak heat release rate of 6.67 kW/m^2 or less Total heat release rate of 1.1 MJ/m^2 or less	ASTM E 1354, membrane applied to glass-faced gypsum sheathing, including surface preparation. 50 kW/m^2 heat flux.

1.8 QUALITY ASSURANCE

A. Installer Qualifications: Shall be experienced in applying the same or similar materials and shall be specifically approved in writing by Manufacturer.

B. Single-Source Responsibility: Obtain product and accessories from single manufacturer.

C. Product and Accessories shall comply with all state and local regulations controlling use of volatile organic compounds (VOCs).

D. Pre-Installation Meeting: Convene one week prior to commencing Work of this Section.

E. Field-Constructed Mock-Ups: Prior to installation on Project, apply Product and Accessories on mock-up to verify details under shop drawing submittals, to demonstrate tie-ins with adjoining construction and other termination conditions and to become familiar with properties of materials in application:

F. Construct typical exterior wall panel, 8 feet long by 8 feet wide, incorporating back-up wall, cladding, window and doorframe and sill, insulation, flashing; illustrating interface of materials and seals

G. Test mock-up in accordance with ASTM E 783 and ASTM E1105 for air and water infiltration

H. Cooperate and coordinate with the Owner's inspection and testing agency. Do not cover any installed Product unless it has been inspected, tested and approved.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Remove and replace liquid materials that cannot be applied within their stated shelf life.

B. Refer to current Product MSDS for proper storage and handling.

C. Deliver materials to the job site in undamaged and original packaging indicating the name of the manufacturer and product.

D. Store roll materials on end in original packaging. Protect rolls from direct sunlight until ready for use.

E. Store air barrier membranes, adhesives and primers at temperatures of 40 degrees

F. Protect stored materials from direct sunlight.

G. Keep solvent away from flame or excessive heat.

1.10 FIELD CONDITIONS

A. Do not apply product or accessories during rain or accumulating snowfall.

B. Apply product and accessories within approved ambient and substrate temperature range stated in manufacturer’s literature.

C. Do not apply product or accessories over incompatible materials.

D. Observe safety and environmental measures indicated in manufacturer's MSDS, and mandated by federal, state and local regulations.

1.11 WARRANTY

A. System Warranty: Provide the manufacturer's five (5) year system warranty, including the primary air/vapor barrier and installed accessory sealant and membrane materials which fail to achieve air tight and watertight seal, exhibit loss of adhesion or cohesion, or do not cure.

PART 2 - PRODUCTS

2.1 FIRE-RESISTANT, SELF-ADHERING MEMBRANE AIR & VAPOR BARRIERS

A. **TO BE INSTALLED FOR ALL ABOVE-GRADE WALLS OVER TOP OF THE DENSGLASS GOLD SHEATHING**

B. Basis of Design: Fire Resist™ 705 FR-A by Carlisle Coatings & Waterproofing, Incorporated (CCW). 900 Hensley Lane, Wylie, TX 75098. Phone 1-800-527-7092. Website http://www.carlisleccw.com

C. Other comparable manufacturers and products, as approved by Architect.

2.2 ACCESSORIES

A. Provide from same manufacturer as air barrier membrane

B. Detail Flashing: Similar composition to air barrier membrane. Factory slit to convenient sizes.
1. CCW: Fire Resist 705 FR-A
2. Others: As specified by air barrier membrane manufacturer

C. Contact Adhesive: Liquid or spray-applied for preparing surfaces accepting air barrier membrane
1. CCW: CCW-702 Solvent-Based , CCW-702 LV VOC Compliant, Solvent-Based, CCW-702 WB Water-Based or CAV-GRIP™ Aerosol Spray
2. Others: As specified by air barrier membrane manufacturer

D. Detail Mastic: 1-part material for sealing details. Installation over air barrier membrane.
1. CCW: Universal Single Ply Sealant
2. Others: As specified by air barrier membrane manufacturer

E. Transition Membrane: Tough, elastomeric sheet capable of bridging a 1" gap. Minimum 60 mils thickness
1. CCW: SURE-SEAL Pressure-Sensitive Elastoform.
2. Others: As specified by air barrier membrane manufacturer

F. Fill Compound: 2-part chemical cure sealant, compatible with adhesive side of air barrier membrane.

1. CCW: CCW-703 V Modified polyurethane, 2-part or CCW-201 Polyurethane, 2-part
2. Others: As specified by air barrier membrane manufacturer

2.3 RELATED MATERIALS

A. Polyurethane Sealant: used for sealing membrane surface defects, penetrations and terminations :
1. Approved by CCW: Sonneborn NP-1, Dymonic FC, S-M 7100 Permathane Pro-Installer by Schnee-Morehead Div, ITW or Xtra-Bond 7500 TX by Premiere Industrial Supply
2. Others: As specified by air barrier membrane manufacturer

B. Silicone Sealant: used for sealing fenestration to air barrier membrane, surface defects and penetrations
1. Approved by CCW: Dow-Corning 758, 790, 791 or 795 or Pecora AVB Silicone, 890, 891 or 895 or GE Silpruf or Silpruf LM
2. Others: As specified by air barrier membrane manufacturer

C. Polyurethane Foam Sealant: used for sealing gaps around fenestration and other penetrations
1. Approved by CCW: Great Stuff by Dow Chemical Company, FireBlock Gun Foam by TVM Building Products or Fireblock Foam Sealant by FOMO
2. Others: As specified by air barrier membrane manufacturer

D. Insulation Adhesive: used for bonding foam board insulation to air barrier membrane
1. Approved by CCW for polyisocyanurate insulation: LM 800 XL or CAV-GRIP Spray Contact Adhesive by Carlisle Coatings & Waterproofing Incorporated
2. Approved by CCW for extruded polystyrene insulation: CAV-GRIP Spray Contact Adhesive by CCW, QB-300 Multi-Pupose Construction Adhesive by OSI or PL-300 VOC Foamboard Adhesive by Loctite
3. Others: As specified by air barrier membrane manufacturer

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions affecting installation of the air & vapor barrier and accessory products for compliance with requirements. Verify that surfaces and conditions are suitable prior to commencing Work of this section. Do not proceed with installation until unsatisfactory conditions have been corrected.

B. Verify that wall assemblies are dried in, such that water intrusion will not occur from above, behind or around the air barrier installation.

C. Concrete shall be cured for a minimum of seven days. It shall be smooth, with sharp protrusions such as form joints ground flush. Honeycomb and holes/cracks exceeding ¼ inch across shall be filled with grout or mortar.

D. Surfaces shall be sound, dry and free of oil, grease, dirt, excess mortar or other contaminants.

E. Surfaces shall be supported and flush at joints without large voids or sharp protrusions.

F. Mortar joints shall be struck flush and shall be free of voids exceeding ¼ inch across. Mortar droppings shall be removed from brick ties and all other surfaces accepting air barrier.

G. Sheathing boards shall be flush at joints, with gaps between boards according to building code and sheathing manufacturer's requirements. Sheathing boards shall also be securely fastened to the structure with proper fastener type, technique and spacing according to building code and sheathing manufacturer's requirements. Sheathing boards shall be repaired or replaced if inspection reveals moisture damage, mechanical damage or if sheathing boards have exceeded the exposure duration or exposure conditions as required by the sheathing manufacturer.

H. Plywood, OSB, lumber or pressure-treated wood moisture content, measured with a wood moisture meter in the core of the substrate, shall be below 20%.

I. Inform Architect [Consultant] [Owner] in writing of
1. Cracks in concrete and masonry.
2. Gaps or obstructions such as steel beams, angles, plates and projections which cannot be spanned or covered by Product or Accessories.
3. Anticipated problems applying Product and Accessories over substrate.

3.2 SURFACE PREPARATION

A. Concrete masonry unit (CMU) wall shall be prepared as follows to accept the air & vapor barrier:
1. Surfaces shall be free of contaminants such as grease, oil and wax on surfaces to receive membrane
2. The CMU surfaces shall be free from projections.
3. Strike all mortar joints flush to the face of the concrete block.
4. Fill all voids and holes greater than ¼ inch across at any point with mortar, sealant or other approved fill material.
5. Surface irregularities exceeding ¼ inch in height or sharp to touch shall be ground flush or made smooth.
6. Fill around all penetrations with mortar, sealant or other approved fill material and strike flush.
7. If the surfaces cannot be made smooth to the satisfaction of the Architect, it will be the responsibility of the trade to alternatively apply a parge coat (typically one part cement to three parts sand) over the entire surface to receive Air & Vapor Barrier Membrane
8. Remove mortar droppings on brick ties, shelf angles, brick shelves or other horizontal obstructions.

B. Fill cracks, gaps and joints exceeding ¼ inch width with fill compound or paintable sealant.

C. Fill rough gaps around pipe, conduit and similar penetrations with mortar, non-shrink grout, fill compound or polyurethane foam sealant shaved flush.

D. Apply a ¾ inch cant of fill compound at the intersection of the base of the wall and the

footing.

3.3 INSTALLATION

A. Apply product over opaque wall surfaces as indicated in Project.

B. Allow sealants used during surface preparation to cure fully before applying product.

C. Apply contact adhesive to all surfaces accepting product, according to manufacturer's instructions.

D. Apply product to prepared surfaces according to manufacturer's instructions and drawings.

E. Sequence installation to provide shingled laps. Lap neighboring sheets 2 inches minimum.

F. Install detail flashing or transition membrane according to manufacturer's drawings and instructions at expansion joints, seismic joints, mechanical/electrical penetrations and similar conditions.

G. Install detail mastic, polyurethane sealant or silicone sealant covering non-water shedding laps, penetrations and similar surface defects.

3.4 SCHEDULE

A. Wall substrates and roof or temporary roof shall be in place, effectively enclosing interior space, before proceeding with air barrier installation.

B. Seal penetrations made through installed product according to manufacturer's instructions and drawings.

C. Seal fenestration to product with detail membrane, transition membrane, polyurethane sealant, silicone sealant or polyurethane foam sealant according to Project drawings

D. Through-wall flashing may be installed before or after product. Seal termination of metal through-wall flashing to product with 6 inch wide detail flashing.

E. Cladding shall be installed after product.

F. Rigid or semi-rigid insulation installed over product shall be attached with insulation adhesive and mechanical fastening according to insulation manufacturer and air barrier manufacturer's instructions.

G. Sequence Work to enable air barrier continuity at wall-to-foundation, shelf angle, wall-to-roof, fenestration, different wall assemblies and other conditions providing challenges to air barrier continuity.

3.5 REPAIR AND PROTECTION

A. Protect from damage during application and remainder of construction period.

B. Inspect before covering. Repair or replace damaged material according to manufacturer's literature.

C. Product and accessories are not designed for permanent exposure. Cover with insulation or exterior cladding as soon as schedule allows.

D. Outdoor exposure of installed product and accessories shall not exceed 180 days.

3.6 WASTE MANAGEMENT

A. Coordinate with Section 01 74 19.

1. Separate and recycle cut-offs and waste materials and material packaging in accordance with Waste Management Plan and to the maximum extent economically feasible and place in designated areas for recycling.
2. Set aside and protect materials suitable for reuse and/or remanufacturing.
3. Separate and fold up metal banding; flatten and place along with other metal scrap for recycling in designated area.

END OF SECTION 07 27 13

SECTION 07 42 13 - COMPOSITE METAL PANELS

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. This section includes the performance criteria, materials, production, and erection of metal composite material wall panel systems for the project. The work performed under this Section consists of the provision of all plant, materials, labor and equipment and the like necessary and/or required for the complete execution of all metal composite material wall panel systems as required by the this section, schedules, keynotes and drawings including, but not limited to the following.

1. Aluminum faced composite panels with mounting system. Panel mounting system including anchorages, shims, furring, fasteners, gaskets and sealants, related flashing adapters, and masking (as required) for a complete watertight installation.
2. Parapet coping, column covers, soffits, sills, border, and filler items indicated as integral components of the panel system or as designed.
3. Interior panel ceiling system work that matches exterior panel system work.
4. Provide for two colors of metal panels. See drawings for color locations.

B. Related Requirements:

1. Division 5: Structural steel and Cold-formed metal framing
2. Division 6: Back up walls.
3. Division 7: Insulation, Metal flashing and counter flashing, Caulking and sealants.
4. Division 9: Interior finishes.

C. This work includes all composite metal panels, with the exception that at the East and West Additions, the exterior metal panels are installed under separate envelope project.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Meet with Owner, Architect, Owner's insurer if applicable, metal composite material panel Installer, metal composite material panel manufacturer's representative, structural-support Installer, and installers whose work interfaces with or affects metal composite material panels, including installers of doors, windows, and louvers.
2. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.

3. Review methods and procedures related to metal composite material panel installation, including manufacturer's written instructions.
4. Examine support conditions for compliance with requirements, including alignment between and attachment to structural members.
5. Review flashings, special siding details, wall penetrations, openings, and condition of other construction that affect metal composite material panels.
6. Review governing regulations and requirements for insurance, certificates, and tests and inspections if applicable.
7. Review temporary protection requirements for metal composite material panel assembly during and after installation.
8. Review procedures for repair of panels damaged after installation.
9. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, and tested physical and performance properties of panels and accessories.
2. Include manufacturer's written instructions for evaluating, preparing, and treating substrate.

B. Shop Drawings:

1. Show locations and extent of waterproofing and details of substrate joints and cracks, sheet flashings, penetrations, inside and outside corners, tie-ins with adjoining waterproofing, and other termination conditions.
2. Include fabrication and installation layouts of metal composite material panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment assembly, trim, flashings, closures, and accessories; and special details.
3. Accessories: Include details of the flashing, trim and anchorage, at a scale of not less than 1-1/2 inches per 12 inches (1:10).

C. Samples for Initial Selection: For each type of metal composite material panel indicated with factory-applied color finishes.

1. Include similar Samples of trim and accessories involving color selection.

D. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below.

1. Mockup for each type of panel system assembly (12” x 12”).
2. Two samples of each color or finish selected minimum 3” x 4”.
3. Metal Composite Material Panels: 12 inches (305 mm) long by actual panel width. Include fasteners, closures, and other metal composite material panel accessories.

E. Code Compliance

1. Documents showing product compliance with the national and local building code shall be submitted prior to the bid. These documents shall include, but not be limited to, appropriate Evaluation Reports and/or test reports supporting the use of the product.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Product Test Reports: For each product, tests performed by a qualified testing agency.

C. Field quality-control reports.

D. Sample Warranties: For special warranties.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For metal composite material panels to include in maintenance manuals.

1.7 QUALITY ASSURANCE

A. Manufacturer/Installer Qualifications:

1. Products shall be produced by a single manufacturer unless otherwise specified.
2. Composite Panel Manufacturer shall have a minimum of 5 years experience in the manufacturing of this product.
3. Composite Panel Manufacturer shall be solely responsible for panel manufacture and application of the finish.
4. Fabricator/installer shall be acceptable to the composite panel manufacturer.
5. Fabricator/Installer shall have a minimum 5 years experience of metal panel work similar in scope and size to this project.

B. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.

1. Build mockup of typical metal composite material panel assembly as shown on Drawings including corner, soffits, supports, attachments, and accessories.
2. Water-Spray Test: Conduct water-spray test of mockup of metal composite material panel assembly, testing for water penetration according to AAMA 501.2.
3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

C. Field Measurements should be taken prior to the completion of shop fabrication whenever possible. Coordinate fabrication schedule with constriction progress as directed by the Contractor to avoid delay of work. Field fabrication is required to ensure proper fit.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver components, metal composite material panels, and other manufactured items so as not to be damaged or deformed. Package metal composite material panels for protection during transportation and handling.

B. Unload, store, and erect metal composite material panels in a manner to prevent bending, warping, twisting, and surface damage.

C. Stack metal composite material panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal composite material panels to ensure dryness, with positive slope for drainage of water. Do not store metal composite material panels in contact with other materials that might cause staining, denting, or other surface damage.

D. Retain strippable protective covering on metal composite material panels during installation.

1.9 FIELD CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal composite material panels to be performed according to manufacturers' written instructions and warranty requirements.

1.10 COORDINATION

A. Coordinate metal composite material panel installation with rain drainage work, flashing, trim, construction of soffits, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.11 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal composite material panel systems that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Structural failures including rupturing, cracking, or puncturing.
b. Deterioration of metals and other materials beyond normal weathering.

2. Warranty Period: Five years from date of Substantial Completion.

B. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal composite material panels that show evidence of deterioration of factory-applied finishes within specified warranty period.

1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:

a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.

c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Source Limitations for Wall Panel System: Obtain system materials from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide metal composite material panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E 330:

1. Wind Loads: As indicated on Drawings.
2. Other Design Loads: As indicated on Drawings.
3. Deflection Limits: For wind loads, no greater than 1/240 of the span.

B. Air Infiltration: Air leakage of not more than 0.06 cfm/sq. ft. (0.3 L/s per sq. m) when tested according to ASTM E 283 at the following test-pressure difference:

1. Test-Pressure Difference: 6.24 lbf/sq. ft. (300 Pa).

C. Water Penetration under Static Pressure: No water penetration when tested according to ASTM E 331 at the following test-pressure difference:

1. Test-Pressure Difference: 6.24 lbf/sq. ft. (300 Pa).
2. Design to drain any water leakage occurring at the joints.

D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing 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 (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

E. Fire-Resistance Ratings: Comply with ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

2.3 EXTERIOR METAL COMPOSITE MATERIAL WALL PANELS

A. Metal Composite Material Wall Panel Systems: Provide factory-formed and -assembled, metal composite material wall panels fabricated from two metal facings that are bonded to a solid, extruded thermoplastic core; formed into profile for installation method indicated, with no glues or adhesives between dissimilar materials. The core material shall be free of voids and / or air spaces and not contain foamed insulation material. Include attachment assembly components, panel stiffeners, and accessories required for weathertight system.

1. Basis-of-Design Product: Subject to compliance with requirements, provide CF Architectural Vertical, Insulated Metal Wall Panel by Metal Span, a Nucor Company or approved equal product by one of the following:

    a. Kingspan, Optima Insulated Wall Panel System
    b. Or equal

B. Aluminum-Faced Composite Wall Panels: Formed with 22GA thick, zinc-coated aluminum sheet facings.

1. Panel Thickness: 2”
2. Exterior & Interior Finish: Three-coat fluoropolymer.
3. Color: To be selected by Architects from Manufacturers range of colors.

C. Attachment Assembly Components: Formed from extruded aluminum.

D. Attachment Assembly: Manufacturer’s standard.

E. R-Value: 17.5

F. U-Value U-0.059

G. System Type: Lock and Groove

H. Fasteners: As per Manufacturer’s recommendation.

2.4 INTERIOR METAL COMPOSITE MATERIAL WALL PANELS

A. Metal Composite Material Wall Panel Systems: Provide factory-formed and -assembled, metal composite material wall panels fabricated from two metal facings that are bonded to a solid, extruded thermoplastic core; formed into profile for installation method indicated, with no glues or adhesives between dissimilar materials. The core material shall be free of voids and / or air spaces and not contain foamed insulation material. Include attachment assembly components, panel stiffeners, and accessories required for weathertight system.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Interiors Alucobond Plus by 3A Composites USA, Inc., or approved equal product by one of the following:

    a. Alcoa Inc.
    b. Gordon, Inc.

c. Omega Panel Products.
d. Petersen Aluminum Corporation.

B. Aluminum-Faced Composite Wall Panels: Formed with 0.020-inch- (0.50-mm-) thick, coil-coated aluminum sheet facings.

1. Panel Thickness: 0.157 inch (4 mm).
2. Panel Weight: 1.12 lbs./sq.ft.
3. Exterior Finish: Three-coat fluoropolymer.

C. Attachment Assembly Components: Formed from extruded aluminum.

D. Attachment Assembly: Manufacturer's standard.

E. System Type:

1. Rout and Return Dry:

a. System must provide a perimeter aluminum extrusion with integral weather stripping. No field sealant required in joints unless specifically noted on drawings, Provide a means of concealed drainage with baffles and weeps for water which may accumulate in members of the system.

F. Fasteners: As per Manufacturer's recommendation.

2.5 MISCELLANEOUS MATERIALS

A. Miscellaneous Metal Subframing and Furring: ASTM C 645, cold-formed, metallic-coated steel sheet ASTM A 653/A 653M, G90 (Z275 hot-dip galvanized) coating designation or ASTM A 792/A 792M, Class AZ50 (Class AZM150) aluminum-zinc-alloy coating designation unless otherwise indicated. Provide manufacturer's standard sections as required for support and alignment of metal composite material panel system.

B. Panel Accessories: Provide components required for a complete, weathertight panel system including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal composite material panels unless otherwise indicated.

C. Flashing and Trim: Provide flashing and trim formed from same material as metal composite material panels as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, bases, drips, sills, jambs, corners, endwalls, framed openings, rakes, fasciae, parapet caps, soffits, reveals, and fillers. Finish flashing and trim with same finish system as adjacent metal composite material panels.

D. Panel Fasteners: Self-tapping screws designed to withstand design loads. Provide exposed fasteners with heads matching color of metal composite material panels by means of plastic caps or factory-applied coating. Provide EPDM or PVC sealing washers for exposed fasteners.

2.6 FABRICATION

A. General: Fabricate and finish metal composite material panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.

B. Fabricate metal composite material panel joints with factory-installed captive gaskets or separator strips that provide a weathertight seal and prevent metal-to-metal contact, and that minimize noise from movements.

C. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated.

1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
2. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.
3. Seams for Other Than Aluminum: Fabricate nonmoving seams in accessories with flat-lock seams. Tin edges to be seamed, form seams, and solder.
4. Sealed Joints: Form non-expansion, but movable, joints in metal to accommodate sealant and to comply with SMACNA standards.
5. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.
6. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal recommended in writing by metal panel manufacturer.

    a. Size: As recommended by SMACNA's "Architectural Sheet Metal Manual" or metal wall panel manufacturer for application but not less than thickness of metal being secured.

2.7 FINISHES

A. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

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 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. Aluminum Panels and Accessories:

1. Coil coated KYNAR 500 or HYLAR 5000 based PolyvInylidene Fluoride (PVDF) or Fluoro Ethylene Alkyl Vinyl Ether (FEVE) resin in conformance with the general requirements of AAMA 2605.

D. Colors:

1. Field Color: Basis of Design- Dark Bronze, PVDF-2/Gloss level-30

2. As selected by Architect, from full range of manufacturer's standard colors.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal composite material panel supports, and other conditions affecting performance of the Work.

1. Examine wall framing to verify that girts, angles, channels, studs, and other structural panel support members and anchorage have been installed within alignment tolerances required by metal composite material wall panel manufacturer.
2. Examine wall sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by metal composite material wall panel manufacturer.

a. Verify that air- or water-resistive barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.

B. Examine roughing-in for components and assemblies penetrating metal composite material panels to verify actual locations of penetrations relative to seam locations of metal composite material panels before installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Miscellaneous Supports: Install subframing, furring, and other miscellaneous panel support members and anchorages according to ASTM C 754 and metal composite material panel manufacturer's written recommendations.

3.3 METAL COMPOSITE MATERIAL PANEL INSTALLATION

A. General: Install metal composite material panels according to manufacturer's written instructions in orientation, sizes, and locations indicated on Drawings. Install panels perpendicular to supports unless otherwise indicated. Anchor metal composite material panels and other components of the Work securely in place, with provisions for thermal and structural movement.

1. Shim or otherwise plumb substrates receiving metal composite material panels.
2. Flash and seal metal composite material panels at perimeter of all openings. Fasten with self-tapping screws. Do not begin installation until air- or water-resistive barriers and flashings that will be concealed by metal composite material panels are installed.

3. Install screw fasteners in predrilled holes.
4. Locate and space fastenings in uniform vertical and horizontal alignment.
5. Install flashing and trim as metal composite material panel work proceeds.
6. Locate panel splices over, but not attached to, structural supports. Stagger panel splices and end laps to avoid a four-panel lap splice condition.
7. Align bottoms of metal composite material panels and fasten with blind rivets, bolts, or self-tapping screws. Fasten flashings and trim around openings and similar elements with self-tapping screws.
8. Provide weathertight escutcheons for pipe- and conduit-penetrating panels.

B. Fasteners:

1. Aluminum Panels: Use aluminum or stainless-steel fasteners for surfaces exposed to the exterior; use aluminum or galvanized-steel fasteners for surfaces exposed to the interior.

C. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action as recommended in writing by metal composite material panel manufacturer.

D. Attachment Assembly, General: Install attachment assembly required to support metal composite material wall panels and to provide a complete weathertight wall system, including subgirts, perimeter extrusions, tracks, drainage channels, panel clips, and anchor channels.

1. Include attachment to supports, panel-to-panel joinery, panel-to-dissimilar-material joinery, and panel-system joint seals.

E. Installation: Attach metal composite material wall panels to supports at locations, spacings, and with fasteners recommended by manufacturer to achieve performance requirements specified.

1. Seal horizontal and vertical joints between adjacent metal composite material wall panels with manufacturer's standard gaskets.
2. Install furring channels (7/8-inch) outboard of rigid insulation, secured to CMU backup; metal composite panels are installed with system clips and fastened thru the furring channel.

F. Clip Installation: Attach panel clips to supports at locations, spacings, and with fasteners recommended by manufacturer. Attach routed-and-returned flanges of wall panels to panel clips with manufacturer's standard fasteners.

1. Seal horizontal and vertical joints between adjacent metal composite material wall panels with manufacturer's standard gaskets.
2. Install furring channels (7/8-inch) outboard of rigid insulation, secured to CMU backup; metal composite panels are installed with system clips and fastened thru the furring channel.

G. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.

1. Install components required for a complete metal composite material panel assembly including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items. Provide types indicated by metal composite material panel

manufacturer; or, if not indicated, provide types recommended in writing by metal composite material panel manufacturer.

H. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that are permanently watertight.

1. Install exposed flashing and trim that is without buckling and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof performance.
2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet (3 m) with no joints allowed within 24 inches (605 mm) of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with mastic sealant (concealed within joints).

3.4 ERECTION TOLERANCES

A. Installation Tolerances: Shim and align metal composite material wall panel units within installed tolerance of 1/4 inch in 20 feet (6 mm in 6 m), non-accumulative, on level, plumb, and location lines as indicated, and within 1/8-inch (3-mm) offset of adjoining faces and of alignment of matching profiles.

3.5 FIELD QUALITY CONTROL

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

B. Water-Spray Test: After installation, test area of assembly as directed by Architect for water penetration according to AAMA 501.2.

C. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect completed metal composite material wall panel installation, including accessories.

D. Metal composite material wall panels will be considered defective if they do not pass test and inspections.

E. Additional tests and inspections, at Contractor's expense, are performed to determine compliance of replaced or additional work with specified requirements.

F. Prepare test and inspection reports.

3.6 CLEANING AND PROTECTION

A. Remove temporary protective coverings and strippable films, if any, as metal composite material panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of metal composite material panel installation, clean finished

surfaces as recommended by metal composite material panel manufacturer. Maintain in a clean condition during construction.

B. After metal composite material panel installation, clear weep holes and drainage channels of obstructions, dirt, and sealant.

C. Replace metal composite material panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

3.7 WASTE MANAGEMENT

A. Coordinate with Section 01 74 19.

1. Separate and recycle cut-offs and waste materials and material packaging in accordance with Waste Management Plan and to the maximum extent economically feasible and place in designated areas for recycling.
2. Set aside and protect materials suitable for reuse and/or remanufacturing.
3. Separate and fold up metal banding; flatten and place along with other metal scrap for recycling in designated area.

END OF SECTION 07 42 13

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SECTION 07 53 23 - EPDM ROOFING

PART 1 - GENERAL

1.1 SUMMARY

A. The Work of this Section consists of the provision of all plant, labor, materials, equipment, testing and services necessary to complete the work of EPDM Roofing, as shown on the schedules, keynotes, drawings, as specified herein, and as may be required by conditions and authorities having jurisdiction, including, but not limited to, the following:

1. Remove and legally dispose of existing gravel surfacing, roofing, insulation, the vapor barrier, underlayment, wood blocking, and flashing. Clean all residual material from the surface of the deck, and the flutes of the steel deck.

2. Install a new fully adhered unreinforced 60 mil thick EPDM roofing system, including a vapor barrier on concrete deck areas, insulation, a cover board, flashings, stripping and related accessories.

3. Provide any miscellaneous mechanical, electrical, hoisting and other work needed, and remove, adjust, modify, reset and reconnect existing roof-mounted and roof-penetrating devices.

4. Install new flashings at the roof drains, and all roof-mounted and roof-penetrating equipment.

5. Disconnect and remove abandoned mechanical equipment and curbs, and infill the roof deck.

6. Refasten loose sections of existing metal deck with self drilling / tapping screws as Base Bid work.

7. Alert the Architect and Owner and replace deteriorated sections of existing metal deck as extra work, after receiving direction from them.

B. Related Requirements

1. Rough Carpentry - Section 06 10 00
2. Sheet Metal Flashing & Specialties - Section 07 62 00
3. Roof Accessories - Section 07 72 00

1.2 CODE APPROVAL REQUIREMENTS

A. Install roofing and insulation system components to meet the following minimum requirements:

1. New York State Uniform Fire Prevention and Building Code.
2. Underwriters Laboratories Inc. Class A external fire rating for Roof Covering Materials.
3. ASCE 7-16 minimum uplift resistance, calculated using a safety factor of 2

B. Provide written certification from the Manufacturer, before beginning work, to confirm the roofing system meets these requirements.

1.3 QUALITY ASSURANCE

A. Installer Qualifications:

1. A firm (Installer) with at least 5 continuous years experience performing EPDM roofing work similar to that required for this project, employing personnel skilled in the specified work.
   a. The Installer shall directly employ the personnel performing the work of this section.
   b. The Installer shall have a full time supervisor/foreman on the roof when roofing work is in progress. The Supervisor shall have a minimum of 5 years experience in EPDM roofing work similar in nature and scope to this project, and speak fluent English.
2. The Installer shall provide a reference list of at least three projects of comparable size and similar design, within a fifty mile radius of this project, which may be observed by representatives of the Owner:
   a. The reference list shall include the completion date, a description of the work performed, the Owner's name - contact person - phone number and address and the Architect's name - contact person and phone number.
   b. The Installer shall provide the reference list prior to contract award if requested.
3. The Installer shall be acceptable to or licensed by the Manufacturer of the primary roofing materials, and provide written certification from the Manufacturer to confirm this prior to award if requested.

B. Material Quality: Obtain each product, including the vapor barrier, insulation, cover board, EPDM roofing and flashing, and the cements, primers and adhesives from a single Manufacturer, which has manufactured the same products in the United States of America for not less than 5 continuous years.

C. Pre-Work Conference: Meet at the project site approximately 10 days prior to starting work, with the Architect, Owner and other representatives concerned about the work, to discuss the following:

1. How the existing building will be kept watertight as old roofing is removed and the work progresses.
2. How new roofing will be coordinated with the installation of related building components, including the drains and mechanical equipment, the vapor barrier, insulation, cover board, flashings and other items to provide a watertight installation.
3. Generally accepted industry practice, the Manufacturer's instructions for handling and installing his products, and specified work requirements.
4. The condition of the existing and new substrates (decks), curbs, penetrations and other preparatory work needed.
5. Submittals, both completed and yet to be completed.
6. The construction schedule, forecast weather, availability of materials, personnel, equipment and facilities needed to proceed and complete the work on schedule.
7. A schedule for Manufacturer and Architect inspections.

1.4 SUBMITTALS

A. Submit the following items far enough in advance to obtain approval prior to performing any work:

1. Written certification from the Manufacturer which states that the Installer is acceptable or licensed to install the specified roofing; if not previously provided.
2. Manufacturer's installation instructions and technical data sheets for each component of the roofing system. Material sample submittals are not needed or wanted.
3. Samples of the Contractor's and Manufacturer's guarantee/warranty forms.

4. Technical submittals shall be prepared and made by the firm that will perform the actual work.
5. Payment requisitions will not be processed until all submittals are received and approved.

1.5 JOB CONDITIONS (CAUTIONS & WARNINGS)

A. Do not use oil base or plastic roof cement with EPDM roofing. Do not allow waste products, (petroleum grease or oil, solvents, vegetable or mineral oil, animal fat) or direct steam venting to come in contact with any roofing, insulation or flashing product. Do not expose EPDM roofing and accessories to a temperature in excess of 175 degrees Fahrenheit.

B. Splice cleaner, primer, cements and bonding adhesives are flammable. Do not breathe vapors or use near fire or flame or in a confined or unventilated area. Dispense only from a UL listed or approved safety can.

C. Remove empty adhesive and solvent containers and contaminated rags from the roof and legally dispose of them daily.

D. Do not apply adhesives adjacent to open ventilation system louvers, or windows. Temporarily cover the louvers and windows with 6 mil fire retardant polyethylene and prevent adhesive odors from entering the building. Remove temporary covers at the end of each days work.

1.6 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver material to the site in the Manufacturer's original and unopened packaging, bearing labels which identify the products and Manufacturers, with the labels intact and legible.

B. Cover all stored materials, except rolls of EPDM and sealed cans of adhesives, with watertight tarpaulins installed immediately upon delivery.

C. Immediately remove any insulation or cover board which gets wet from the job site.

D. Do not overload the structure when storing materials on the roof.

E. Store and install all material within the Manufacturer’s recommended temperature range.

1.7 GUARANTEE/WARRANTY

A. Provide a written Manufacturer's "Full System Guarantee/Warranty" which warrants that the roofing system, including the insulation, cover board, EPDM roofing and flashings, will remain in a watertight condition for a twenty year period beginning upon Final Completion.

1. Guarantee/Warranty coverage shall remain in effect for gust wind speeds up to 72 miles per hour, measured at ground level at the site.

2. Guarantee and Warranty coverage shall have no dollar value limit.

B. Provide a Contractor's written Guarantee which warrants that all work will remain free of material and workmanship defects and in a watertight condition for a five year period beginning upon Final Completion:

1. Defective work includes but is not limited to the following types of failure: leakage, adhesive separation, delamination, lifting, loosening, splitting, cracking, and undue expansion.

2. The Contractor's Guarantee shall provide that the Contractor will make the repairs and modifications necessary to enable the work to perform as warranted at his own expense:

3. The Guarantee shall include the removal and replacement of items or materials installed as part of the original work, if removal is needed to affect guaranteed repairs.

C. Manufacturer's and Contractor's Guarantees/Warranties shall be issued no more than 30 days before the satisfactory completion of punch list work.

D. Guarantees/Warranties shall include the removal and replacement of items or materials installed as part of the original work, if removal is needed to make warranty repairs.

E. Guarantee/Warranty coverage may be cancelled, for the affected portion of the roof, if the work is damaged by winds in excess of 72 mph, by hail, lightning, insects or animals, by failure of the structural substrate, by exposure to harmful chemicals, by other trades on the roof, or by vandalism, or if the Owner fails to maintain the roof in accordance with, or makes roof alterations contrary to, the Manufacturer’s printed recommendations.

F. Guarantee/Warranty coverage shall be reinstated, for the remainder of the original period; if the Owner restores the roof to the condition it was in prior to the damage occurring.

G. The Contractor’s Surety Company may add a rider to the Performance Bond which clarifies that Bond Coverage expires two years after Final Completion; i.e., Performance Bond Coverage does not run for the entire five year term of the Contractor’s Guarantee.

1.8 SUBSTITUTIONS

A. The following factors will be considered when evaluating a possible alternative to the roofing system specified:

1. The wording and intent of the warranty to be issued.
2. The financial status, numbers of years in business, and stability of the entity that will issue the warranty.
3. A reference list of at least five completed similar projects of comparable size, with a successful functional history of at least five years, within an approximate fifty mile radius of the Project.
4. Technical aspects of the system, especially relating to durability, serviceability and performance.
5. The capacity and history of the Manufacturer in providing technical response, on-site inspections and assistance.
6. The availability and prior experience of local authorized applicators, within a 50 mile radius of the project, to install and maintain the proposed alternate system.
7. The willingness and history of the Manufacturer in responding to warranty claims previously made by the Owner, Architect or any Consultant involved in this project.

PART 2 - PRODUCTS

2.1 GENERAL

A. EPDM roof system components are specified as products of Firestone Building Products Company to establish a standard of quality. Equal products and systems from Carlisle SynTec will be accepted.

B. Primary products required for this project include:

1. Vapor barrier
2. Roof insulation
3. Cover board
4. EPDM roofing
5. Primers and adhesives
6. Sealants
7. EPDM flashing
8. Fasteners

2.2 VAPOR BARIER

A. 154 mm thick smooth surfaced APP modified bitumen sheet suitable for torch application over ASTM D 41, Type II asphalt primer applied on concrete deck surfaces.

2.3 INSULATION:

A. Isocyanurate – Rigid cellular polyisocyanurate boards with fibrous felt/fiberglass mat facers, minimum compressive strength 20 psi, meeting ASTM C1289-01, Type II, Class1, Grade 2, as manufactured by Firestone under the trade name of “ISO 95+ Isocyanurate Insulation”.

1. Flat insulation sloped as shown on the roof plan.
2. Crickets sloping 1/4 and 1/2 inch per foot.

2.4 GYPSUM COVER BOARD:

A. 1/4 inch thick fire resistant gypsum board decking with inorganic glass mat facers and a water resistant core, formulated in 48 x 96 inch square edge boards, UL Class A, meeting ASTM C-1177, manufactured under the trade name Dens-Deck.

2.5 INSULATION ADHESIVE:

A. Two component low rise polyurethane foam adhesive, installed with a mixing extruding Pace-Cart dispenser, or with a pleural heated foam rig, Firestone I.S.O. Adhesive intended for application at the temperatures that will be encountered.

B. Do not use twin cartridge adhesive except on very small isolated sections of roof.

2.6 EPDM

A. Unreinforced 60 mils thick, fire retardant, EPDM (Ethylene Propylene Diene Monomer) sheet membrane conforming to the following minimum physical properties.

PROPERTY	TEST METHOD	SPECIFICATION
Color	—	Gray/Black
Tensile Strength	ASTM D-412	1305 psi min.
Elongation	ASTM D-412	300% min
Tear Strength	ASTM D-624	150 lb/in min
Ozone Resistance	ASTM D-1149	No cracks,7 days/100 pphm/100ºF/50% strain

Heat Aging	ASTM D-573	1200 psi min@ 200% elongation/4 wks/240ºF
Brittleness Temperature	ASTM D-746	-49ºF
Water Vapor Permanence	ASTM E-96	2.0 perm max
Thickness	ASTM D-412	60 mils plus/minus 6 mils
Fire Retardant		UL Class A

2.7 RELATED MATERIALS

A. Cleaners, adhesives, sealants, caulking and fasteners furnished by the EPDM system Manufacturer and as listed below. Use low VOC adhesives and cleaners as required by regulations in effect at the time of application.

1. Stripping: 90 mil thick 5 inch and 9 inch wide self adhering flashing, consisting of 45 mils of semi-cured EPDM factory laminated to 45 mils of cured seaming tape.

2. Bonding Adhesive: High strength contact adhesive.

3. Splice Adhesive: High strength synthetic polymer based contact cement formulated specifically to splice EPDM sheets.

4. Lap Sealant: EPDM rubber based gun grade sealant.

5. Water Block Seal: One component low viscosity butyl rubber sealant.

6. Pre-Molded Pipe Flashing: Pressure sensitive prefabricated flashings with pre-applied adhesive.

7. Pourable Sealer: Two component, solvent free polyurethane based sealant.

8. Reinforced Perimeter Fastening Strips: .030 inch thick reinforced cured EPDM.

9. Seam Tape Primer: Synthetic rubber polymer based primer designed to clean and prime seam tape spice areas prior to installing the tape.

10. Seam Splice Tape: Nominal 30 mil thick cured polymer self adhesive tape with release paper carrier, 6 inches wide.

11. Plates and Bars: Galvanized and corrosion resistant specialty products.

12. Fasteners: #14 Fluorocarbon polymer coated heavy duty screws.

PART 3 - EXECUTION

3.1 GENERAL

A. Construct the new roofing system in a watertight, workmanlike manner, meeting the guarantee requirements specified herein; in strict accordance with the drawings and in conformance with the Manufacturer's requirements, except as enhanced in this specification.

B. Perform work in areas with roof mounted mechanical equipment, so the work coincides with equipment shutdown periods and does not affect building occupants. Temporarily cover and protect equipment openings, and windows adjoining the work area, with 6 mil fire retardant

polyethylene, so dirt, dust and odors do not enter the equipment or building. Remove covers at the end of each workday, and as soon as roof work is complete.

C. Clean the surface on which roofing system components will be applied, of all laitance, dirt, oil, grease or other foreign matter which would in any way affect the quality of the installation.

D. Install roof system components on dry surfaces only. Do not install any items when weather conditions and outside temperatures are not suitable in accordance with the Manufacturer's recommendations.

E. Complete all work in sequence as quickly as possible so that as small an area as practicable is in the process of construction at any one time. Complete the entire area of work begun each day, the same day, and make all exposed edges watertight at the end of each day's work.

3.2 SUBSTRATE INSPECTION

A. Remove existing roofing, insulation, flashings, underlayment material and the vapor barrier as indicated, and carefully check the existing deck. To be an acceptable surface for the new roofing system, it is to be well secured to the underlying structure and not rotted or otherwise deteriorated.

B. Immediately notify the Architect and Owner by telephone and in writing if defects in the substrate are discovered.

C. Maintain the building watertight in the interim, but do not proceed with the installation of new roofing until defects have been corrected.

3.3 DECK REPAIR & REPLACEMENT

A. Refasten loose sections of steel deck using self drilling / tapping screws as Base Bid work

B. Steel deck replacement:

1. Alert the Owner and Architect if deteriorated steel decking is encountered, maintain the building watertight in the interim, and obtain direction before continuing with the work.
2. Remove damage decking across the entire width of individual sections by a length equal to a minimum of two joist bays.
3. Install new deck of thickness, gauge and cross section configuration to match existing. New steel deck shall be galvanized.
4. Fasten new deck to the joists with #12 screws spaced 6 inches on center in each joist.
5. Stitch side seams of steel deck with #10 screws spaced 24 inches apart.

3.4 PRIMER & VAPOR BARRIER

A. Install asphalt primer on concrete deck surfaces and allow it to dry before installing the vapor barrier.

1. Apply the primer only after new concrete has cured for at least 21 days, and when the concrete is dry.
2. Do not thin the primer.

B. Torch apply the vapor barrier to fully adhere it to the primer deck surface. Overlap end laps 6 inches, overlap ply lines 3 inches, and turn the vapor barrier up at perimeter blocking, curbs and change in elevation walls.

C. Post an English speaking fire watch employee, with a cell phone, on the roof when torch work occurs, and for 1 hour after it finishes each day.

3.5 INSULATION AND COVER BOARD

A. Install tapered insulation neatly cut at all miters and transitions. Do not lace corner boards.

B. Install insulation with joints offset between rows and layers a minimum of 12 inches. Cut insulation to fit neatly at penetrations and joints. Fill any gap which is greater than 1/4 inch.

C. Fasten all layers of insulation only to the top flute of steel decks with screws and discs which penetrate through the deck a minimum of 3/4 inch and a maximum of 1-1/2 inches.

1. Install 16 fasteners per 4 by 8 foot insulation board in the field of the roof.
2. Install 28 fasteners per 4 by 8 foot insulation board in 8 foot wide perimeter zones.
3. Install 32 fasteners per 4 by 8 foot insulation board in 8 foot square corner zones.

D. Install all layers of insulation over the vapor barrier on concrete decks in low rise polyurethane foam adhesive.

E. Install gypsum cover board over the insulation using foam adhesive, with joints offset between the insulation and cover board a minimum of 12 inches. Cut gypsum cover board to fit neatly at penetrations and joints. Fill any gap which is greater than 1/4 inch.

F. Install foam adhesive in accordance with the Manufacturer's recommendations and to achieve the specified minimum uplift resistance.

1. Install 1/2 inch diameter adhesive beads spaced 12 inches on center in the field of the roof.
2. Install 1/2 inch diameter adhesive beads spaced 6 inches on center in 8 foot wide perimeter zones.
3. Install 1/2 inch diameter adhesive beads spaced 4 inches on center in 8 foot square corner zones.
4. Place 5 gallon pails half full of gravel or concrete on the insulation and gypsum cover board to hold it firmly in position while the low rise foam adhesive sets. Position the pails no more than 24 inches apart in all directions.

3.6 EPDM

A. Position the EPDM roofing over the substrate without stretching it, and allow it to relax approximately one hour before adhering it to the substrate or forming the seams.

B. Position adjoining sheets in the same manner lapping the edges about 7 inches.

C. Fully adhere the EPDM to the substrate with bonding adhesive.

1. Open each can of adhesive and stir it with an electric paddle mixer for at least 5 minutes before applying the adhesive. Re-stir adhesive that isn't used within two hours of initial mixing.
2. Do not punch holes in cans of adhesive and use them in a "Better Spreader" without first opening the cans to mix them.
3. Replace used roller covers each day; discard covers after each days use.
4. Allow bonding adhesive to dry to the touch before joining the EPDM to the substrate.
5. Roll the EPDM onto the dried bonding adhesive and immediately rub it vigorously with a soft bristle broom to ensure complete adhesion.

D. **Roofing installed over improperly applied adhesive, and roofing installed with blisters, ridges, mole runs and similar deficiencies shall be removed and replaced at the Contractor's expense.**

3.7 SPLICING

A. Form all EPDM roof splices with 6 inch wide seam tape.

1. Fold the top sheet back about 7 inches. Clean both mating surfaces using clean rags with splice wash.
2. Scrub a smooth coat of QuickPrime to both mating surfaces, with long strokes obtaining complete coverage, using approximately 1 gallon per 225 square. Do not allow the QuickPrime to glop, streak or puddle. Allow it to dry to the touch before installing the seam tape.
3. Install the seam tape on the bottom sheet of EPDM roofing, using guide marks to position it so 1/8 inch minimum and 1/2 inch maximum will be exposed out of the seam when the seam is complete.
4. Roll and allow the top sheet to fall freely into place without stretching or wrinkling it.
5. Pull the splice tape release paper from within the seam area and neatly mate the seam using hand pressure to rub the membrane together.
6. Immediately roll the splice with a 2 inch wide roller, using positive pressure, toward the outer edge of splice.
7. Install uncured EPDM surface patches with rounded corners, over all T-Seam intersections.
8. Install 5 inch uncured EPDM stripping over any seam where the tape is exposed less than 1/8 inch or more than 1/2 inch.

3.8 PERIMETER FASTENING

A. Secure the EPDM roof at the perimeter of each section, and at eaves, penetrations, expansion joints and slope changes greater than 1 inch in 12 inches. Secure discs through the membrane or adhere it to continuous reinforced EPDM fastening strips. Fasten the discs and EPDM fastening strips 12 inches on center.

3.9 FLASHING

A. Utilized cured EPDM for all flashings; utilize self-curing EPDM at corners and angle changes only where required by the Manufacturer.

1. Form flashing splices, and the splice between the flashing and main roof sheet with 7 inch seam tape.
2. Adhere the flashing to vertical surfaces with bonding adhesive.
3. Fasten the top edge of all flashings, positioning the fasteners 12 inches on center, to be covered by the cap flashing.

B. Install premolded pipe flashings wherever possible. Where premolded pipe flashings cannot be installed, use field wrapped flashings. Install pitch pockets as a last resort.

C. Remove existing pipe flashings and Kennedy type couplings and extend the vent pipes to finish a minimum of 18 inches above the roof surface.

3.10 MISCELLANEOUS

A. Provide any miscellaneous roofing, flashing, caulking, and metal work needed to leave the work complete and entirely watertight, neatly and carefully executed in a thorough and workmanlike manner.

B. Mechanical and electrical work shall be performed by mechanics skilled and licensed in these trades. Provide new material, couplings, transition pieces, blocking, fasteners and the like needed to complete the work.

3.11 CLEANING, PROTECTION AND WATERTIGHTNESS

A. Conduct an inspection of the interior and exterior of the existing building and grounds, and submit a written report with photos to document any pre-existing leakage or damage, prior to performing any work.

B. The Owner will conduct a similar inspection at the completion of the work, and the Contractor will be charged for all leakage or damage which was not documented in the Contractor's report, or repaired to the Owners satisfaction at the Contractor's expense.

C. Provide any equipment, material and labor necessary to protect the site, the building, its contents and occupants, pedestrians, and surrounding landscaped and paved areas from damage due to the construction work or from inclement weather during construction.

D. Do not perform work during inclement weather. Protect incomplete work and the building from damage by inclement weather which may occur unexpectedly. Make all work areas watertight at the end of each day's work.

E. Frequently clean up all refuse, rubbish, scrap materials and debris so the work site presents a neat, orderly and workmanlike appearance.

F. Carefully clean the roof to remove all residual debris when work is complete. After cleaning the roof, thoroughly clean all drain sumps, drain lines, leader heads and leaders. Do not allow debris to enter the drainage system.

3.12 ROOF INSPECTIONS BY MANUFACTURER

A. Arrange for the roofing Manufacturer, or his authorized representative, to make a minimum of five inspections in accordance with the following schedule and submit a written report of each inspection to the Architect within one week following each inspection:

1. First inspection during the first two days of new roof installation.
2. Second inspection when roofing is approximately one third complete.
3. Third inspection when roofing is approximately two thirds complete.
4. Fourth inspection when all roofing and flashings are installed.
5. Final inspection at the completion of all work.

B. Provide 48 hours advance written notice to the Architect, so he may have a representative attend the inspections.

C. Payment requisitions will not be reviewed nor approved until the inspection reports are received.

3.13 WASTE MANAGEMENT

A. Coordinate with Section 01 74 19

1. Separate and recycle cut-offs and waste materials and material packaging in accordance with the Waste Management Plan and to the maximum extent economically feasible and place in designated areas for recycling.
2. Set aside and protect materials suitable for reuse and/or remanufacturing until removed from the site.
3. Separate and fold up metal banding; flatten and place along with other metal scrap for recycling in designated area.

END OF SECTION 07 52 23

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SECTION 07 62 00 - SHEET METAL FLASHINGS & SPECIALTIES

PART 1 - GENERAL

1.1 SUMMARY

A. The Work of this Section consists of the provision of all plant, labor, materials, equipment, testing and services necessary to complete the work of Sheet Metal Flashings & Specialties, shown on the schedules, keynotes, drawings, as specified herein, and as may be required by conditions and authorities having jurisdiction, including, but not limited to, the following:

1. Sheet metal work that is compatible with the roofing systems specified, including cap and through wall flashings, hook strips, fascia, gravel stops, copings, gutters, leaders, valleys, flat and standing seam panels, ridges and miscellaneous flashings.

B. Related Requirements

1. Rough Carpentry - Section 06 10 00
2. EPDM Roofing - Section 07 53 23
3. Roof Accessories - Section 07 20 00

1.2 CODE APPROVAL REQUIREMENTS

A. Fabricate and install roof perimeter flashings that comply with the NY State Uniform Fire Prevention and Building Code and ANSI/SPRI ES-1 requirements.

1.3 QUALITY ASSURANCE

A. Installer Qualifications:

1. A firm (Installer) with not less than 5 continuous years experience performing Sheet Metal work similar to that required for this project, employing personnel skilled in the specified work.
   a. The Installer shall directly employ the personnel performing the work of this section.
   b. The Installer shall have a full time supervisor/foreman on the roof when work is in progress. The Supervisor shall have a minimum of 5 years experience in work similar in nature and scope to this project, and speak fluent English.
2. The Installer shall provide a reference list of at least three projects of comparable size and similar design, within a fifty mile radius of this project, which may be observed by representatives of the Owner:
   a. The reference list shall include at a minimum, the completion date, a description of the work performed, the Owner’s name - contact person - phone number and address and the Architect’s name - contact person and phone number.
   b. The Installer shall provide the reference list prior to contract award if requested.

B. Material Quality:

1. Obtain each product from a single Manufacturer which has manufactured the same product in the United States of America for not less than 5 continuous years.
2. Obtain copper and pre-finished sheet metal items from the same mill run to maintain consistent color hue and surface finish.

C. Pre-Work Conference: Meet at the project site approximately one week prior to starting work, with the Architect, Owner and other representatives concerned about the work, to discuss the following:

1. How the existing building will be kept watertight as work progresses.
2. How sheet metal work will be coordinated with the installation of the vapor barrier, thermal barrier, insulation, cover board, roofing, flashings, roof accessories and other items to provide a watertight installation.
3. Generally accepted industry practice, the Manufacturer's instructions for handling and installing his products, and specified work requirements.
4. The condition of the substrate (deck), curbs, penetrations and other preparatory work needed.
5. Submittals, both completed and yet to be completed.
6. The construction schedule, forecast weather, availability of materials, personnel, equipment and facilities needed to proceed and complete the work on schedule.
7. A schedule for Manufacturer and Architect inspections.

1.4 SUBMITTALS

A. Submit the following items far enough in advance to obtain approval prior to performing any work:

1. Pre-work site and existing building inspection report with photos to document conditions before work starts.
2. Shop drawings, or 2 foot long samples, for each sheet metal item, to show how it relates and fits on adjoining masonry and wood blocking assemblies, and with the roof, stripping, and flashings.
3. A 6 inch square piece of each type of sheet metal to show surface finish, texture and color.
4. Literature for each type of sheet metal, sealant and fastener, including the Manufacturer's instructions which show how to install the items, and form and seal joints.
5. A sample of the Contractor’s guarantee form.

B. Technical submittals shall be prepared and made by the firm that will perform the actual work.

C. Payment requisitions will not be processed until all submittals are received and approved.

1.5 JOB MOCK-UPS

A. After the submittals are approved, prepare in actual job locations, mock-ups of cap and through wall flashings, hook strips, drip edges, fascia, gravel stops, and all other items of sheet metal and related work, for inspection and approval by the Architect.

B. Construct each mock-up of two full lengths of metal, fastened, connected and stripped-in to the related roofing system, to show the following:

1. Type, gauge, color, cross-sectional dimensions and shape, and joint and mitering techniques.
2. Related masonry work, wood blocking, and the attachment techniques and fasteners for all wood and metal components.
3. Other sheet metal related materials and their installation techniques to fully define the detailing of each mock-up.

C. The purpose of each mock-up is to establish the minimum standard of materials and workmanship, and to assure that completed work which matches the mock-ups will be fully functional and serve the purpose for it has been designed.

D. Approved mock-ups may be left in place and incorporated into the permanent installation. Rejected mock-ups shall be removed and replaced until approved.
E. Do not purchase or fabricate sheet metal items until mock-up installation, inspection and approval are completed and approval is documented in writing.

1.6 GUARANTEE

A. Provide a Contractor's written Guarantee which warrants that all work will remain free of material and workmanship defects and in a watertight condition for a five year period beginning upon Final Completion:

1. Defective work includes but is not limited to the following types of failure: leakage, adhesive separation, delamination, lifting, loosening, splitting, cracking, and undue expansion.
2. The Contractor's Guarantee shall provide that the Contractor will make the repairs and modifications necessary to enable the work to perform as warranted at his own expense.
3. The Guarantee shall include the removal and replacement of items or materials installed as part of the original work, if removal is needed to affect guaranteed repairs.

B. The Guarantee shall be issued no more than 30 days before the satisfactory completion of punch list work.

C. The Contractor’s Surety Company may add a rider to the Performance Bond which clarifies that Bond Coverage expires two years after Final Completion; i.e., Performance Bond Coverage does not run for the entire five year term of the Contractor’s Guarantee.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Copper sheet: ASTM B370, 99.0 % pure copper, thickness 16 ounces per square foot. Use copper for all metal items not otherwise indicated

B. Zinc-Tin coated copper: copper sheet, coated on both sides, with a smooth uniform coating of zinc and tin, base metal weight 16 ounces per square foot, cold rolled temper, available as FreedomGray Copper by Revere.

C. Solder:

1. 50-50 tin and lead for plain copper, supplied in one pound bars with the alloy mixture stamped into the bar by the Manufacturer.
2. Lead free / or pure tin solder for zinc-tin coated copper, Number 497 by Johnson Manufacturing.

D. Flux:

1. Water-Soluble Liquid Flux, Kester #3345 for iron soldering of brass and copper.
2. Tin-bearing flux such as “Flux-N-Solder E127 with pure tin” by Johnson Manufacturing.

E. Factory Fabricated Roof Edge System: Extruded aluminum anchor bars secured with #9 stainless steel screws spaced 12 inches on center and .050 inch thick Kynar 500 prefinished aluminum trim covers, independently tested to comply with the ANSI / SPRI ES-1 Wind Design Guide.

F. Fasteners: stainless steel, or to match the sheet metal being fastened.

G. Glass Cloth: open mesh glass fabric coated on each side with plasticized asphalt as manufactured by Karnak Corporation or equal.

H. Asphalt cement: Federal Specification SS-C-153B, Type 1, asbestos free grade.

I. Exterior mounted leaders and straps: .027 inch thick rectangular corrugated aluminum leaders factory finished with baked acrylic enamel. Fasten each leader with 1/16 inch thick by 1 inch wide straps spaced 7 feet on center.

J. Sealant: High performance, solvent free, formulated and moisture curing silyl-terminated polyether sealant, ASTM C-920, Type S, Grade NS, Class 25, NovaLink construction sealant by ChemLink, color as selected.

PART 3 - EXECUTION

3.1 GENERAL

A. Accurately reproduce the details and design shown, and form profiles, bends and intersections, sharp, true and even. Fabricate sheet metal in the shop whenever possible, and form joints, laps, splices and connections to shed water and condensation in the direction of flow.

B. Provide any miscellaneous flashing and sheet metal work not shown on the drawings but otherwise needed to leave the project complete and entirely watertight, neatly and carefully executed in a thorough and workmanlike manner.

3.2 INSPECTION

A. Examine surfaces to receive work of this section and report any defects to the Owner and Architect.

3.3 INSTALLATION

A. Fabricate and install copper work in accordance with the current edition of "Copper and Common Sense" as published by the Revere Copper and Brass Company, unless otherwise indicated.

1. Form all joints, except loose locked sealant filled expansion joints, to overlap 2 inches.
2. Secure the joints with rivets spaced 1 inch on center positioned about 1/2 inch from the top edge of the joint, then sweat solder the joint.
3. Use solder only to fill and seal the joint, not for mechanical strength. Form soldered joints continuous, strong and free from defects, with well heated soldering irons. Do not use open flame torches for soldering.
4. Clean soldered joints daily, immediately after soldering, by washing them with soap and water applied with a soft bristle brush, then rinsing with clear water.

B. Securely fasten and anchor all work, and make provisions for thermal expansion. Submit details of expansion joints for approval. Install fasteners through one edge of metal only, use a hook strip on the other edge.

C. Use stainless steel pin Zamac type nail-in fasteners, or stainless steel screws and washers with neoprene inserts where fasteners will be exposed.

3.4 CAP FLASHINGS

A. Install new copper cap flashings built into masonry walls properly joined to all related materials in a watertight manner.

1. Solder all joints in the new cap flashing, except form 2 inch wide flat locked sealant filled expansion joints a maximum of 32 feet on center.
2. Form the flashing to turn up 2 inches inside the wall and finish with a hem on the bottom exposed edge.
3. Fasten the top edge of the cap flashing to the back up masonry 12 inches on center.
4. Install the new cap flashing under flexible type wall flashings where possible. Where it is not possible to lap the new cap flashing under an existing wall flashing, install a ply of glass cloth set in and coated with asphalt cement to connect the new cap flashing to the existing wall flashing.
5. In the absence of an existing wall flashing, or at a solid masonry wall, turn up the new cap flashing 2 inches behind the first wythe of masonry.
6. Install new cap flashings where shown on the drawings, and at a height of 10 to 12 inches above the roof surface.

B. Install new aluminum cap flashings on existing and new skylight and equipment curbs.

1. Form the cap flashing to extend 2 inches under the equipment or skylight, 4 inches over the base flashing, and finish with a 1/2 inch hem on the bottom edge.
2. Install a 1/2 inch thick by 2 inch wide continuous foam gasket between the cap flashing and mechanical equipment or skylight. Do not set the equipment or skylight in sealant.
3. Secure the equipment or skylight to the curb with stainless steel screws spaced 12 inches on center.

3.5 DRIP EDGES

A. Fabricate drip edges to extend 1-1/2 inches past the roof edge, and turn down to ensure water cannot track back and run down the fascia. Secure the drip edge with roofing nails along the top edge, spaced 4 inches apart along the raw metal edge. Form joints in the drip edge with 6 inch wide concealed under plates which duplicate the profile of the drip edge. Set the underplates in a full bed of sealant.

3.6 HOOK STRIPS

A. Form continuous hook strips with locks that engage the superimposed trim piece a minimum of 3/4 inch, and to cover the entire underside edge of the wood blocking and neatly extend to the building wall.

B. Fasten hook strips along their bottom edge, just above the 45 degree bend, with nails spaced 4 inches on center into underlying wood blocking; Zamac type nail-in type fasteners spaced 8 inches on center into masonry surfaces, or screws spaced 8 inches on-center into sheet metal surfaces.

3.7 ROOF EDGE SYSTEM

A. Install a factory fabricated roof edge system on all roof eaves.

1. Extend the EPDM roof down the face of the fascia trim, so it stops just short of the bottom edge of the anchor bar.
2. Install the anchor bar straight, level and true, set in a full bed of sealant, and secure the bar with #9 by 2 inch long stainless steel screws spaced no more than 12 inches apart.
3. Pre-drill screw holes in the underlying metal fascia trim, and where extra fasteners are needed at corners and special conditions.

4. Install color matching under plates at each joint in the roof edge trim; set the under plates in a full bed of sealant.

3.8 CLEANING, PROTECTION AND WATERTIGHTNESS

A. Conduct an inspection of the interior and exterior of the building and grounds, and submit a written report with photos to document any pre-existing leakage or damage, prior to performing any work.

B. The Owner will conduct a similar inspection at the completion of the work, and the Contractor will be charged for all leakage or damage which was not documented in the Contractor's report, or repaired to the Owners satisfaction at the Contractor's expense.

C. Provide any equipment, material and labor necessary to protect the site, the building, its contents and occupants, pedestrians, and surrounding landscaped and paved areas from damage due to the construction work or from inclement weather during construction.

D. Do not perform work during inclement weather. Protect incomplete work and the building from damage by inclement weather which may occur unexpectedly. Make all work areas watertight at the end of each day's work.

E. Frequently clean up all refuse, rubbish, scrap materials and debris so the work site presents a neat, orderly and workmanlike appearance.

F. Carefully clean the roof to remove all residual debris when work is complete. After cleaning the roof, thoroughly clean all drain sumps, drain lines, leader heads and leaders. Do not allow debris to enter the drainage system.

3.9 WASTE MANAGEMENT

A. Coordinate with Section 01 74 19

1. Separate and recycle cut-offs and waste materials and material packaging in accordance with the Waste Management Plan and to the maximum extent economically feasible and place in designated areas for recycling.
2. Set aside and protect materials suitable for reuse and/or remanufacturing until removed from the site.
3. Separate and fold up metal banding; flatten and place along with other metal scrap for recycling in designated area.

END OF SECTION 07 62 00

SECTION 07 84 13 - PENETRATION FIRESTOPPING

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. This section includes the performance criteria, materials, production, and erection of penetration firestopping for the project. The work performed under this Section consists of the provision of all plant, materials, labor and equipment and the like necessary and/or required for the complete execution of all penetration firestopping as required by the this section, schedules.

1. Penetrations in fire-resistance-rated walls.
2. Penetrations in horizontal assemblies.
3. Penetrations in smoke barriers.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Product Schedule: For each penetration firestopping system. Include location and design designation of qualified testing and inspecting agency.

1. Where Project conditions require modification to a qualified testing and inspecting agency's illustration for a particular penetration firestopping condition, submit illustration, with modifications marked, approved by penetration firestopping manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer.

B. Installer Certificates: From Installer indicating penetration firestopping has been installed in compliance with requirements and manufacturer's written recommendations.

C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for penetration firestopping.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A firm that has been approved by FM Global according to FM Global 4991, "Approval of Firestop Contractors," or been evaluated by UL and found to comply with its "Qualified Firestop Contractor Program Requirements."

B. Installer Qualifications: A firm experienced in installing penetration firestopping similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful performance. Qualifications include having the necessary experience, staff, and training to install manufacturer's products per specified requirements. Manufacturer's willingness to sell its penetration firestopping products to Contractor or to Installer engaged by Contractor does not in itself confer qualification on buyer.

C. Fire-Test-Response Characteristics: Penetration firestopping shall comply with the following requirements:

1. Penetration firestopping tests are performed by a qualified testing agency acceptable to authorities having jurisdiction.
2. Penetration firestopping is identical to those tested per testing standard referenced in "Penetration Firestopping" Article. Provide rated systems complying with the following requirements:

a. Penetration firestopping products bear classification marking of qualified testing and inspecting agency.
b. Classification markings on penetration firestopping correspond to designations listed by the following:

1) UL in its "Fire Resistance Directory."

D. Preinstallation Conference: Conduct conference at Project site.

1.6 REFERENCED STANDARDS

A. American Society for Testing and Materials (ASTM).

1. E 814 – Standard Method of fire Tests of Through Penetration Fire Stops.
2. E 119 – Methods of Fire Tests of Building Construction and Materials.
3. E 84 – Standard Test Method for Surface Burning Characteristics of Building Materials.
4. E 136 – Test Method for Behavior of Materials in a Vertical Tube Furnace at 750F.
5. E 1399 – Cyclic Movement and Measuring Minimum and Maximum Joint Widths.
6. E 1966 – Test method for Resistance of Building Joint.
7. E 2174 – Standard practice for On-Site Inspection of Installed Firestops.
8. E 05.11.14 – Standard Test method for Determining the fire endurance of Perimeter Fire Barrier Systems Using the Intermediate-Scale, Multi Story Test Apparatus (ISMA): ASTM number pending draft approval.

B. Underwriters Laboratories, Inc. (UL).

1. UL 1479 – Fire Tests of Through Penetration fire Stops.
2. UL 263 – Fire Test of Building Construction and Materials.
3. UL 723 – Surface Burning Characteristics of Building Materials.

4. UL 2079 – Tests for Fire Resistance of Building Joint Systems.
5. UL "Fire Resistance Directory", current year, including but not limited to the following:

    a. For penetrations by uninsulated, non-combustible items including steel pipe, copper pipe, rigid steel conduit and electrical metallic tubing (EMT):
        1) UL System: CAJ-1235, CAJ-1404, WL-1152.
    b. For penetrations by insulated, non-combustible items including steel pipe, cooper pipe, rigid steel conduit and electrical metallic tubing (EMT):
        1) UL Systems: CAJ-5222, CAJ-5250, CAJ-5251, WL-5171.
    c. For penetrations of PVC jacketed, flexible cable or cable bundles and plastic pipe (closed piping systems):
        1) UL Systems: CAJ-2401, CAJ-3185, CAJ-3199, CAJ-3234, WL-3118, WL-3179, WL-3199.
    d. For penetrations of combustible plastic pipe (open piping system):
        1) UL Systems: CAJ-2174, CAJ-2330, CAJ-2351, CAJ-2432, WL-2168, WL-2170, WL-2185, WL-2259.
    e. For penetrations by multiple combustible and/or non-combustible items:
        1) UL Systems: CAJ-8101, CAJ-8133, WL-8007.
    f. For large size / complex penetrations made to accommodate cable trays, multiple steel and cooper pipes, electrical busways in raceways:
        1) UL Systems: CAJ-1406, CAJ-1502, CAJ-4053, CAJ-6027, WJ6004, WL-1207, WL-2343, WL-4030, WL-6018.
    g. For penetrations by steel ducts:
        1) UL Systems: CAJ-7075, CAJ-7082, WJ-7045, WJ-7046, WL-7006, WL-7046, WL-7081, WL-7082.
    h. For fire-rated construction joints and other gaps:
        1) UL Systems: CEJ-296P, CEJ-302P.
    i. For openings between structurally separate sections of wall and floors:
        1) At the top of walls: UL systems: HWD-0107, HWD-0110, HWD-0257, HWD-0267, HWD-0299, HWD-0327, HWD-0266, HWD-0333, HWD-0334.

C. Factory Mutual (FM) Approval guide, current year.

D. National Fire Protection Association.

E. FICA "Manual of Practice".

F. International Firestop Council (IFC).

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Do not install penetration firestopping when ambient or substrate temperatures are outside limits permitted by penetration firestopping manufacturers or when substrates are wet because of rain, frost, condensation, or other causes.

B. Install and cure penetration firestopping per manufacturer's written instructions using natural means of ventilations or, where this is inadequate, forced-air circulation.

1.8 COORDINATION

A. Coordinate construction of openings and penetrating items to ensure that penetration firestopping is installed according to specified requirements.

B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate penetration firestopping.

C. Notify Owner's testing agency at least seven days in advance of penetration firestopping installations; confirm dates and times on day preceding each series of installations.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following, or approved equal:

1. Grace Construction Products.
2. Hilti, Inc.
3. Johns Manville.
4. NUCO Inc.
5. Passive Fire Protection Partners.
6. Specified Technologies Inc.
7. 3M Fire Protection Products.
8. Tremco, Inc.; Tremco Fire Protection Systems Group.
9. USG Corporation.

2.2 PENETRATION FIRESTOPPING

A. Provide penetration firestopping that is 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 construction penetrated. Penetration firestopping systems shall be compatible with one another, with the substrates forming openings, and with penetrating items if any.

B. Penetrations in Fire-Resistance-Rated Walls: Provide penetration firestopping with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg (2.49 Pa).

1. Fire-resistance-rated walls include fire walls, fire-barrier walls, smoke-barrier walls and fire partitions.
2. F-Rating: Not less than the fire-resistance rating of constructions penetrated.

C. Penetrations in Horizontal Assemblies: Provide penetration firestopping with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg (2.49 Pa).

1. Horizontal assemblies include floors, floor/ceiling assemblies and ceiling membranes of roof/ceiling assemblies.
2. F-Rating: At least 1 hour, but not less than the fire-resistance rating of constructions penetrated.
3. T-Rating: At least 1 hour, but not less than the fire-resistance rating of constructions penetrated except for floor penetrations within the cavity of a wall.

D. Penetrations in Smoke Barriers: Provide penetration firestopping with ratings determined per UL 1479.

1. L-Rating: Not exceeding 5.0 cfm/sq. ft. (0.025 cu. m/s per sq. m) of penetration opening at 0.30-inch wg (74.7 Pa) at both ambient and elevated temperatures.

E. W-Rating: Provide penetration firestopping showing no evidence of water leakage when tested according to UL 1479.

F. Exposed Penetration Firestopping: Provide products with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E 84.

G. VOC Content: Penetration firestopping sealants and sealant primers shall comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):

1. Sealants: 250 g/L.
2. Sealant Primers for Nonporous Substrates: 250 g/L.
3. Sealant Primers for Porous Substrates: 775 g/L.

H. Accessories: Provide components for each penetration firestopping system that are needed to install fill materials and to maintain ratings required. Use only those components specified by penetration firestopping manufacturer and approved by qualified testing and inspecting agency for firestopping indicated.

1. Permanent forming/damming/backing materials, including the following:

a. Slag-wool-fiber or 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. Fire-rated form board.
d. Fillers for sealants.

2. Temporary forming materials.
3. Substrate primers.
4. Collars.
5. Steel sleeves.

2.3 FILL MATERIALS

A. Cast-in-Place Firestop Devices: Factory-assembled devices for use in cast-in-place concrete floors and consisting of an outer metallic sleeve lined with an intumescent strip, a radial extended flange attached to one end of the sleeve for fastening to concrete formwork, and a neoprene gasket.

B. Flexible Firestop Sealant (For use where roof joists penetrate fire-rated walls): Acrylic based firestop sealant that provides movement capability in fire rated joint applications. Basis of Design: Hilti CP 606.

C. Latex Sealants: Single-component latex formulations that do not re-emulsify after cure during exposure to moisture.

D. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.

E. Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced elastomeric sheet bonded to galvanized-steel sheet.

F. Intumescent Putties: Nonhardening dielectric, water-resistant putties containing no solvents, inorganic fibers, or silicone compounds.

G. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.

H. Mortars: Prepackaged dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers, and lightweight aggregate formulated for mixing with water at Project site to form a nonshrinking, homogeneous mortar.

I. Pillows/Bags: Reusable heat-expanding pillows/bags consisting of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents, and fire-retardant additives. Where exposed, cover openings with steel-reinforcing wire mesh to protect pillows/bags from being easily removed.

J. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.

K. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below:

1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces, and nonsag formulation for openings in vertical and sloped surfaces, unless indicated firestopping limits use of nonsag grade for both opening conditions.

2.4 MIXING

A. For those products requiring mixing before application, comply with penetration firestopping manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

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 of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning: Clean out openings immediately before installing penetration firestopping to comply with manufacturer's written instructions and with the following requirements:

1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of penetration firestopping.
2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with penetration firestopping. 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 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 penetration firestopping from contacting adjoining surfaces that will remain exposed on completion of the Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove stains. Remove tape as soon as possible without disturbing firestopping's seal with substrates.

3.3 INSTALLATION

A. General: Install penetration firestopping to comply with manufacturer's written installation instructions and published drawings for products and applications indicated.

B. Install forming 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 and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of firestopping.

C. Install fill materials for firestopping 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 the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 IDENTIFICATION

A. Identify penetration firestopping with preprinted metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches (150 mm) of firestopping edge so labels will be visible to anyone seeking to remove penetrating items or firestopping. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:

1. The words "Warning - Penetration Firestopping - Do Not Disturb. Notify Building Management of Any Damage."
2. Contractor's name, address, and phone number.
3. Designation of applicable testing and inspecting agency.
4. Date of installation.
5. Manufacturer's name.
6. Installer's name.

3.5 FIELD QUALITY CONTROL

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

B. Where deficiencies are found or penetration firestopping is damaged or removed because of testing, repair or replace penetration firestopping to comply with requirements.

C. Proceed with enclosing penetration firestopping with other construction only after inspection reports are issued and installations comply with requirements.

3.6 CLEANING AND PROTECTION

A. Clean off excess fill materials adjacent to openings as the Work progresses by methods and with cleaning materials that are approved in writing by penetration firestopping manufacturers and that do not damage materials in which openings occur.

B. Provide final protection and maintain conditions during and after installation that ensure that penetration firestopping is without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, immediately cut out and remove damaged or deteriorated penetration firestopping and install new materials to produce systems complying with specified requirements.

3.7 PENETRATION FIRESTOPPING SCHEDULE

A. The following schedules shall be completed by the Contractor and reviewed prior to submission to the Architect. The Table included shall be completed with each of the following categories of penetrating items:

1. Single uninsulated metallic piping and conduit.

2. Multiple uninsulated metallic piping and conduit.
3. Uninsulatted plastic piping and conduit.
4. Insulated metallic piping.
5. Insulated high temperature flues and exhaust pipes (boiler flues, generator exhausts insulated with calcium silicate or on the non-combustible insulation, etc.)
6. Cable tray.
7. Electric / telephone cable.
8. Bus duct.
9. Miscellaneous penetrations.

B. Complete the additional Tables for the following, using the format provided.

1. Blanks, voids, holes (including edge of slab).
2. Engineering judgments.
3. Ductwork engineering judgments.

3.3 WASTE MANAGEMENT

A. Coordinate with Section 01 74 19.

1. Separate and recycle cut-offs and waste materials and material packaging in accordance with Waste Management Plan and to the maximum extent economically feasible and place in designated areas for recycling.
2. Set aside and protect materials suitable for reuse and/or remanufacturing.
3. Separate and fold up metal banding; flatten and place along with other metal scrap for recycling in designated area.

END OF SECTION 07 84 13

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SECTION 07 84 46 - FIRE-RESISTIVE JOINT SYSTEMS

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. The Work of this Section consists of the provision of all plant, labor, materials, equipment, testing and services necessary to complete the work for fire resistive joint systems as shown on the schedules, keynotes, drawings, as specified herein, and as may be required by conditions and authorities having jurisdiction, including, but not limited to, the following:

1. Joints in or between fire-resistance-rated constructions.
2. Joints at exterior storefront-wall/floor intersections.
3. Joints in smoke barriers.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Product Schedule: For each fire-resistive joint system. Include location and design designation of qualified testing agency. Retain subparagraph below only after verifying that authorities having jurisdiction will accept modifications handled by method in subparagraph.

1. Where Project conditions require modification to a qualified testing agency's illustration for a particular fire-resistive joint system condition, submit illustration, with modifications marked, approved by fire-resistive joint system manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly.

1.4 INFORMATIONAL SUBMITTALS

A. Installer Certificates: From Installer indicating fire-resistive joint systems have been installed in compliance with requirements and manufacturer's written recommendations.

B. Product test reports.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A firm that has been approved by FM Global according to FM Global 4991, "Approval of Firestop Contractors," or been evaluated by UL and found to comply with UL's "Qualified Firestop Contractor Program Requirements."

B. Fire-Test-Response Characteristics: Fire-resistive joint systems shall comply with the following requirements:

1. Fire-resistive joint system tests are performed by a qualified testing agency acceptable to authorities having jurisdiction.

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

PART 2 - PRODUCTS

2.1 FIRE-RESISTIVE JOINT SYSTEMS

A. Where required, provide fire-resistive joint 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 assemblies in or between which fire-resistive joint systems are installed. Fire-resistive joint systems shall accommodate building movements without impairing their ability to resist the passage of fire and hot gases.

B. Joints in or between Fire-Resistance-Rated Construction: Ratings determined per ASTM E 1966 or UL 2079:

1. Fire-Resistance Rating: Equal to or exceeding the fire-resistance rating of construction they will join.

2. Manufacturers: Subject to compliance with requirements, provide products by one of the following available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Grace Construction Products.
b. Hilti, Inc.
c. 3M Fire Protection Products.
d. Tremco, Inc.; Tremco Fire Protection Systems Group.
e. USG Corporation.

C. Joints at Exterior Storefront-Wall/Floor Intersections: Rating determined by ASTM E 119 based on testing at a positive pressure differential of 0.01-inch wg or ASTM E 2307.

1. Fire-Resistance Rating: Equal to or exceeding the fire-resistance rating of the floor assembly.

2. Basis of Design: Perimeter Fire Barrier System CEJ 127P (HI/JS 120-05) by Hilti, Inc.

3. Manufacturers: Subject to compliance with requirements, provide products by one of the following available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Grace Construction Products.
b. Hilti, Inc.
c. 3M Fire Protection Products.
d. Thermafiber, Inc.
e. Tremco, Inc.; Tremco Fire Protection Systems Group.
f. USG Corporation.

D. Joints in Smoke Barriers: Ratings determined per UL 2079.

1. L-Rating: Not exceeding 5.0 cfm/ft of joint at 0.30 inch wg at both ambient and elevated temperatures.

2. Manufacturers: Subject to compliance with requirements, provide products by one of the following available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Grace Construction Products.
b. Hilti, Inc.
c. 3M Fire Protection Products.
d. Tremco, Inc.; Tremco Fire Protection Systems Group.
e. USG Corporation.

E. Exposed Fire-Resistive Joint Systems: Provide products with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E 84.

F. VOC Content: Fire-resistive joint system sealants shall comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):

1. Architectural Sealants: 250 g/L.

2. Sealant Primers for Nonporous Substrates: 250 g/L.

3. Sealant Primers for Porous Substrates: 775 g/L.

G. Accessories: Provide components of fire-resistive joint systems, including primers and forming materials that are needed to install fill materials and to maintain ratings required. Use only components specified by fire-resistive joint system manufacturer and approved by the qualified testing agency for systems indicated.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for joint configurations, substrates, and other conditions affecting performance of the Work.

B. Install fire-resistive joint systems to comply with manufacturer's written installation instructions and published drawings for products and applications indicated.

C. Install forming materials and other accessories of types required to support fill materials during their application and in position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.

1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of fire-resistive joint system.

D. Install fill materials for fire-resistive joint systems by proven techniques to produce the following results:

1. Fill voids and cavities formed by joints and forming materials as required to achieve fire-resistance ratings indicated.
2. Apply fill materials so they contact and adhere to substrates formed by joints.
3. For fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.2 IDENTIFICATION

A. Identify fire-resistive joint systems with preprinted metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches of joint edge so labels will be visible to anyone seeking to remove or penetrate joint system. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:

1. The words "Warning - Fire-Resistive Joint System - Do Not Disturb. Notify Building Management of Any Damage."
2. Contractor's name, address, and phone number.
3. Designation of applicable testing agency.
4. Date of installation.
5. Manufacturer's name.
6. Installer's name.

3.3 FIELD QUALITY CONTROL

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

B. Where deficiencies are found or fire-resistive joint systems are damaged or removed due to testing, repair or replace fire-resistive joint systems so they comply with requirements.

C. Proceed with enclosing fire-resistive joint systems with other construction only after inspection reports are issued and installations comply with requirements

3.4 FIRE-RESISTIVE JOINT SYSTEM SCHEDULE

A. Where UL-classified systems are indicated, they refer to system numbers in UL's "Fire Resistance Directory" under product Category XHBN or Category XHDG.

B. Where Intertek ETL SEMKO-listed systems are indicated, they refer to design numbers in Intertek ETL SEMKO's "Directory of Listed Building Products" under product category Expansion/Seismic Joints or Firestop Systems.

C. Floor-to-Floor, Fire-Resistive Joint Systems FRJS-1:

1. UL-Classified Systems: FF-D S-Insert four-digit number 0000-0999 1000-1999 2000-2999 3000-3999 4000-4999.

D. Wall-to-Wall, Fire-Resistive Joint Systems FRJS-2:

1. UL-Classified Systems: WW-D S-Insert four-digit number 0000-0999 1000-1999 2000-2999 3000-3999 4000-4999.

E. Floor-to-Wall, Fire-Resistive Joint Systems FRJS-3:

1. UL-Classified Systems: FW-D or S-Insert four-digit number 0000-0999 1000-1999 2000-2999 3000-3999 4000-4999.

F. Head-of-Wall, Fire-Resistive Joint Systems FRJS-4:

1. UL-Classified Systems: HW-D S-Insert four-digit number 0000-0999 1000-1999 2000-2999 3000-3999 4000-4999.
2. Intertek ETL SEMKO-Listed Systems:

G. Bottom-of-Wall, Fire-Resistive Joint Systems FRJS-5:

1. UL-Classified Systems: BW-D S-Insert four-digit number 0000-0999 1000-1999 2000-2999 3000-3999 4000-4999.

H. Wall-to-Wall, Fire-Resistive Joint Systems Intended for Use as Corner Guards FRJS-6:

1. UL-Classified Systems: CG-D S-Insert four-digit number 0000-0999 1000-1999 2000-2999 3000-3999 4000-4999.

I. Perimeter Fire-Resistive Joint Systems PFRJS-1:

1. UL-Classified Perimeter Fire-Containment Systems: CW-D S-Insert four-digit number 0000-0999 1000-1999 2000-2999.
2. Intertek ETL SEMKO-Listed, Perimeter Fire-Barrier Systems.

3.5 WASTE MANAGEMENT

A. Coordinate with Section 01 74 19.

1. Separate and recycle cut-offs and waste materials and material packaging in accordance with Waste Management Plan and to the maximum extent economically feasible and place in designated areas for recycling.
2. Set aside and protect materials suitable for reuse and/or remanufacturing.
3. Separate and fold up metal banding; flatten and place along with other scrap for recycling.

END OF SECTION 07 84 46

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SECTION 07 92 00 - JOINT SEALANTS

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. The Work of this Section consists of the provision of all plant, labor, materials, equipment, testing and services necessary to complete the work for joint sealants as shown on the schedules, keynotes, drawings, as specified herein, and as may be required by conditions and authorities having jurisdiction, including, but not limited to, the following:

1. Architectural Sealants.
2. Sealant Primers for Nonporous Substrates.
3. Sealant Primers for Porous Substrates.

B. Related Sections:

1. Division 04 "Unit Masonry" for masonry control and expansion joint fillers and gaskets.
2. Division 07 "Expansion Control" for building expansion joints, "Fire-Resistive Joint Systems" for sealing joints in fire-resistance-rated construction.
3. Division 08 "Glazing" for glazing sealants.
4. Division 09 "Gypsum Board" for sealing perimeter joints, "Tiling" for sealing tile joints,
5. "Acoustical Tile Ceilings**"** for sealing edge moldings at perimeters with acoustical sealant.

1.3 PRECONSTRUCTION TESTING

A. Preconstruction Compatibility and Adhesion Testing: Submit to joint-sealant manufacturers, for testing indicated below, samples of materials that will contact or affect joint sealants.

1. Use ASTM C 1087 to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.
2. Submit not fewer than eight pieces of each kind of material, including joint substrates, shims, joint-sealant backings, secondary seals, and miscellaneous materials.
3. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
4. For materials failing tests, obtain joint-sealant manufacturer's written instructions for corrective measures including use of specially formulated primers.
5. Testing will not be required if joint-sealant manufacturers submit joint preparation data that are based on previous testing, not older than 24 months, of sealant products for adhesion to, and compatibility with, joint substrates and other materials matching those submitted.

B. Preconstruction Field-Adhesion Testing: Before installing sealants, field test their adhesion to Project joint substrates as follows:

1. Locate test joints where indicated on Project or, if not indicated, as directed by Architect.
2. Conduct field tests for each application indicated below:

    a. Each kind of sealant and joint substrate indicated.

3. Notify Architect seven days in advance of dates and times when test joints will be erected.
4. Arrange for tests to take place with joint-sealant manufacturer's technical representative present.

    a. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.

        1) For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.

5. Report whether sealant failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. For sealants that fail adhesively, retest until satisfactory adhesion is obtained.
6. Evaluation of Preconstruction Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing, in absence of other indications of noncompliance with requirements, will be considered satisfactory. Do not use sealants that fail to adhere to joint substrates during testing.

1.4 ACTION SUBMITTALS

A. Product Data: For each joint-sealant product indicated.

B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

C. Samples for Verification: For each kind and color of joint sealant required, provide Samples with joint sealants in 1/2-inch- (13-mm-) wide joints formed between two 6-inch- (150-mm-) long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.

D. Joint-Sealant Schedule: Include the following information:

1. Joint-sealant application, joint location, and designation.
2. Joint-sealant manufacturer and product name.
3. Joint-sealant formulation.
4. Joint-sealant color.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer and testing agency.

B. Product Certificates: For each kind of joint sealant and accessory, from manufacturer.

C. Sealant, Waterproofing, and Restoration Institute (SWRI) Validation Certificate: For each sealant specified to be validated by SWRI's Sealant Validation Program.

D. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, indicating that sealants comply with requirements.

E. Preconstruction Compatibility and Adhesion Test Reports: From sealant manufacturer, indicating the following:

1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
2. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.

F. Preconstruction Field-Adhesion Test Reports: Indicate which sealants and joint preparation methods resulted in optimum adhesion to joint substrates based on testing specified in "Preconstruction Testing" Article.

G. Field-Adhesion Test Reports: For each sealant application tested.

H. Warranties: Sample of special warranties.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.

B. Source Limitations: Obtain each kind of joint sealant from single source from single manufacturer.

C. Product Testing: Test joint sealants using a qualified testing agency.

1. Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated.
2. Test according to SWRI's Sealant Validation Program for compliance with requirements specified by reference to ASTM C 920 for adhesion and cohesion under cyclic movement, adhesion-in-peel, and indentation hardness.

D. Mockups: Install sealant in mockups of assemblies specified in other Sections that are indicated to receive joint sealants specified in this Section. Use materials and installation methods specified in this Section.

E. Preinstallation Conference: Conduct conference at Project site.

1.7 PROJECT CONDITIONS

A. Do not proceed with installation of joint sealants under the following conditions:

1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F (5 deg C).
2. When joint substrates are wet.
3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.8 WARRANTY

A. Special Installer's Warranty: Manufacturer's standard form in which Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

B. Special Manufacturer's Warranty: Manufacturer's standard form in which joint-sealant manufacturer agrees to furnish joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

C. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:

1. Movement of the structure caused by structural settlement or errors attributable to design or construction resulting in stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
2. Disintegration of joint substrates from natural causes exceeding design specifications.
3. Mechanical damage caused by individuals, tools, or other outside agents.
4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.

B. VOC Content of Interior Sealants: Sealants and sealant primers used inside the weatherproofing system shall comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):

1. Architectural Sealants: 250 g/L.
2. Sealant Primers for Nonporous Substrates: 250 g/L.
3. Sealant Primers for Porous Substrates: 775 g/L.

C. Liquid-Applied Joint Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied joint sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.

1. Suitability for Immersion in Liquids. Where sealants are indicated for Use I for joints that will be continuously immersed in liquids, provide products that have undergone testing according to ASTM C 1247. Liquid used for testing sealants is deionized water, unless otherwise indicated.

D. Stain-Test-Response Characteristics: Where sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.

E. Suitability for Contact with Food: Where sealants are indicated for joints that will come in repeated contact with food, provide products that comply with 21 CFR 177.2600.

F. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

G. Suitability for Contact with Food: Comply with 21 CFR 177.2600, where applicable.

2.2 SILICONE JOINT SEALANTS

A. Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 100/50, for Use NT.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Dow Corning Corporation; 790
b. GE Advanced Materials - Silicones; SilPruf LM SCS2700.
c. May National Associates, Inc.; [Bondaflex Sil 290] [Bondaflex Sil 728 NS].
d. Pecora Corporation; [301 NS] [311 NS] [890] [890FTS].
e. Sika Corporation, Construction Products Division; SikaSil-C990.
f. Tremco Incorporated; [Spectrem 1] [Spectrem 800].

B. Single-Component, Nonsag, Urethane Joint Sealant: ASTM C 920, Type S, Grade NS, Class 100/50, for Use NT.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Sika Corporation, Construction Products Division; Sikaflex - 15LM.
b. Tremco Incorporated; [Vulkem 921] [Dymonic FC].

2.3 ACOUSTICAL JOINT SEALANTS

A. Acoustical Joint Sealant: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.

1. Products: Subject to compliance with requirements, [provide the following] [provide one of the following] [available products that may be incorporated into the Work include, but are not limited to, the following]:

    a. Pecora Corporation; [AC-20 FTR] [AIS-919].
    b. USG Corporation; SHEETROCK Acoustical Sealant.

2.4 JOINT SEALANT BACKING

A. General: Provide sealant backings of material that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

B. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin), Type O (open-cell material), Type B (bicellular material with a surface skin), or any of the preceding types, as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

2.5 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, and other conditions affecting performance of the Work.

B. Examine joints for suitable conditions.

C. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:

    a. Concrete.
    b. Masonry.
    c. Unglazed surfaces of ceramic tile.

3. Remove laitance and form-release agents from concrete.
4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:

    a. Metal.
    b. Glass.
    c. Porcelain enamel.
    d. Glazed surfaces of ceramic tile.

B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

1. Do not leave gaps between ends of sealant backings.
2. Do not stretch, twist, puncture, or tear sealant backings.
3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.

D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:

1. Place sealants so they directly contact and fully wet joint substrates.
2. Completely fill recesses in each joint configuration.
3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

1. Remove excess sealant from surfaces adjacent to joints.
2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
3. Provide concave joint profile per Figure 8A in ASTM C 1193, unless otherwise indicated.
4. Provide flush joint profile where indicated per Figure 8B in ASTM C 1193.
5. Provide recessed joint configuration of recess depth and at locations indicated per Figure 8C in ASTM C 1193.

    a. Use masking tape to protect surfaces adjacent to recessed tooled joints.

G. Installation of Preformed Silicone-Sealant System: Comply with the following requirements:

1. Apply masking tape to each side of joint, outside of area to be covered by sealant system.
2. Apply silicone sealant to each side of joint to produce a bead of size complying with preformed silicone-sealant system manufacturer's written instructions and covering a bonding area of not less than 3/8 inch (10 mm). Hold edge of sealant bead 1/4 inch inside masking tape.
3. Within 10 minutes of sealant application, press silicone extrusion into sealant to wet extrusion and substrate. Use a roller to apply consistent pressure and ensure uniform contact between sealant and both extrusion and substrate.
4. Complete installation of sealant system in horizontal joints before installing in vertical joints. Lap vertical joints over horizontal joints. At ends of joints, cut silicone extrusion with a razor knife.

H. Acoustical Sealant Installation: At sound-rated assemblies and elsewhere as indicated, seal construction at perimeters, behind control joints, and at openings and penetrations with a

continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written recommendations.

3.4 FIELD QUALITY CONTROL

A. Field-Adhesion Testing: Field test joint-sealant adhesion to joint substrates as follows:

1. Extent of Testing: Test completed and cured sealant joints as follows:

    a. Perform 10 tests for the first 1000 feet (300 m) of joint length for each kind of sealant and joint substrate.
    b. Perform 1 test for each 1000 feet (300 m) of joint length thereafter or 1 test per each floor per elevation.

2. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.

    a. For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.

3. Inspect tested joints and report on the following:

    a. Whether sealants filled joint cavities and are free of voids.
    b. Whether sealant dimensions and configurations comply with specified requirements.
    c. Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. Compare these results to determine if adhesion passes sealant manufacturer's field-adhesion hand-pull test criteria.

4. Record test results in a field-adhesion-test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant fill, sealant configuration, and sealant dimensions.
5. Repair sealants pulled from test area by applying new sealants following same procedures used originally to seal joints. Ensure that original sealant surfaces are clean and that new sealant contacts original sealant.

B. Evaluation of Field-Adhesion Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

3.5 CLEANING

A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.6 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

3.7 JOINT-SEALANT SCHEDULE

A. Joint-Sealant Application: Exterior joints in vertical surfaces and horizontal nontraffic surfaces.

1. Joint Locations:

    a. Construction joints in cast-in-place concrete.
    b. Joints between plant-precast architectural concrete units.
    c. Control and expansion joints in unit masonry.
    d. Joints in dimension cast stone cladding.
    e. Joints in glass unit masonry assemblies.
    f. Joints between metal panels.
    g. Joints between different materials listed above.
    h. Perimeter joints between materials listed above and frames of doors, windows and louvers.
    i. Control and expansion joints in ceilings and other overhead surfaces.

2. Silicone Joint Sealant: Single component, nonsag, neutral curing, Class 100/50.
3. Urethane Joint Sealant: Single component, nonsag, Class 100/50.
4. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

B. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces.

1. Joint Locations:

    a. Control and expansion joints on exposed interior surfaces of exterior walls.
    b. Perimeter joints of exterior openings where indicated.
    c. Tile control and expansion joints.
    d. Vertical joints on exposed surfaces of interior unit masonry, concrete walls and] partitions.
    e. Joints on underside of plant-precast structural concrete planks.
    f. Perimeter joints between interior wall surfaces and frames of interior doors, windows and elevator entrances.
    g. Other joints as indicated.
2. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

C. Joint-Sealant Application: Interior acoustical joints in vertical surfaces and horizontal nontraffic surfaces.

1. Joint Location:

a. Acoustical joints where indicated.
b. Other joints as indicated.

2. Joint Sealant: Acoustical.
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range.

3.8 WASTE MANAGEMENT

A. Coordinate with Section 01 74 19.

1. Separate and recycle cut-offs and waste materials and material packaging in accordance with Waste Management Plan and to the maximum extent economically feasible and place in designated areas for recycling.
2. Set aside and protect materials suitable for reuse and/or remanufacturing.
3. Separate and fold up metal banding; flatten and place along with other scrap for recycling.

END OF SECTION 07 92 00

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SECTION 07 95 00 - EXPANSION CONTROL

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. The Work of this Section consists of the provision of all plant, labor, materials, equipment, testing and services necessary to complete the work for expansion control as shown on the schedules, keynotes, drawings, as specified herein, and as may be required by conditions and authorities having jurisdiction, including, but not limited to, the following:

1. Interior floor wall ceiling expansion control systems.
2. Exterior wall expansion control systems.

B. Related Requirements:
1. Division 3 for concrete work
2. Division 5 for structural and non-structural metal work
3. Section 07 92 00 Joint Sealants
4. Section 07 53 23 EPDM Roofing
5. Section 07 62 00 SM Flashing and Specialties
6. Section 07 72 00 Roof Accessories
7. Division 9 for interior wall and floor work

1.3 ACTION SUBMITTALS

A. Shop Drawings: For each expansion control system specified. Include plans, elevations, sections, details, splices, blockout requirement, attachments to other work, and line diagrams showing entire route of each expansion control system. Where expansion control systems change planes, provide isometric or clearly detailed drawing depicting how components interconnect.

B. Samples: For each exposed expansion control system and for each color and texture specified, full width by 6 inches (150 mm) long in size.

C. Samples for Initial Selection: For each type of expansion control system indicated.

1. Include manufacturer's color charts showing the full range of colors and finishes available for each exposed metal and elastomeric seal material.

D. Samples for Verification: For each type of expansion control system indicated, full width by 6 inches (150 mm) long in size.

E. Product Schedule: Prepared by or under the supervision of the supplier. Include the following information in tabular form:

1. Manufacturer and model number for each expansion control system.
2. Expansion control system location cross-referenced to Drawings.
3. Nominal joint width.
4. Movement capability.
5. Classification as thermal or seismic.
6. Materials, colors, and finishes.
7. Product options.
8. Fire-resistance ratings.

1.4 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For each fire barrier provided as part of an expansion control system, for tests performed by a qualified testing agency.

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

A. General: Provide expansion control systems of design, basic profile, materials, and operation indicated. Provide units with capability to accommodate variations in adjacent surfaces.

1. Furnish units in longest practicable lengths to minimize field splicing. Install with hairline mitered corners where expansion control systems change direction or abut other materials.
2. Include factory-fabricated closure materials and transition pieces, T-joints, corners, curbs, cross-connections, and other accessories as required to provide continuous expansion control systems.

B. Coordination: Coordinate installation of exterior wall and soffit expansion control systems with roof expansion control systems to ensure that wall transitions are watertight. Roof expansion joint assemblies are specified elsewhere.

2.2 PERFORMANCE REQUIREMENTS

A. Fire-Resistance Ratings: Where indicated, provide expansion control systems with fire barriers identical to those of systems tested for fire resistance per UL 2079 or ASTM E 1966 by a testing and inspecting agency acceptable to authorities having jurisdiction.

1. Hose Stream Test: Wall-to-wall and wall-to-ceiling systems shall be subjected to hose stream testing.

B. Seismic Performance: Expansion control systems shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

1. The term "withstand" means "the system will remain in place without separation of any parts when subjected to the seismic forces specified and the system will be fully operational after the seismic event."
2. Component Importance Factor is 1.5.

2.3 INTERIOR EXPANSION CONTROL SYSTEMS

A. Locations: Where noted in drawings.

B. Basis-of-Design Product: Subject to compliance with requirements, provide products by MM Systems Corporation, as indicated on the drawings or a comparable product by one of the following:

1. Architectural Art Mfg., Inc.; Division of Pittcon Industries.
2. Balco, Inc.
3. JointMaster/InPro Corporation.
4. Michael Rizza Company, LLC.
5. Construction Specialties, Inc.
6. Nystrom, Inc.

C. Source Limitations: Obtain expansion control systems from single source from single manufacturer.

D. Interior Expansion Control System Requirement:

1. Floor to Floor - LASD
2. Floor to Wall – FSSTE
3. Wall to Wall – VSW
4. Wall to Corner – VSWL
5. Wall to Ceiling – VSWL
6. Ceiling to Ceiling – VSG
7. Wall to Soffit – VSWL

E. Finishes shall be compatible with adjacent materials or as designated in the drawings.

2.4 EXTERIOR WALL EXPANSION CONTROL SYSTEMS

A. Basis-of-Design Product: Subject to compliance with requirements, provide products by MM Systems Corporation, as indicated on the drawings or a comparable product by one of the following:

1. Architectural Art Mfg., Inc.; Division of Pittcon Industries.
2. Balco, Inc.
3. JointMaster/InPro Corporation.
4. Michael Rizza Company, LLC.
5. Construction Specialties, Inc.
6. Nystrom, Inc.

B. Source Limitations: Obtain expansion control systems from single source from single manufacturer.

C. Fire Resistance Rating: same as adjacent construction.

D. Exterior Expansion Control System Requirement with cover plates:
1. Wall to Wall – ESS
2. Wall to Corner – ESS

E. Exposed gasket: Extruded flexible gasket. Color as selected by Architect from manufacture's full range.

2.5 MATERIALS

A. Aluminum: ASTM B 221 (ASTM B 221M), Alloy 6063-T5 for extrusions; ASTM B 209 (ASTM B 209M), Alloy 6061-T6 for sheet and plate.

1. Apply manufacturer's standard protective coating on aluminum surfaces to be placed in contact with cementitious materials.

B. Elastomeric Seals: ASTM E 1783; preformed elastomeric membranes or extrusions to be installed in metal frames.

C. Compression Seals: ASTM E 1612; preformed elastomeric extrusions having an internal baffle system and designed to function under compression.

D. Cellular Foam Seals: Extruded, compressible foam designed to function under compression.

E. Elastomeric Concrete: Modified epoxy or polyurethane extended into a prepackaged aggregate blend, specifically designed for bonding to concrete substrates.

F. Fire Barriers: Any material or material combination, when fire tested after cycling, designated to resist the passage of flame and hot gases through a movement joint and to meet performance criteria for required fire-resistance rating.

G. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107/C 1107M, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

H. Accessories: Manufacturer's standard anchors, clips, fasteners, set screws, spacers, and other accessories compatible with material in contact, as indicated or required for complete installations.

2.6 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.7 ALUMINUM FINISHES

A. Mill finish.

B. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine surfaces where expansion control systems will be installed for installation tolerances and other conditions affecting performance of work.

1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare substrates according to expansion control system manufacturer's written instructions.

B. Coordinate and furnish anchorages, setting drawings, and instructions for installing expansion control systems. Provide fasteners of metal, type, and size to suit type of construction indicated and to provide for secure attachment of expansion control systems.

C. Cast-In Frames: Coordinate and furnish frames to be cast into concrete.

3.3 INSTALLATION

A. Comply with manufacturer's written instructions for storing, handling, and installing expansion control systems and materials unless more stringent requirements are indicated.

B. Metal Frames: Perform cutting, drilling, and fitting required to install expansion control systems.

1. Install in true alignment and proper relationship to joints and adjoining finished surfaces measured from established lines and levels.
2. Adjust for differences between actual structural gap and nominal design gap due to ambient temperature at time of installation. Notify Architect where discrepancies occur that will affect proper expansion control system installation and performance.
3. Cut and fit ends to accommodate thermal expansion and contraction of metal without buckling of frames.
4. Repair or grout blockout as required for continuous frame support using nonmetallic, shrinkage-resistant grout.
5. Install frames in continuous contact with adjacent surfaces.
   a. Shimming is not permitted.

6. Locate anchors at interval recommended by manufacturer, but not less than 3 inches (75 mm) from each end and not more than 24 inches (600 mm) o.c.

C. Seals in Metal Frames: Install elastomeric seals and membranes in frames to comply with manufacturer's written instructions. Install with minimum number of end joints.

1. Provide in continuous lengths for straight sections.
2. Seal transitions according to manufacturer's written instructions. Vulcanize or heat-weld field-spliced joints as recommended by manufacturer.
3. Installation: Mechanically lock seals into frames or adhere to frames with adhesive or pressure-sensitive tape as recommended by manufacturer.

D. Compression Seals: Apply adhesive or lubricant adhesive as recommended by manufacturer before installing compression seals.

E. Foam Seals: Install with adhesive recommended by manufacturer.

F. Epoxy-Bonded Seals: Pressurize seal for time period and to pressure recommended by manufacturer. Do not overpressurize.

G. Terminate exposed ends of expansion control systems with field- or factory-fabricated termination devices.

H. Fire-Resistance-Rated Assemblies: Coordinate installation of expansion control system materials and associated work so complete assemblies comply with assembly performance requirements.

1. Fire Barriers: Install fire barriers to provide continuous, uninterrupted fire resistance throughout length of joint, including transitions and field splices.

I. Moisture Barrier: Provide at all exterior joints and where indicated on Drawings. Provide drainage fittings at a maximum of 50 feet (15.2 m) or where indicated on Drawings.

3.4 PROTECTION

A. Do not remove protective covering until finish work in adjacent areas is complete. When protective covering is removed, clean exposed metal surfaces to comply with manufacturer's written instructions.

B. Protect the installation from damage by work of other Sections. Where necessary due to heavy construction traffic, remove and properly store cover plates or seals and install temporary protection over expansion control systems. Reinstall cover plates or seals prior to Substantial Completion of the Work.

3.5 WASTE MANAGEMENT

A. Coordinate with Section 01 74 19.

1. Separate and recycle cut-offs and waste materials and material packaging in accordance with Waste Management Plan and to the maximum extent economically feasible and place in designated areas for recycling.
2. Set aside and protect materials suitable for reuse and/or remanufacturing.
3. Separate and fold up metal banding; flatten and place along with other metal scrap for recycling in designated area.

END OF SECTION 07 95 00

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SECTION 08 11 13 - HOLLOW METAL DOORS AND FRAMES

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. The work performed under this Section includes the performance criteria, materials, production, and erection of hollow-metal work for the project and consists of the provision of all plant, materials, labor and equipment and the like necessary and/or required for the complete execution of all hollow-metal work as required by schedules, keynotes and drawings, as specified herein, and as may be required by conditions and authorities.

B. Related Requirements:

1. Division 08 **"**Door Hardware" for door hardware for hollow-metal doors.

1.3 DEFINITIONS

A. Minimum Thickness: Minimum thickness of base metal without coatings according to NAAMM-HMMA 803 or SDI A250.8.

1.4 COORDINATION

A. Coordinate anchorage installation for hollow-metal frames with wall types in which they are installed. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

B. Coordinate installation of hollow-metal doors with existing hollow-metal door frames or existing wood frames. Contractor to verify existing frames are UL approved for fire-rated openings. Provide survey of existing hollow-metal frame showing existing conditions including squareness and plumbness. All fire-rated doors to fit with maximum of 1/8” gap. Fabricate doors to fit existing opening. Door openings not meeting these requirements may require and engineering judgement for each varying condition. Furnish setting drawings, templates, and directions for installing hinges, locksets, panic hardware, closers, etc. Deliver such items to Project site in time for installation.

1.5 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.6 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, core descriptions, fire-resistance ratings, temperature-rise ratings**,** and finishes.

B. Shop Drawings: Include the following:

1. Elevations of each door type.
2. Details of doors, including vertical- and horizontal-edge details and metal thicknesses.
3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
4. Locations of reinforcement and preparations for hardware.
5. Details of each different wall opening condition.
6. Details of anchorages, joints, field splices, and connections.
7. Details of accessories.
8. Details of moldings, removable stops, and glazing.
9. Details of conduit and preparations for power, signal, and control systems.

C. Samples for Initial Selection: For units with factory-applied color finishes.

D. Samples for Verification:

1. For each type of exposed finish required, prepared on Samples of not less than 3 by 5 inches (75 by 127 mm).
2. For "Doors" and "Frames" subparagraphs below, prepare Samples approximately 8 by 10 inches (203 by 254 mm) to demonstrate compliance with requirements for quality of materials and construction:

a. Doors: Show vertical-edge, top, and bottom construction; core construction; and hinge and other applied hardware reinforcement. Include separate section showing glazing if applicable.
b. Frames: Show profile, corner joint, floor and wall anchors, and silencers. Include separate section showing fixed hollow-metal panels and glazing if applicable.

E. Schedule: Provide a schedule of hollow-metal work prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with final Door Hardware Schedule.

1.7 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For each type of hollow-metal door and frame assembly, for tests performed by a qualified testing agency.

B. Oversize Construction Certification: For assemblies required to be fire rated and exceeding limitations of labeled assemblies.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver hollow-metal work palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.

1. Provide additional protection to prevent damage to factory-finished units.

B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.

C. Store hollow-metal work vertically under cover at Project site with head up. Place on minimum 4-inch- (102-mm-) high wood blocking. Provide minimum 1/4-inch (6-mm) space between each stacked door to permit air circulation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. 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. Ceco Door Products; an Assa Abloy Group company.
2. Curries Company; an Assa Abloy Group company.
3. Custom Metal Products.
4. Hollow Metal Inc.
5. National Custom Hollow Metal.
6. North American Door Corp.
7. Pioneer Industries, Inc.
8. Republic Doors and Frames.
9. Steelcraft; an Ingersoll-Rand company.

B. Source Limitations: Obtain hollow-metal work from single source from single manufacturer.

2.2 REGULATORY REQUIREMENTS

A. Fire-Rated Assemblies: Complying with NFPA 80 and listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction for fire-protection ratings and temperature-rise limits indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.

1. Smoke- and Draft-Control Assemblies: Provide an assembly with gaskets listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction, based on testing according to UL 1784 and installed in compliance with NFPA 105.

B. Fire-Rated, Borrowed-Light Assemblies: Complying with NFPA 80 and listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction for fire-protection ratings indicated, based on testing according to NFPA 257 or UL 9.

2.3 INTERIOR DOORS AND FRAMES

A. Construct interior doors and frames to comply with the standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.

B. Commercial Doors and Frames: NAAMM-HMMA 861. Provide 18 gauge doors, 16 gauge frames at openings 4'-0" or less in width; 14 gauge frames at openings larger than 4'-0" in width; 14 gauge frames at openings larger than 4'-0" in width. **No knock-down type frames are allowed** except where explicitly indicated as acceptable.

1. Physical Performance: Level A according to SDI A250.4.
2. Doors:

    a. Type: As indicated in the Door and Frame Schedule.
    b. Thickness: 1-3/4 inches (44.5 mm.)
    c. Face: Uncoated, cold-rolled steel sheet, minimum thickness of 0.042 inch (1.0 mm).
    d. Edge Construction: Continuously welded with no visible seam.
    e. Core: Steel stiffened.

3. Frames:

    a. Materials: Uncoated steel sheet, minimum thickness of 0.053 inch (1.3 mm) for door openings 48 inches (1219 mm) or less, or window frames; minimum thickness of 0.067 inch (1.7 mm)for door openings greater than 48 inches (1219 mm).
    b. Construction: Full profile welded.
    c. KD frames are not acceptable.

4. Exposed Finish: Prime.

2.4 EXTERIOR HOLLOW-METAL DOORS AND FRAMES

A. Construct exterior doors and frames to comply with the standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.

B. Commercial Doors and Frames: NAAMM-HMMA 861. Provide 16 gauge doors, 14 gauge frames. **No knock-down type frames are allowed** except where explicitly indicated as acceptable.

1. Physical Performance: Level A according to SDI A250.4.
2. Doors:

    a. Type: As indicated in the Door and Frame Schedule.
    b. Thickness: 1-3/4 inches (44.5 mm.)
    c. Face: Metallic-coated steel sheet, minimum thickness of 0.053 inch (1.30 mm), with minimum G60 (Z180 or)A60 (ZF180) coating.
    d. Edge Construction: Continuously welded with no visible seam.
    e. Core: Steel stiffened.

1) Thermal-Rated Doors: Provide doors fabricated with thermal-resistance value (R-value) of not less than 2.1 deg F x h x sq. ft./Btu (0.370 K x sq. m/W) when tested according to ASTM C 1363.

3. Frames:

a. Materials: Metallic-coated steel sheet, minimum thickness of 0.067 inch (1.7 mm), with minimum G60 (Z180 or)A60 (ZF180) coating.
b. Construction: Full profile welded.
c. KD frames are not acceptable.

4. Exposed Finish: Prime (Galvanized – zinc coating applied by hot dip process).

2.5 HOLLOW-METAL PANELS

A. Provide hollow-metal panels of same materials, construction, and finish as adjacent door assemblies.

2.6 FRAME ANCHORS

A. Jamb Anchors:

1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, not less than 0.042 inch (1.0 mm) thick, with corrugated or perforated straps not less than 2 inches (51 mm) wide by 10 inches (254 mm) long; or wire anchors not less than 0.177 inch (4.5 mm) thick.
2. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch (1.0 mm) thick.
3. Postinstalled Expansion Type for In-Place Concrete or Masonry: Minimum 3/8-inch- (9.5-mm-) diameter bolts with expansion shields or inserts. Provide pipe spacer from frame to wall, with throat reinforcement plate, welded to frame at each anchor location.

B. Floor Anchors: Formed from same material as frames, minimum thickness of 0.042 inch (1.0 mm), and as follows:

1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.
2. Separate Topping Concrete Slabs: Adjustable-type anchors with extension clips, allowing not less than 2-inch (51-mm) height adjustment. Terminate bottom of frames at finish floor surface.

2.7 MATERIALS

A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

B. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.

C. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.

D. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B.

E. Frame Anchors: ASTM A 879/A 879M, Commercial Steel (CS), 04Z (12G) coating designation; mill phosphatized.

1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M, hot-dip galvanized according to ASTM A 153/A 153M, Class B.

F. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.

G. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow-metal frames of type indicated.

H. Grout: ASTM C 476, except with a maximum slump of 4 inches (102 mm), as measured according to ASTM C 143/C 143M.

I. Mineral-Fiber Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.

J. Glazing: Comply with requirements in Section 088000 "Glazing."

K. Bituminous Coating: Cold-applied asphalt mastic, compounded for 15-mil (0.4-mm) dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

2.8 FABRICATION

A. Fabricate hollow-metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for metal thickness. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.

B. Hollow-Metal Doors:

1. Steel-Stiffened Door Cores: Provide minimum thickness 0.026 inch (0.66 mm), steel vertical stiffeners of same material as face sheets extending full-door height, with vertical webs spaced not more than 6 inches (152 mm) apart. Spot weld to face sheets no more than 5 inches (127 mm) o.c. Fill spaces between stiffeners with glass- or mineral-fiber insulation.
2. Fire Door Cores: As required to provide fire-protection and temperature-rise ratings indicated.
3. Vertical Edges for Single-Acting Doors: Bevel edges 1/8 inch in 2 inches (3.2 mm in 51 mm).

4. Top Edge Closures: Close top edges of doors with inverted closures, except provide flush closures at exterior doors of same material as face sheets.
5. Bottom Edge Closures: Close bottom edges of doors where required for attachment of weather stripping with end closures or channels of same material as face sheets.
6. Exterior Doors: Provide weep-hole openings in bottoms of exterior doors to permit moisture to escape. Seal joints in top edges of doors against water penetration.
7. Astragals: Provide overlapping astragal on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch (19 mm) beyond edge of door on which astragal is mounted or as required to comply with published listing of qualified testing agency.

C. Hollow-Metal Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.

1. Sidelight Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
2. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
3. Grout Guards: Weld guards to frame at back of hardware mortises in frames to be grouted.
4. Floor Anchors: Weld anchors to bottoms of jambs with at least four spot welds per anchor; however, for slip-on drywall frames, provide anchor clips or countersunk holes at bottoms of jambs.
5. Jamb Anchors: Provide number and spacing of anchors as follows:

    a. Masonry Type: Locate anchors not more than 16 inches (406 mm) from top and bottom of frame. Space anchors not more than 32 inches (813 mm) o.c., to match coursing, and as follows:

        1) Two anchors per jamb up to 60 inches (1524 mm) high.
        2) Three anchors per jamb from 60 to 90 inches (1524 to 2286 mm) high.
        3) Four anchors per jamb from 90 to 120 inches (2286 to 3048 mm) high.
        4) Four anchors per jamb plus one additional anchor per jamb for each 24 inches (610 mm) or fraction thereof above 120 inches (3048 mm) high.

    b. Stud-Wall Type: Locate anchors not more than 18 inches (457 mm) from top and bottom of frame. Space anchors not more than 32 inches (813 mm) o.c. and as follows:

        1) Three anchors per jamb up to 60 inches (1524 mm) high.
        2) Four anchors per jamb from 60 to 90 inches (1524 to 2286 mm) high.
        3) Five anchors per jamb from 90 to 96 inches (2286 to 2438 mm) high.
        4) Five anchors per jamb plus one additional anchor per jamb for each 24 inches (610 mm) or fraction thereof above 96 inches (2438 mm) high.
6. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers as follows. Keep holes clear during construction.

    a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
    b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.

7. Terminated Stops: Terminate stops 6 inches (152 mm) above finish floor with a 45 degree angle cut, and close open end of stop with steel sheet closure. Cover opening in extension of frame with welded-steel filler plate, with welds ground smooth and flush with frame.

D. Fabricate concealed stiffeners and edge channels from either cold- or hot-rolled steel sheet.

E. Hardware Preparation: Factory prepare hollow-metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to SDI A250.6, the Door Hardware Schedule, and templates.

1. Reinforce doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.
2. Comply with applicable requirements in SDI A250.6 and BHMA A156.115 for preparation of hollow-metal work for hardware.

F. Stops and Moldings: Provide stops and moldings around glazed lites and louvers where indicated. Form corners of stops and moldings with mitered hairline joints.

1. Single Glazed Lites: Provide fixed stops and moldings welded on secure side of hollow-metal work.
2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.
3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.
4. Coordinate rabbet width between fixed and removable stops with glazing and installation types indicated.

2.9 STEEL FINISHES

A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.

1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with SDI A250.10; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

B. Factory Finish: Clean, pretreat, and apply manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat, complying with SDI A250.3.

1. Color and Gloss: As selected by Architect from manufacturer's full range.

2.10 ACCESSORIES

A. Louvers: Provide louvers for interior doors, where indicated, which comply with SDI 111C, with blades or baffles formed of 0.020-inch- (0.5-mm-) thick, cold-rolled steel sheet set into 0.032-inch- (0.8-mm-) thick steel frame.

1. Sightproof Louver: Stationary louvers constructed with inverted-V or inverted-Y blades.
2. Lightproof Louver: Stationary louvers constructed with baffles to prevent light from passing from one side to the other.

3. Fire-Rated Automatic Louvers: Louvers constructed with movable blades closed by actuating fusible link, and listed and labeled for use in fire-rated door assemblies of type and fire-resistance rating indicated by same qualified testing and inspecting agency that established fire-resistance rating of door assembly.

B. Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.

C. Grout Guards: Formed from same material as frames, not less than 0.016 inch (0.4 mm) thick.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine roughing-in for embedded and built-in anchors to verify actual locations before frame installation.

C. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.

B. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

3.3 INSTALLATION

A. General: Install hollow-metal work plumb, rigid, properly aligned, and securely fastened in place. Comply with Drawings and manufacturer's written instructions.

B. Hollow-Metal Frames: Install hollow-metal frames of size and profile indicated. Comply with SDI A250.11 or NAAMM-HMMA 840 as required by standards specified.

1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.

a. At fire-rated openings, install frames according to NFPA 80.

b. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
c. Install frames with removable stops located on secure side of opening.
d. Install door silencers in frames before grouting.
e. Remove temporary braces necessary for installation only after frames have been properly set and secured.
f. Check plumb, square, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
g. Field apply bituminous coating to backs of frames that will be filled with grout containing antifreezing agents.

2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with postinstalled expansion anchors.

a. Floor anchors may be set with power-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.

3. Metal-Stud Partitions: Solidly pack mineral-fiber insulation inside frames.
4. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout.
5. Concrete Walls: Solidly fill space between frames and concrete with mineral-fiber insulation.
6. In-Place Concrete or Masonry Construction: Secure frames in place with postinstalled expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
7. In-Place Metal or Wood-Stud Partitions: Secure slip-on drywall frames in place according to manufacturer's written instructions.
8. Installation Tolerances: Adjust hollow-metal door frames for squareness, alignment, twist, and plumb to the following tolerances:

a. Squareness: Plus or minus 1/16 inch (1.6 mm), measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
b. Alignment: Plus or minus 1/16 inch (1.6 mm), measured at jambs on a horizontal line parallel to plane of wall.
c. Twist: Plus or minus 1/16 inch (1.6 mm), measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
d. Plumbness: Plus or minus 1/16 inch (1.6 mm), measured at jambs at floor.

C. Hollow-Metal Doors: Fit hollow-metal doors accurately in frames, within clearances specified below. Shim as necessary.

1. Non-Fire-Rated Steel Doors:

a. Between Door and Frame Jambs and Head: 1/8 inch (3.2 mm) plus or minus 1/32 inch (0.8 mm).
b. Between Edges of Pairs of Doors: 1/8 inch (3.2 mm) to 1/4 inch (6.3 mm) plus or minus 1/32 inch (0.8 mm).
c. At Bottom of Door: 3/4 inch (19.1 mm) plus or minus 1/32 inch (0.8 mm).
d. Between Door Face and Stop: 1/16 inch (1.6 mm) to 1/8 inch (3.2 mm) plus or minus 1/32 inch (0.8 mm).

2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
3. Smoke-Control Doors: Install doors and gaskets according to NFPA 105.

D. Glazing: Comply with installation requirements in Section 088000 "Glazing" and with hollow-metal manufacturer's written instructions.

1. Secure stops with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches (230 mm) o.c. and not more than 2 inches (51 mm) o.c. from each corner.

3.4 ADJUSTING AND CLEANING

A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow-metal work that is warped, bowed, or otherwise unacceptable.

B. Remove grout and other bonding material from hollow-metal work immediately after installation.

C. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.

D. Metallic-Coated Surface Touchup: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.

E. Factory-Finish Touchup: Clean abraded areas and repair with same material used for factory finish according to manufacturer's written instructions.

F. Touchup Painting: Cleaning and touchup painting of abraded areas of paint are specified in painting Sections.

3.5 WASTE MANAGEMENT

A. Coordinate with Section 01 74 19.

1. Separate and recycle cut-offs and waste materials and material packaging in accordance with Waste Management Plan and to the maximum extent economically feasible and place in designated areas for recycling.
2. Set aside and protect materials suitable for reuse and/or remanufacturing.
3. Separate and fold up metal banding; flatten and place along with other metal scrap for recycling in designated area.

END OF SECTION 08 11 13

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SECTION 08 11 16 – FIRE-RATED ALUMINUM FULL VISSION DOORS AND FRAMES

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Fire-rated aluminum full vision Aluflam door system including pre-finished door, frame, glazing, and hardware.

1.02 RELATED SECTIONS

A. Section 08710 (08 71 00): Door Hardware.
B. Section 08817 (08 88 17): Fire-Rated Glass & Framing.

1.03 REFERENCES

A. American Society for Testing and Materials (ASTM):
   1. ASTM E119 Standard Test Methods for Fire Tests of Building Construction and Materials.
   2. ASTM E2074 Standard Test Method for Fire Tests of Door Assemblies, Including Positive Pressure Testing of Side-Hinged and Pivoted Swinging Door Assemblies.

B. National Fire Protection Association (NFPA):
   1. NFPA 80: Standard for Fire Doors and Fire Windows.
   2. NFPA 251: Standard Methods of Tests of Fire Endurance of Building Construction and Materials.
   3. NFPA 252: Standard Methods of Fire Tests of Door Assemblies.

C. Uniform Building Code (UBC):
   1. UBC-7-2: Methods for Fire Tests of Door Assemblies.

D. Underwriters Laboratories, Inc. (UL):
   1. UL 10C: Positive Pressure Fire Tests of Door Assemblies.

E. Standard Council of Canada:
   1. ULC Standard CAN4-S104: Fire Tests of Door Assemblies.

F. American National Standards Institute (ANSI):
   1. ANSI Z97.1 Safety Glazing Materials Used in Buildings – Safety Performance Specifications and Methods of Test.

G. Consumer Product Safety Commission (CPSC):
   1. CPSC 16 CFR 1201 Categories I and II: Safety Standard for Glazing Materials.

1.04 SYSTEM DESCRIPTION

A. Performance Requirements:

1. Fire Rating: 60 minutes.
2. Certification: Doors and frames shall be tested in accordance with ASTM E 2074, NFPA 252, UBC 7-2, UL 10C, CAN4-S104.
3. Testing Laboratory: Fire tests shall be conducted by an approved independent testing laboratory, similar to Underwriter's Laboratories, Inc.

1.05 SUBMITTALS

A. Submit listed submittals in accordance with Conditions of the Contract and Division 1 Submittal Procedure Section.
   1. Shop Drawings: Submit shop drawings showing layouts, profiles and product components.
   2. Samples: Submit samples for finishes, colors and textures.
   3. Technical Information: Submit latest edition of manufacturer's product data providing product description, technical data and installation instructions.

1.06 QUALITY ASSURANCE

A. Listings and Labels:
   Fire rated framing and glazing shall be under current follow-up services by an approved independent agency and maintain a current listing or certification. Assemblies shall be labeled in accordance with limits of listings.

1.07 DELIVERY, STORAGE AND HANDLING

A. Ordering: Comply with manufacturer's ordering instructions and lead-time requirements to avoid construction delays.

B. Delivery: Deliver materials to specified destination in manufacturer's packaging undamaged, complete with installation instructions.

C. Storage and Protection: Store off ground, under cover, protected from weather, direct sunlight, construction activities and at temperature conditions recommended by manufacturer, +10°F to +110°F.

D. Handling: Protect materials and finish during handling and installation to prevent damage.

1.08 PROJECT CONDITIONS

A. Field Measurements: Verify actual measurements for openings by field measurements before fabrication. Show recorded measurements on shop drawings. Coordinate field measurements and fabrication schedule with construction progress to avoid construction delays.

PART 2 - PRODUCTS

2.01 FIRE-RATED ALUMINUM FULL VISION DOORS AND FRAMES

A. Manufacturer: Aluflam North America
   1. Contact: 16604 Edwards Road, Cerritos, CA 90703: Telephone 562.926.9520 Fax 562.404.1394. E-mail info@aluflam-usa.com Website www.aluflam-usa.com, or local representative (www.aluflam-usa.com/contact/representatives.php).

2.02 MATERIALS – ALUMINUM FRAMING

A. Frame construction: Integral structure and glazing stops from extruded and thermally broken aluminum profiles. Filled internally with cement composite material.

B. Dimensions:
   1. Door framing face dimension: 2-½ inch
   2. Depth of door framing: 3-7/16 inch (3-5/8 for 90 Min Door)
   3. Door stile face dimension: 3-9/16 inch (3-3/4 for (90 Min Door)
   4. Door cross rail (if applicable): 3-9/16 inch (N/A for 90 Min Door)

C. Assembly: Frame corners assembled by means of crimped and bonded miter joints.

D. Sealing: Framing system shall insulate against effects of fire, smoke, and heat transfer from either side. Perimeter of the framing system to the rough opening shall be firmly packed with mineral wool insulation.

2.03 MATERIALS – FIRE RESISTANT GLAZING

A. Assemblies shall be glazed with 60 minute rated 1 inch thick SGG Contraflam 60 fire resistant glazing material as manufactured by Vetrotech Saint-Gobain (www.vetrotechusa.com).
   1. Individual lites shall be permanently identified with a listing mark.
   2. Glazing material installed in “Hazardous Locations” (subject to human impact) shall be certified to meet the applicable requirements for fire rated assemblies referenced in ANSI Z97.1 Standard for Safety Glazing Materials Used In Buildings and/or CPSC 16 CFR 1201 Safety Standard for Architectural Glazing Materials.
   3. Visible daylight transmission shall be a minimum of 81%. Glazing material shall be optically clear, colorless and free from unusual distortion.

2.04 MATERIALS – GLAZING AND ASSEMBLY ACCESSORIES

A. Fasteners: All fasteners, setting pads, and glazing clips, shall be stainless or zinc-plated steel.

B. Glazing Accessories: The glazing material perimeter shall be separated from the perimeter framing system with approved flame retardant intumescent glazing tape. Ceramic setting

blocks shall be placed between the metal setting pads and the glazing material. Setting pads and blocks provided by manufacturer.

2.05 FABRICATION

A. Door frames and door leaves shall be furnished pre-assembled. Door assemblies shall be field glazed.

B. Door assemblies shall be factory prepared for field mounting of hardware.

C. Fabrication Dimensions: Fabricate to approved dimensions. The general contractor shall guarantee dimensions within required tolerance (+ - 1/8”). Obtain approved shop drawings prior to fabrication.

2.06 FINISHES

A. Framing shall be chemically cleaned and pretreated, then finished on all exposed areas with:
Anodized – Dark Bronze

B. Protect finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Slight variations in appearance of abutting or adjacent pieces are acceptable. Noticeable variations in the same piece are not acceptable.

2.07 DOOR HARDWARE

A. Hardware shall be supplied from door manufacturer’s standard recommended hardware groups as specified.

B. Operating hardware for single doors. Each to have the following:

Quantity	Description	Manufacturer/Model	Finish
1	Surface applied door closer	Dorma TS93 series	Aluminum
3	Surface applied hinges (Qty 4 on 90 min door)	Dr Hahn A901/951 series	Aluminum
2	Lever handles	FSB 1080 series	Stainless
1	Narrow stile mortise lock	Accurate 8600 series	Stainless (front)
1	Cylinder lock	Schlage compatible	Satin chrome
1	*) Rim based exit device – (Standard on 90 min door)	Dorma 9700	Stainless
1	*) 10” bottom kickplate	Aluflam	Match door finish
1	*) Automatic floor seal	Planet MF	Aluminum

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine area to receive doors. Openings shall be plumb, square and within allowable tolerances. Notify Architect of conditions that would adversely affect installation or subsequent use. Do not proceed with installation until unsatisfactory conditions are corrected.

3.02 INSTALLATION

A. Door installation shall be by a specialty contractor with appropriate experience qualifications; and in strict accordance with the approved shop drawings.

3.03 CLEANING

A. Cleaning: Remove temporary coverings and protection of adjacent work areas. Glass and frame should be cleaned using soft clean cloth, chamois leathers, sponges or soft paper. Use clean warm water with a mild detergent. Do not use detergent that contains either alkaline, acids or fluoride! Abrasive cleaning methods can damage surfaces! Clean prior to owner's acceptance. Remove construction debris from project site and legally dispose of debris.

END OF SECTION

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SECTION 08 1416 - FLUSH WOOD DOORS

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 this Section.
   1. Division 6 Section "Finish Carpentry"
   2. Division 8 Section “Hollow Metal Doors and Frames”

1.2 SUMMARY

A. This Section includes the following:
   1. Solid core doors with wood veneer faces.
   2. Factory finishing of flush wood doors.
   3. Factory fitting flush wood doors to frames and factory machining for hardware.
   4. Louvers for flush wood doors.

1.3 SUBMITTALS

A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

B. Product data for each type of door, including details of core and edge construction, trim for openings, and factory-finishing specifications.

C. Shop drawings indicating location and size of each door, elevation of each kind of door, details of construction, location and extent of hardware blocking, fire ratings, requirements for veneer matching and factory finishing and other pertinent data.
   1. For factory-machined doors, indicate dimensions and locations of cutouts for locksets and other cutouts adjacent to light openings.

D. Samples for initial selection in the form of color charts consisting of actual materials in small sections for the following:
   1. Faces of factory-finished doors with transparent finish. Show the full range of colors available for stained finishes.

E. Samples for verification in the form and size indicated below:
   1. Corner sections of doors approximately 12 inches square with door faces and edgings representing the typical range of color and grain for each species of veneer and solid lumber required. Finish sample with same materials proposed for factory-finished doors.
   2. Frames for light openings, 6 inches long, for each material, type, and finish required.

1.4 QUALITY ASSURANCE

A. Quality Standard: Comply with the following standard:
   1. AWI Quality Standard: "Architectural Woodwork Quality Standards" of the Architectural Woodwork Institute for grade of door, core, construction, finish, and other requirements.

B. Fire-Rated Wood Doors: Provide wood doors that comply with NFPA 80; are identical in materials and construction to units tested in door and frame assemblies per ASTM E 152; and are labeled and listed by UL, Warnock Hersey, or another testing and inspection agency acceptable to authorities having jurisdiction.

C. Single-Source Responsibility: Obtain doors from one source and by a single manufacturer.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Protect doors during transit, storage, and handling to prevent damage, soiling, and deterioration. Comply with requirements of referenced standard and manufacturer's instructions.

B. Identify each door with individual opening numbers as designated on shop drawings, using temporary, removable, or concealed markings.

1.6 PROJECT CONDITIONS

A. Conditioning: Do not deliver or install doors until conditions for temperature and relative humidity have been stabilized and will be maintained in storage and installation areas during the remainder of the construction period to comply with the following requirements applicable to Project's geographical location:
   1. AWI quality standard Section 100-S-11 "Relative Humidity and Moisture Content."

1.7 WARRANTY

A. General Warranty: Door manufacturer's warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.

B. Door Manufacturer's Warranty: Submit written agreement on door manufacturer's standard form signed by manufacturer, Installer, and Contractor, agreeing to repair or replace defective doors that have warped (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section or that show telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch span, or do not conform to tolerance limitations of referenced quality standards.

   1. Warranty shall be in effect during the following period of time after date of Substantial Completion.
      a. Solid Core Interior Doors: Life of installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering doors that may be incorporated in the Work include, but are not limited to, the following:
   1. Solid Core Doors:
      a. Algoma Hardwoods Inc.
      b. Buell Door Co.
      c. Eggers Industries, Architectural Door Division.
      d. Graham Manufacturing Corp.
      e. Haley Brothers, Inc.
      f. Ideal Wood Products, Inc.
      g. IPIK Door Co., Inc.
      h. Mohawk Flush Doors, Inc.
      i. Ragland Manufacturing Co., Inc.
      j. V-T Industries Inc.
      k. Weyerhauser Co.

2.2 INTERIOR FLUSH WOOD DOORS

A. Solid Core Doors for transparent stained Finish: Comply with the following requirements:
   1. Faces: Rotary Natural Birch.
   2. Grade: Premium.
   3. Construction: 5 plies.
   4. Core: Particleboard ANSI A208.1, GRADE LD-2 – PC-5 ME. Provide wood blocking in particleboard core doors as needed to eliminate through-bolting hardware. 5” toprail on doors and closers..
   5. Bonding: Stiles and rails bonded to core, then entire unit abrasive planed before veneering.

2.3 VENEER MATCHING

A. Within Door Faces: Provide doors with the following veneer matching:
   1. Book matching.

B. Pairs and Sets: Provide pair matching and set matching for pairs of doors and for doors hung in adjacent sets.

C. Doors with Transoms (if any): Provide the following matching:
   1. Continuous matching.

2.4 FABRICATION

A. Fabricate flush wood doors to comply with following requirements:
   1. Factory fit doors to suit frame-opening sizes indicated, with the following uniform clearances and bevels:

a. Comply with clearance requirements of referenced quality standard for fitting. Comply with requirements of NFPA 80 for fire-resistance-rated doors.

2. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules, door frame shop drawings, DHI A115-W series standards, and hardware templates.
   a. Coordinate measurements of hardware mortises in metal frames to verify dimensions and alignment before proceeding with factory machining.
   b. Metal Astragals: Premachine astragals and formed-steel edges for hardware for pairs of fire-rated doors.

B. Transom and Side Panels (if any): Fabricate matching panels with same construction, exposed surfaces, and finish as specified for associated doors.
   1. Fixed Transom Panels (if any): Fabricate fixed panels with solid lumber transom bottom rail and door top rail, both rabbeted as indicated. Provide factory-installed spring bolts for concealed attachment into jambs of metal door frames.

C. Openings (if any): Cut and trim openings through doors to comply with applicable requirements of referenced standards for kind(s) of door(s) required.
   1. Light Openings: Trim openings with moldings of material and profile indicated.

2.5 FACTORY FINISHING

A. General: Comply with referenced quality standard's requirements for factory finishing.

B. Finish wood doors at factory.

C. Transparent Finish: Comply with requirements indicated for grade, finish system, staining effect, and sheen.
   1. Grade: Premium.
   2. Finish: Manufacturer's standard finish with performance requirements comparable to either AWI System TR-6 catalyzed polyurethane.
   3. Staining: As selected from manufacturer’s full line of standard stain colors.
   4. Effect: Filled finish.
   5. Sheen: Satin.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine installed door frames prior to hanging door:
   1. Verify that frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with plumb jambs and level heads.
   2. Reject doors with defects.

B. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Hardware: For installation see Division 8 Section "Door Hardware."

B. Manufacturer's Instructions: Install wood doors to comply with manufacturer's instructions and referenced quality standard and as indicated.
   1. Install fire-rated doors in corresponding fire-rated frames according to requirements of NFPA 80.
   2. Fitting Clearances for Non-Fire-Rated Doors: Provide 1/8 inch at jambs and heads, 1/16 inch per leaf at meeting stiles for pairs of doors, and 1/8 inch from bottom of door to top of decorative floor finish or covering. Where threshold is shown or scheduled, provide 1/4-inch clearance from bottom of door to top of threshold.
   3. Fitting Clearances for Fire-Rated Doors: Comply with NFPA 80.
   4. Bevel non-fire-rated doors 1/8 inch in 2 inches at lock and hinge edges.
   5. Bevel fire-rated doors 1/8 inch in 2 inches on lock edge; trim stiles and rails only to extent permitted by labeling agency.

C. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.

D. Factory-Finished Doors: Restore finish before installation, if fitting or machining is required at the job site.

3.3 ADJUSTING AND PROTECTION

A. Operation: Rehang or replace doors that do not swing or operate freely.

B. Finished Doors: Refinish or replace doors damaged during installation.

C. Protect doors as recommended by door manufacturer to ensure that wood doors will be without damage or deterioration at the time of Substantial Completion.

END OF SECTION 08 14 16

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SECTION 08 31 13 - ACCESS DOORS AND FRAMES

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. The work performed under this Section includes the performance criteria, materials, production, and erection of access doors and frames for the project and consists of the provision of all plant, materials, labor and equipment and the like necessary and/or required for the complete execution of all access door work as required by schedules, keynotes and drawings, as specified herein, and as may be required by conditions and authorities having jurisdiction including, but not limited to the following:

1. Access doors and frames for walls and ceilings.
2. Floor access doors and frames.

B. Related Requirements:
1. Division 22 “Plumbing” for plumbing devices that require access.
2. Division 23 “Mechanical” for HVAC devices that require access.
3. Division 26 “Electrical” for Electrical devices that require access.
4. Division 28 “Electronic Safety and Security” for safety and security devices that require access.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, fire ratings, materials, individual components and profiles, and finishes.

B. Shop Drawings:

1. Include plans, elevations, sections, details, substrates and attachments to other work.
2. Detail fabrication and installation of access doors and frames for each type of substrate.

C. Samples: For each door face material, at least 3 by 5 inches (75 by 125 mm) in size, in specified finish.

D. Access Door and Frame Schedule: Provide complete access door and frame schedule, including types, locations, sizes, latching or locking provisions, and other data pertinent to installation.

E. Ceiling Coordination Drawings: Reflected ceiling plans, drawn to scale, on which ceiling mounted items including access doors and frames, lighting fixtures, diffusers, grilles, speakers, sprinklers, and special trim are shown and coordinated with each other.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Rated Access Doors and Frames: Units complying with NFPA 80 that are identical to access door and frame assemblies tested for fire-test-response characteristics according to the following test method and that are listed and labeled by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:

1. NFPA 252 or UL 10B for fire-rated access door assemblies installed vertically.
2. NFPA 288 for fire-rated access door assemblies installed horizontally.

2.2 ACCESS DOORS AND FRAMES FOR WALLS AND CEILINGS

A. Basis-of-Design Product: Subject to compliance with requirements, provide access panels as fabricated by FF Systems Access Panels, Inc. or comparable product by one of the following:

1. Access Panel Solutions.
2. Acudor Products, Inc.
3. Babcock-Davis.
4. J. L. Industries, Elmdor/Stoneman Manufacturing Co.; Div. of Acorn Engineering Co.
5. Larsen's Manufacturing Company.
6. Metropolitan Door Industries Corp.
7. Milcor Inc.

B. Source Limitations: Obtain each type of access door and frame from single source from single manufacturer.

C. Aluminum Access Doors with Drywall Inserts **(at all public, occupied spaces)**

1. Basis-of-Design Product: FF Systems Access Panels, Inc., System F2AKL.
2. Assembly Description: Welded aluminum frame with both outer and inner frame of high grade aluminum, with drywall inlay.
3. Locations: Wall and ceiling.
4. Door Size: As indicated
5. Frame Material: Aluminum.
6. Hinges: Manufacturer's standard.
7. Seal: Air/dust seal.
8. Hardware: Cylinder-lock.

D. Hardware:

1. Lock: Cylinder.

2.3 FLOOR ACCESS DOORS AND FRAMES

A. Manufacturers: Subject to compliance with requirements, provide access panels as fabricated by Babcock Davis or comparable product by one of the following:

1. Acudor Products, Inc.
2. Metropolitan Door Industries Corp.
3. Milcor Inc.

B. Floor Doors, General: Equip each door with adjustable counterbalancing springs, heavy-duty hold-open arm that automatically locks door open at 90 degrees, release handle with red vinyl grip that allows for one-handed closure, and recessed lift handle.

C. Aluminum Floor Door: Coordinate with equipment. Extruded-aluminum angle frame with 1/4-inch- (6.4-mm-) thick, 1/8-inch pan recess for carpet or tile; nonwatertight; loading capacity to support 300-lbf/sq. ft. (14.4-kN/sq. m) pedestrian live load.

D. Hardware: Provide the following:

1. Hinges: Heavy-duty, stainless-steel butt hinges with stainless-steel pins.
2. Lock: Manufacturer’s standard.
3. Hardware Material: Manufacturer's standard.

E. Fire-Rating: Provide 2-hour fire rated doors in rated floors.

2.4 MATERIALS

A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

B. Rolled-Steel Floor Plate: ASTM A 786/A 786M, rolled from plate complying with ASTM A 36/A 36M or ASTM A 283/A 283M, Grade C or D.

C. Steel Sheet: Uncoated or electrolytic zinc coated, ASTM A 879/A 879M, with cold-rolled steel sheet substrate complying with ASTM A 1008/A 1008M, Commercial Steel (CS), exposed.

D. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.

E. Rolled-Stainless-Steel Floor Plate: ASTM A 793, manufacturer's standard finish.

F. Stainless-Steel Sheet, Strip, Plate, and Flat Bars: ASTM A 666, Type 316. Remove tool and die marks and stretch lines or blend into finish.

G. Aluminum Extrusions: ASTM B 221 (ASTM B 221M), Alloy 6063-T6.

H. Aluminum-Alloy Rolled Tread Plate: ASTM B 632/B 632M, Alloy 6061-T6.

I. Aluminum Sheet: ASTM B 209 (ASTM B 209M), alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with not less than strength and durability properties of Alloy 5005-H15; with minimum sheet thickness according to ANSI H35.2 (ANSI H35.2M).

J. Frame Anchors: Same type as door face.

K. Inserts, Bolts, and Anchor Fasteners: Hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329.

2.5 FABRICATION

A. General: Provide access door and frame assemblies manufactured as integral units ready for installation.

B. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.

C. Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access doors to types of supports indicated.

1. For concealed flanges with drywall bead, provide edge trim for gypsum board securely attached to perimeter of frames.
2. For concealed flanges with plaster bead for full-bed plaster applications, provide zinc-coated expanded metal lath and exposed casing bead welded to perimeter of frames.
3. Provide mounting holes in frames for attachment of units to metal or wood framing.
4. Provide mounting holes in frame for attachment of masonry anchors.

D. Recessed Access Doors: Form face of panel to provide recess for application of applied finish. Reinforce panel as required to prevent buckling.

1. For recessed doors with plaster infill, provide self-furring expanded metal lath attached to door panel.

E. Latching Mechanisms: Furnish number required to hold doors in flush, smooth plane when closed.

1. For cylinder locks, furnish two keys per lock and key all locks alike.
2. For recessed panel doors, provide access sleeves for each locking device. Furnish plastic grommets and install in holes cut through finish.

F. Extruded Aluminum: After fabrication, apply manufacturer's standard protective coating on aluminum that will come in contact with concrete.

2.6 FINISHES

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

D. Steel and Metallic-Coated-Steel Finishes:

1. Factory Prime: Apply manufacturer's standard, fast-curing, lead- and chromate-free, universal primer immediately after surface preparation and pretreatment.
2. Factory Finish: Immediately after cleaning and pretreating, apply manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat, with a minimum dry-film thickness of 1 mil (0.025 mm) for topcoat.

E. Stainless-Steel Finishes:

1. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.
2. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.

a. Run grain of directional finishes with long dimension of each piece.
b. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.
c. Directional Satin Finish: No. 4.

3. Bright, Cold-Rolled, Unpolished Finish: No. 2B.

F. Aluminum Finishes:

1. Mill finish.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Comply with manufacturer's written instructions for installing access doors and frames.

B. Install doors flush with adjacent finish surfaces or recessed to receive finish material.

3.3 ADJUSTING

A. Adjust doors and hardware, after installation, for proper operation.

B. Remove and replace doors and frames that are warped, bowed, or otherwise damaged.

3.4 WASTE MANAGEMENT

A. Coordinate with Section 01 74 19.

1. Separate and recycle cut-offs and waste materials and material packaging in accordance with Waste Management Plan and to the maximum extent economically feasible and place in designated areas for recycling.
2. Set aside and protect materials suitable for reuse and/or remanufacturing.
3. Separate and fold up metal banding; flatten and place along with other metal scrap for recycling in designated area.

END OF SECTION 08 31 13

SECTION 08 41 13 - ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This section includes the performance criteria, materials, production, and erection of aluminum framed entrances and storefronts for the project. The work performed under this Section consists of the provision of all plant, materials, labor and equipment and the like necessary and/or required for the complete execution of all aluminum framed entrances and storefronts as required by the this section, schedules, keynotes and drawings, including, but not limited to the following:

1. Exterior storefront framing.
2. Storefront framing for window walls.
3. Storefront framing for punched openings.
4. Exterior and interior manual-swing entrance doors and door-frame units.

1.3 PREINSTALLATION MEETINGS

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

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.

B. Shop Drawings: For aluminum-framed entrances and storefronts. Include plans, elevations, sections, full-size details, and attachments to other work.

1. Include details of provisions for assembly expansion and contraction and for draining moisture occurring within the assembly to the exterior.
2. Include full-size isometric details of each vertical-to-horizontal intersection of aluminum-framed entrances and storefronts, showing the following:

a. Joinery, including concealed welds.
b. Anchorage.
c. Expansion provisions.
d. Glazing.

e. Flashing and drainage.

3. Show connection to and continuity with adjacent thermal, weather, air, and vapor barriers.

C. Samples for Initial Selection: For units with factory-applied color finishes.

D. Samples for Verification: For each type of exposed finish required, in manufacturer's standard sizes.

E. Fabrication Sample: Of each vertical-to-horizontal intersection of assemblies, made from 12-inch (300-mm) lengths of full-size components and showing details of the following:

1. Joinery, including concealed welds.
2. Anchorage.
3. Expansion provisions.
4. Glazing.
5. Flashing and drainage.

F. Entrance Door Hardware Schedule: Prepared by or under supervision of supplier, detailing fabrication and assembly of entrance door hardware, as well as procedures and diagrams. Coordinate final entrance door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of entrance door hardware.

G. Delegated-Design Submittal: For aluminum-framed entrances and storefronts indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.5 INFORMATIONAL SUBMITTALS

A. Preconstruction Laboratory Mockup Testing Submittals:

1. Testing Program: Developed specifically for Project.
2. Test Reports: Prepared by a qualified preconstruction testing agency for each mockup test.
3. Record Drawings: As-built drawings of preconstruction laboratory mockups showing changes made during preconstruction laboratory mockup testing.

B. Qualification Data: For Installer and field testing agency.

C. Energy Performance Certificates: For aluminum-framed entrances and storefronts, accessories, and components, from manufacturer.

1. Basis for Certification: NFRC-certified energy performance values for each aluminum-framed entrance and storefront.

D. Product Test Reports: For aluminum-framed entrances and storefronts, for tests performed by manufacturer and witnessed by a qualified testing agency.

E. Quality-Control Program: Developed specifically for Project, including fabrication and installation, according to recommendations in ASTM C 1401. Include periodic quality-control reports.

F. Source quality-control reports.

G. Field quality-control reports.

H. Sample Warranties: For special warranties.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For aluminum-framed entrances and storefronts to include in maintenance manuals.

B. Maintenance Data for Structural Sealant: For structural-sealant-glazed storefront to include in maintenance manuals. Include ASTM C 1401 recommendations for post-installation-phase quality-control program.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

B. Testing Agency Qualifications: Qualified according to ASTM E 699 for testing indicated.

C. Product Options: Information on Drawings and in Specifications establishes requirements for aesthetic effects and performance characteristics of assemblies. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction.

1. Do not change intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If changes are proposed, submit comprehensive explanatory data to Architect for review.

D. Structural-Sealant Glazing: Comply with ASTM C 1401 for design and installation of storefront systems.

E. Quality-control program for structural-sealant-glazed system.

F. Preconstruction sealant testing.

1.8 MOCKUPS

A. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.

1. Build mockup of typical wall area as shown on Drawings.
2. Mockups for each form of construction and finish.

3. Testing shall be performed on mockups according to requirements in "Field Quality Control" Article.
4. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
5. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.9 WARRANTY

A. Special Warranty: Manufacturer and Installer agrees to repair or replace components of aluminum-framed entrances and storefronts that do not comply with requirements or that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Structural failures including, but not limited to, excessive deflection.
b. Noise or vibration created by wind and thermal and structural movements.
c. Deterioration of metals**,** metal finishes, and other materials beyond normal weathering.
d. Water penetration through fixed glazing and framing areas.
e. Failure of operating components.

2. Warranty Period: 10 years from date of Substantial Completion.

B. Special Finish Warranty: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of factory-applied finishes within specified warranty period.

1. Deterioration includes, but is not limited to, the following:

a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

2. Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design aluminum-framed entrances and storefronts.

B. General Performance: Comply with performance requirements specified, as determined by testing of aluminum-framed entrances and storefronts representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.

1. Aluminum-framed entrances and storefronts shall withstand movements of supporting structure including, but not limited to, story drift, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.
2. Failure also includes the following:

    a. Thermal stresses transferring to building structure.
    b. Glass breakage.
    c. Noise or vibration created by wind and thermal and structural movements.
    d. Loosening or weakening of fasteners, attachments, and other components.
    e. Failure of operating units.

C. Structural Loads:

1. Wind Loads: 118 mph, and in compliance with NYS Building Code Section 2404 “Wind, Snow, Seismic, and Dead loads on Glass.”
2. Other Design Loads: As indicated on Drawings.

D. Deflection of Framing Members: At design wind pressure, as follows:

1. Deflection Normal to Wall Plane: Limited to 1/175 of clear span for spans up to 13 feet 6 inches (4.1 m) and to 1/240 of clear span plus 1/4 inch (6.35 mm) for spans greater than 13 feet 6 inches (4.1 m) or an amount that restricts edge deflection of individual glazing lites to 3/4 inch (19.1 mm), whichever is less.
2. Deflection Parallel to Glazing Plane: Limited to 1/360 of clear span or 1/8 inch (3.2 mm), whichever is smaller.

    a. Operable Units: Provide a minimum 1/16-inch (1.6-mm) clearance between framing members and operable units.

3. Cantilever Deflection: Where framing members overhang an anchor point, as follows:

    a. Perpendicular to Plane of Wall: No greater than 1/240 of clear span plus 1/4 inch (6.35 mm) for spans greater than 11 feet 8-1/4 inches (3.6 m) or 1/175 times span, for spans less than 11 feet 8-1/4 inches (3.6 m).

E. Structural: Test according to ASTM E 330 as follows:

1. When tested at positive and negative wind-load design pressures, assemblies do not evidence deflection exceeding specified limits.
2. When tested at 150 percent of positive and negative wind-load design pressures, assemblies, including anchorage, do not evidence material failures, structural distress, or permanent deformation of main framing members exceeding 0.2 percent of span.
3. Test Durations: As required by design wind velocity, but not less than 10 seconds.

F. Air Infiltration: Test according to ASTM E 283 for infiltration as follows:

1. Fixed Framing and Glass Area:

    a. Maximum air leakage of 0.06 cfm/sq. ft. (0.30 L/s per sq. m) at a static-air-pressure differential of 6.24 lbf/sq. ft. (300 Pa).

2. Entrance Doors:

a. Pair of Doors: Maximum air leakage of 1.0 cfm/sq. ft. (5.08 L/s per sq. m) at a static-air-pressure differential of 6.24 lbf/sq. ft. (300 Pa).
b. Single Doors: Maximum air leakage of 0.5 cfm/sq. ft. (2.54 L/s per sq. m) at a static-air-pressure differential of 6.24 lbf/sq. ft. (300 Pa).

G. Water Penetration under Static Pressure: Test according to ASTM E 331 as follows:

1. No evidence of water penetration through fixed glazing and framing areas when tested according to a minimum static-air-pressure differential of 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft. (300 Pa).

H. Water Penetration under Dynamic Pressure: Test according to AAMA 501.1 as follows:

1. No evidence of water penetration through fixed glazing and framing areas when tested at dynamic pressure equal to 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft. (300 Pa).
2. Maximum Water Leakage: According to AAMA 501.1. Water leakage does not include water controlled by flashing and gutters, or water that is drained to exterior.

I. Interstory Drift: Accommodate design displacement of adjacent stories indicated.

1. Design Displacement: As indicated on Drawings.
2. Test Performance: Complying with criteria for passing based on building occupancy type when tested according to AAMA 501.4 at design displacement and 1.5 times the design displacement.

J. Seismic Performance: Aluminum-framed entrances and storefronts shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

1. Seismic Drift Causing Glass Fallout: Complying with criteria for passing based on building occupancy type when tested according to AAMA 501.6 at design displacement and 1.5 times the design displacement.
2. Vertical Interstory Movement: Complying with criteria for passing based on building occupancy type when tested according to AAMA 501.7 at design displacement and 1.5 times the design displacement.

K. Energy Performance: Certify and label energy performance according to NFRC as follows:

1. Thermal Transmittance (U-factor): Fixed glazing and framing areas shall have U-factor of not more than 0.47 Btu/sq. ft. x h x deg F (2.55 W/sq. m x K) as determined according to NFRC 100.
2. Solar Heat Gain Coefficient: Fixed glazing and framing areas shall have a solar heat gain coefficient of no greater than 0.35 as determined according to NFRC 200.
3. Condensation Resistance: Fixed glazing and framing areas shall have an NFRC-certified condensation resistance rating of no less than 15 as determined according to NFRC 500.

L. Noise Reduction: Test according to ASTM E 90, with ratings determined by ASTM E 1332, as follows.

1. Outdoor-Indoor Transmission Class: Minimum 26.

M. Windborne-Debris Impact Resistance: Pass missile-impact and cyclic-pressure tests when tested according to ASTM E 1886 and testing information in ASTM E 1996 for Wind Zone 5.

1. Large-Missile Test: For glazed openings located within 30 feet (9.1 m) of grade.

N. Thermal Movements: Allow for thermal movements resulting from ambient and surface temperature changes:

1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.
2. Thermal Cycling: No buckling; stress on glass; sealant failure; excess stress on framing, anchors, and fasteners; or reduction of performance when tested according to AAMA 501.5.

a. High Exterior Ambient-Air Temperature: That which produces an exterior metal-surface temperature of 180 deg F (82 deg C).
b. Low Exterior Ambient-Air Temperature: 0 deg F (minus 18 deg C).
c. Interior Ambient-Air Temperature: 75 deg F (24 deg C).

O. Structural-Sealant Joints:

1. Designed to carry gravity loads of glazing.
2. Designed to produce tensile or shear stress of less than 20 psi (138 kPa).

P. Structural Sealant: Capable of withstanding tensile and shear stresses imposed by structural-sealant-glazed storefront system without failing adhesively or cohesively. When tested for preconstruction adhesion and compatibility, cohesive failure of sealant shall occur before adhesive failure.

1. Adhesive failure occurs when sealant pulls away from substrate cleanly, leaving no sealant material behind.
2. Cohesive failure occurs when sealant breaks or tears within itself but does not separate from each substrate because sealant-to-substrate bond strength exceeds sealant's internal strength.

2.2 MANUFACTURERS

A. Basis-of-Design: Subject to compliance with requirements, provide systems that match size and appearance of aluminum windows within the specifications of this section division, EFCO 403 (thermal) Storefront System, as manufactured by Efco Corporation, or comparable product by one of the following:

1. Architectural Windows.
2. Kawneer Company, Inc.
3. CRL – U.S. Aluminum

B. Source Limitations: Obtain all components of aluminum-framed entrance and storefront system, including framing spandrel panels and venting windows and accessories, from single manufacturer.

2.3 FRAMING

A. Framing Members: Manufacturer's extruded- or formed-aluminum framing members of thickness required and reinforced as required to support imposed loads.

1. Construction: Thermally broken.
2. System Dimensions: 2” x 4 ½” (50.8mm x 114.3 mm).
3. Glazing Plane: Front (exterior).
4. Finish: High-performance organic finish.
5. Color: Match Architect’s sample.

B. Backer Plates: Manufacturer's standard, continuous backer plates for framing members, if not integral, where framing abuts adjacent construction.

C. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.

D. Materials:

1. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.

a. Sheet and Plate: ASTM B 209 (ASTM B 209M).
b. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221 (ASTM B 221M).
c. Extruded Structural Pipe and Tubes: ASTM B 429/B 429M.
d. Structural Profiles: ASTM B 308/B 308M.

2. Steel Reinforcement: Manufacturer's standard zinc-rich, corrosion-resistant primer complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM, and prepare surfaces according to applicable SSPC standard.

a. Structural Shapes, Plates, and Bars: ASTM A 36/A 36M.
b. Cold-Rolled Sheet and Strip: ASTM A 1008/A 1008M.
c. Hot-Rolled Sheet and Strip: ASTM A 1011/A 1011M.

2.4 ENTRANCE DOOR SYSTEMS

A. Entrance Doors: Manufacturer's standard glazed entrance doors for manual-swing operation.

1. Door Construction: 2-inch overall thickness, extruded-aluminum tubular rail and stile members. Mechanically fasten corners with reinforcing brackets that are deeply penetrated and fillet welded or that incorporate concealed tie rods.
2. Door Design: Medium or Wide stile. 10” high bottom rail for ADA compliance.
3. Glazing stops and gaskets.
4. Material: extra thick (3/16”)

B. Entrance Door Hardware: Refer to Section 08 71 00 "Door Hardware.”

1. Weather stripping: manufacturer’s standard.

2. All hardware to be surface mounted to facilitate future maintenance.
3. Hardware finishes: As selected by Architect from Manufacture's full range.

C. Additional requirements:

1. Thresholds: Stainless steel, raised thresholds beveled with a slope of not more than 1:2, with maximum height of 1/2 inch (12.7 mm).
2. Opening-Force Requirements:
   a. Egress Doors: Not more than 15 lbf (67 N) to release the latch and not more than 30 lbf (133 N) to set the door in motion[and not more than 15 lbf (67 N) to open the door to its minimum required width].
   b. Accessible Interior Doors: Not more than 5 lbf (22.2 N) to fully open door.
3. Removable Mullions: BHMA A156.3, extruded aluminum.
   a. When used with panic exit devices, provide removable mullions listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for panic protection, based on testing according to UL 305. Use only mullions that have been tested with exit devices to be used.

2.5 GLAZING

A. Glazing: Comply with Section 08 80 00 "Glazing."

B. Glazing Gaskets: Manufacturer's standard sealed-corner pressure-glazing system of black, resilient elastomeric glazing gaskets, setting blocks, and shims or spacers.

C. Glazing Sealants: As recommended by manufacturer.

D. Sealants used inside the weatherproofing system shall have a VOC content of 250 g/L.

E. Structural Glazing Sealants: ASTM C 1184, chemically curing silicone formulation that is compatible with system components with which it comes in contact, specifically formulated and tested for use as structural sealant and approved by structural-sealant manufacturer for use in storefront system indicated.

1. Color: As selected by Architect from manufacturer's full range of colors.

F. Weatherseal Sealants: ASTM C 920 for Type S; Grade NS; Class 25; Uses NT, G, A, and O; chemically curing silicone formulation that is compatible with structural sealant and other system components with which it comes in contact; recommended by structural-sealant, weatherseal-sealant, and structural-sealant-glazed storefront manufacturers for this use.

1. Color: Match structural sealant.

2.6 ACCESSORIES

A. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.

1. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.

2. Reinforce members as required to receive fastener threads.
3. Use exposed fasteners with countersunk Phillips screw heads fabricated from 300 series stainless steel.

B. Anchors: Three-way adjustable anchors with minimum adjustment of 1 inch (25.4 mm) that accommodate fabrication and installation tolerances in material and finish compatible with adjoining materials and recommended by manufacturer.

1. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts complying with ASTM A 123/A 123M or ASTM A 153/A 153M requirements.

C. Concealed Flashing: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials.

D. Bituminous Paint: Cold-applied asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos, formulated for 30-mil (0.762-mm) thickness per coat.

E. Aluminum sunscreen extrusion profile – to be selected by Architect from Manufacturer's standard profiles. Anchored directly to the vertical or horizontal mullions – refer to Drawings. Color to match storefront and windows.

2.7 FABRICATION

A. Form or extrude aluminum shapes before finishing.

B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.

C. Fabricate components that, when assembled, have the following characteristics:

1. Profiles that are sharp, straight, and free of defects or deformations.
2. Accurately fitted joints with ends coped or mitered.
3. Physical and thermal isolation of glazing from framing members.
4. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
5. Provisions for field replacement of glazing from interior.
6. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.

D. Mechanically Glazed Framing Members: Fabricate for flush glazing without projecting stops.

E. Structural-Sealant-Glazed Framing Members: Include accommodations for using temporary support device to retain glazing in place while structural sealant cures.

F. Entrance Door Frames: Reinforce as required to support loads imposed by door operation and for installing entrance door hardware.

1. At exterior doors, provide compression weather stripping at fixed stops.

2. At interior doors, provide silencers at stops to prevent metal-to-metal contact. Install three silencers on strike jamb of single-door frames and two silencers on head of frames for pairs of doors.

G. Entrance Doors: Reinforce doors as required for installing entrance door hardware.

1. At pairs of exterior doors, provide sliding-type weather stripping retained in adjustable strip and mortised into door edge.
2. At exterior doors, provide weather sweeps applied to door bottoms.

H. Entrance Door Hardware Installation: Factory install entrance door hardware to the greatest extent possible. Cut, drill, and tap for factory-installed entrance door hardware before applying finishes.

I. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

2.8 ALUMINUM FINISHES

A. High-Performance Organic Coating Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturer's written instructions.

1. Fluoropolymer 3-Coat Coating System: Manufacturer's standard 3-coat, thermocured system composed of specially formulated inhibitive primer, fluoropolymer color coat, and clear fluorocarbon topcoat, with both color coat and clear topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AAMA 2605

a. Color and Gloss: Match Architect’s sample of Alucobond Anodic Clear Mica Cool PVDF-2/gloss level-30.
b. It is the intent that all aluminum framing members on the project shall match in color and gloss.

2.9 SOURCE QUALITY CONTROL

A. Structural Sealant: Perform quality-control procedures complying with ASTM C 1401 recommendations including, but not limited to, assembly material qualification procedures, sealant testing, and assembly fabrication reviews and checks.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare surfaces that are in contact with structural sealant according to sealant manufacturer's written instructions to ensure compatibility and adhesion. Preparation includes, but is not limited to, cleaning and priming surfaces.

3.3 INSTALLATION

A. General:

1. Comply with manufacturer's written instructions.
2. Do not install damaged components.
3. Fit joints to produce hairline joints free of burrs and distortion.
4. Rigidly secure nonmovement joints.
5. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.
6. Seal perimeter and other joints watertight unless otherwise indicated.

B. Metal Protection:

1. Where aluminum is in contact with dissimilar metals, protect against galvanic action by painting contact surfaces with materials recommended by manufacturer for this purpose or by installing nonconductive spacers.
2. Where aluminum is in contact with concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

C. Set continuous sill members and flashing in full sealant bed as specified in Section 079200 "Joint Sealants" to produce weathertight installation.

D. Install components plumb and true in alignment with established lines and grades.

E. Install operable units level and plumb, securely anchored, and without distortion. Adjust weather-stripping contact and hardware movement to produce proper operation.

F. Install glazing as specified in Section 088000 "Glazing."

G. Install weatherseal sealant according to Section 07 92 00 "Joint Sealants" and according to sealant manufacturer's written instructions to produce weatherproof joints. Install joint filler behind sealant as recommended by sealant manufacturer.

H. Entrance Doors: Install doors to produce smooth operation and tight fit at contact points.

1. Exterior Doors: Install to produce weathertight enclosure and tight fit at weather stripping.
2. Field-Installed Entrance Door Hardware: Install surface-mounted entrance door hardware according to entrance door hardware manufacturers' written instructions using concealed fasteners to greatest extent possible.

3.4 ERECTION TOLERANCES

A. Erection Tolerances: Install aluminum-framed entrances and storefronts to comply with the following maximum tolerances:

1. Plumb: 1/8 inch in 10 feet (3.2 mm in 3 m); 1/4 inch in 40 feet (6.35 mm in 12.2 m).
2. Level: 1/8 inch in 20 feet (3.2 mm in 6 m); 1/4 inch in 40 feet (6.35 mm in 12.2 m).
3. Alignment:

    a. Where surfaces abut in line or are separated by reveal or protruding element up to 1/2 inch (12.7 mm) wide, limit offset from true alignment to 1/16 inch (1.6 mm).
    b. Where surfaces are separated by reveal or protruding element from 1/2 to 1 inch (12.7 to 25.4 mm) wide, limit offset from true alignment to 1/8 inch (3.2 mm).
    c. Where surfaces are separated by reveal or protruding element of 1 inch (25.4 mm) wide or more, limit offset from true alignment to 1/4 inch (6 mm).

4. Location: Limit variation from plane to 1/8 inch in 12 feet (3.2 mm in 3.6 m); 1/2 inch (12.7 mm) over total length.

3.5 FIELD QUALITY CONTROL

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

B. Field Quality-Control Testing: Perform the following test on representative areas of aluminum-framed entrances and storefronts and mockups.

1. Water-Spray Test: Before installation of interior finishes has begun, areas designated by Architect shall be tested according to AAMA 501.2 and shall not evidence water penetration.

    a. Perform a minimum of two tests in areas as directed by Architect.
    b. Perform tests in each test area as directed by Architect. Perform at least three tests, prior to 10, 35, and 70 percent completion.

C. Structural-Sealant Adhesion: Test structural sealant according to recommendations in ASTM C 1401, Destructive Test Method A, "Hand Pull Tab (Destructive)," Appendix X2.

1. Test a minimum of three areas on each building facade.
2. Repair installation areas damaged by testing.

D. Aluminum-framed entrances and storefronts will be considered defective if they do not pass tests and inspections.

E. Prepare test and inspection reports.

3.6 MAINTENANCE SERVICE

A. Entrance Door Hardware:

1. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of entrance door hardware.
2. Initial Maintenance Service: Beginning at Substantial Completion, provide six months' full maintenance by skilled employees of entrance door hardware Installer. Include quarterly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper entrance door hardware operation at rated speed and capacity. Use parts and supplies that are the same as those used in the manufacture and installation of original equipment.

3.7 WASTE MANAGEMENT

A. Coordinate with Section 01 74 19.

1. Separate and recycle cut-offs and waste materials and material packaging in accordance with Waste Management Plan and to the maximum extent economically feasible and place in designated areas for recycling.
2. Set aside and protect materials suitable for reuse and/or remanufacturing.
3. Separate and fold up metal banding; flatten and place along with other metal scrap for recycling in designated area.

END OF SECTION

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SECTION 08 56 67 - BULLET-RESISTANT STEEL TRANSACTION WINDOWS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Bullet-resistant fixed steel transaction window assemblies.

B. Related Sections:
   1. Division 01: Administrative, procedural, and temporary work requirements.

1.2 REFERENCES

A. American Welding Society (AWS) D1.3/D1.3M - Structural Welding Code - Sheet Steel.

B. ASTM International (ASTM) A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.

C. Underwriters Laboratories (UL) 752 - Bullet Resisting Equipment.

1.3 SYSTEM DESCRIPTION

A. Design Requirements:
   1. Provide window frames of “non-ricochet type" intended to permit capture and retention of attacking projectile, lessening potential of random injury or lateral penetration.

1.4 SUBMITTALS

A. Submittals for Review:
   1. Shop Drawings: Include window profiles and sizes, type and spacing of frame anchors, reinforcement size and locations, details of joints and connections, and welding details.
   2. Product Data: Include product description for window assemblies including bullet-resistant ratings.
   3. Samples: 2 x 2 inch coating samples showing available colors.

B. Closeout Submittals:
   1. Maintenance Data: Include instructions for cleaning of glazed panels.

1.5 QUALITY ASSURANCE

A. Transaction Window Assemblies: Ballistic Level 3, tested to UL 752.

1.6 DELIVERY, STORAGE AND HANDLING

A. Store window assemblies upright in protected, dry area, off ground or floor, with at least 1/4 inch space between individual units.

B. Do not cover with non-vented coverings that create excessive humidity.

C. Remove wet coverings immediately.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Contract Documents are based on products by ARMORTEX, 5926 Corridor Parkway, Schertz, Texas, 800-880-8306, www.armortex.com.

Basis of Design: Transaction Window NV Split Frame, Model: W1-TW-NV-SA by ARMORTEX.

B. Substitutions: Under provisions of Division 01.

2.2 MATERIALS

A. Steel Sheet:
1. ASTM A1008/1008M, cold rolled, free from scale, pitting, coil breaks, and other surface defects.

B. Bullet-Resistant Composite: UL Listed Bullet Resistant Composite by ARMORTEX, of UL Ballistic Level equal to specified frame ballistic protection level.

C. Glazing:
1. UL Listed laminated glass or glass/polycarbonate composite.
2. Bottom edge of glazing panel provided with 18 gage stainless steel cap.

D. Track and Hangers:
1. Stainless steel 12 gage track guard and guide.

2.3 FABRICATION

A. Frames:
1. Fabricate from 16 gage steel lined with bullet-resistant composite.
2. Bullet-resistant rating equivalent to or greater than glazing.
3. Weld frame corners; knock-down and mechanical joints not acceptable.
4. Frame modules capable of being joined with other frame modules to form continuous line.
5. Replacement of glazing from secure side of window, not requiring removal of frame from opening.

B. Shelf: Minimum 2 inches thick with recessed dip tray, full width of window x minimum 12 inches deep, centered under glazing, covered with 18 gage stainless steel.

C. Dip Tray: Model RMDT1016, 16 gage stainless steel, 10 x 16 inches to outside edge of flanges, clear 1-5/8 inch open depth under glazing.

D. Welding: In accordance with AWS D1.3/D1.3M. Grind exposed welds flush and smooth.

E. Finish work neat and free from defects.

F. Allowable Tolerances: Plus or minus 1/16 inch for frame opening width, height, diagonal dimensions, and overall width and height (outside to outside).

2.4 FINISHES

A. Stainless Steel: No. 3 brushed finish.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install window assemblies in accordance with manufacturer's instructions and approved Shop Drawings.

B. Set plumb and level.

C. Secure to adjacent construction using fastener type best suited to application.

D. Field alterations to window assemblies not permitted unless approved in advance by manufacturer and Architect.

3.2 ADJUSTING

A. Touch up minor scratches and abrasions to match factory finish.

END OF SECTION 08 56 67

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SECTION 087100 - DOOR HARDWARE

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:

1. Mechanical and electrified door hardware
2. Electronic access control system components
3. Field verification, preparation and modification of existing doors and frames to receive new door hardware.

B. Section excludes:

1. Windows
2. Cabinets (casework), including locks in cabinets
3. Signage
4. Toilet accessories
5. Overhead doors

C. Related Sections:

1. Division 01 Section "Alternates" for alternates affecting this section.
2. Division 06 Section "Rough Carpentry"
3. Division 06 Section "Finish Carpentry"
4. Division 07 Section "Joint Sealants" for sealant requirements applicable to threshold installation specified in this section.
5. Division 08 Sections:

a. "Metal Doors and Frames"
b. "Flush Wood Doors"
c. "Stile and Rail Wood Doors"
d. "Interior Aluminum Doors and Frames"
e. "Aluminum-Framed Entrances and Storefronts"
f. "Stainless Steel Doors and Frames"
g. "Special Function Doors"
h. "Entrances"

6. Division 09 sections for touchup, finishing or refinishing of existing openings modified by this section.
7. Division 26 "Electrical" sections for connections to electrical power system and for low-voltage wiring.
8. Division 28 "Electronic Safety and Security" sections for coordination with other components of electronic access control system and fire alarm system.

1.02 REFERENCES

A. UL LLC

1. UL 10B - Fire Test of Door Assemblies
2. UL 10C - Positive Pressure Test of Fire Door Assemblies

3. UL 1784 - Air Leakage Tests of Door Assemblies
4. UL 305 - Panic Hardware

B. DHI - Door and Hardware Institute

1. Sequence and Format for the Hardware Schedule
2. Recommended Locations for Builders Hardware
3. Keying Systems and Nomenclature
4. Installation Guide for Doors and Hardware

C. NFPA – National Fire Protection Association

1. NFPA 70 – National Electric Code
2. NFPA 80 – 2016 Edition – Standard for Fire Doors and Other Opening Protectives
3. NFPA 101 – Life Safety Code
4. NFPA 105 – Smoke and Draft Control Door Assemblies
5. NFPA 252 – Fire Tests of Door Assemblies

D. ANSI - American National Standards Institute

1. ANSI A117.1 – 2017 Edition – Accessible and Usable Buildings and Facilities
2. ANSI/BHMA A156.1 - A156.29, and ANSI/BHMA A156.31 - Standards for Hardware and Specialties
3. ANSI/BHMA A156.28 - Recommended Practices for Keying Systems
4. ANSI/WDMA I.S. 1A - Interior Architectural Wood Flush Doors
5. ANSI/SDI A250.8 - Standard Steel Doors and Frames

1.03 SUBMITTALS

A. General:

1. Submit in accordance with Conditions of Contract and Division 01 Submittal Procedures.
2. Prior to forwarding submittal:

a. Comply with procedures for verifying existing door and frame compatibility for new hardware, as specified in PART 3, "EXAMINATION" article, herein.
b. Review drawings and Sections from related trades to verify compatibility with specified hardware.
c. Highlight, encircle, or otherwise specifically identify on submittals: deviations from Contract Documents, issues of incompatibility or other issues which may detrimentally affect the Work.

B. Action Submittals:

1. Product Data: Submit technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.
2. Riser and Wiring Diagrams: After final approval of hardware schedule, submit details of electrified door hardware, indicating:

a. Wiring Diagrams: For power, signal, and control wiring and including:
1) Details of interface of electrified door hardware and building safety and security systems.
2) Schematic diagram of systems that interface with electrified door hardware.

3) Point-to-point wiring.
4) Risers.

3. Samples for Verification: If requested by Architect, submit production sample of requested door hardware unit in finish indicated and tagged with full description for coordination with schedule.

   a. Samples will be returned to supplier. Units that are acceptable to Architect may, after final check of operations, be incorporated into Work, within limitations of key coordination requirements.

4. Door Hardware Schedule:

   a. Submit concurrent with submissions of Product Data, Samples, and Shop Drawings. Coordinate submission of door hardware schedule with scheduling requirements of other work to facilitate fabrication of other work critical in Project construction schedule.
   b. Submit under direct supervision of a Door Hardware Institute (DHI) certified Architectural Hardware Consultant (AHC) or Door Hardware Consultant (DHC) with hardware sets in vertical format as illustrated by Sequence of Format for the Hardware Schedule published by DHI.
   c. Indicate complete designations of each item required for each opening, include:
      1) Door Index: door number, heading number, and Architect's hardware set number.
      2) Quantity, type, style, function, size, and finish of each hardware item.
      3) Name and manufacturer of each item.
      4) Fastenings and other pertinent information.
      5) Location of each hardware set cross-referenced to indications on Drawings.
      6) Explanation of all abbreviations, symbols, and codes contained in schedule.
      7) Mounting locations for hardware.
      8) Door and frame sizes and materials.
      9) Degree of door swing and handing.
      10) Operational Description of openings with electrified hardware covering egress, ingress (access), and fire/smoke alarm connections.

5. Key Schedule:

   a. After Keying Conference, provide keying schedule that includes levels of keying, explanations of key system's function, key symbols used, and door numbers controlled.
   b. Use ANSI/BHMA A156.28 "Recommended Practices for Keying Systems" as guideline for nomenclature, definitions, and approach for selecting optimal keying system.
   c. Provide 3 copies of keying schedule for review prepared and detailed in accordance with referenced DHI publication. Include schematic keying diagram and index each key to unique door designations.
   d. Index keying schedule by door number, keyset, hardware heading number, cross keying instructions, and special key stamping instructions.
   e. Provide one complete bitting list of key cuts and one key system schematic illustrating system usage and expansion. Forward bitting list, key cuts and key system schematic directly to Owner, by means as directed by Owner.
   f. Prepare key schedule by or under supervision of supplier, detailing Owner's final keying instructions for locks.

C. Informational Submittals:

1. Provide Qualification Data for Supplier, Installer and Architectural Hardware Consultant.

2. Provide Product Data:

    a. Certify that door hardware approved for use on types and sizes of labeled fire-rated doors complies with listed fire-rated door assemblies.
    b. Include warranties for specified door hardware.

D. Closeout Submittals:

1. Operations and Maintenance Data: Provide in accordance with Division 01 and include:

    a. Complete information on care, maintenance, and adjustment; data on repair and replacement parts, and information on preservation of finishes.
    b. Catalog pages for each product.
    c. Final approved hardware schedule edited to reflect conditions as installed.
    d. Final keying schedule
    e. Copy of warranties including appropriate reference numbers for manufacturers to identify project.
    f. As-installed wiring diagrams for each opening connected to power, both low voltage and 110 volts.

E. Inspection and Testing:

1. Submit written reports to the Owner and Authority Having Jurisdiction (AHJ) of the results of functional testing and inspection for:

    a. fire door assemblies, in compliance with NFPA 80.
    b. required egress door assemblies, in compliance with NFPA 101.

1.04 QUALITY ASSURANCE

A. Qualifications and Responsibilities:

1. Supplier: Recognized architectural hardware supplier with a minimum of 5 years documented experience supplying both mechanical and electromechanical door hardware similar in quantity, type, and quality to that indicated for this Project. Supplier to be recognized as a factory direct distributor by the manufacturer of the primary materials with a warehousing facility in the Project's vicinity. Supplier to have on staff, a certified Architectural Hardware Consultant (AHC) or Door Hardware Consultant (DHC) available to Owner, Architect, and Contractor, at reasonable times during the Work for consultation.
2. Installer: Qualified tradesperson skilled in the application of commercial grade hardware with experience installing door hardware similar in quantity, type, and quality as indicated for this Project.
3. Architectural Hardware Consultant: Person who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project and meets these requirements:

    a. For door hardware: DHI certified AHC or DHC.
    b. Can provide installation and technical data to Architect and other related subcontractors.
    c. Can inspect and verify components are in working order upon completion of installation.
    d. Capable of producing wiring diagram and coordinating installation of electrified hardware with Architect and electrical engineers.

4. Single Source Responsibility: Obtain each type of door hardware from single manufacturer.

B. Certifications:

1. Fire-Rated Door Openings:

a. Provide door hardware for fire-rated openings that complies with NFPA 80 and requirements of authorities having jurisdiction.
b. Provide only items of door hardware that are listed products tested by UL LLC, Intertek Testing Services, or other testing and inspecting organizations acceptable to authorities having jurisdiction for use on types and sizes of doors indicated, based on testing at positive pressure and according to NFPA 252 or UL 10C and in compliance with requirements of fire-rated door and door frame labels.

2. Smoke and Draft Control Door Assemblies:

a. Provide door hardware that meets requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105
b. Comply with the maximum air leakage of 0.3 cfm/sq. ft. (3 cu. m per minute/sq. m) at tested pressure differential of 0.3-inch wg (75 Pa) of water.

3. Electrified Door Hardware

a. Listed and labeled as defined in NFPA 70, Article 100, by testing agency acceptable to authorities having jurisdiction.

4. Accessibility Requirements:

a. Comply with governing accessibility regulations cited in "REFERENCES" article 087100, 1.02.D3 herein for door hardware on doors in an accessible route. This project must comply with all Federal Americans with Disability Act regulations and all Local Accessibility Regulations.

C. Pre-Installation Meetings

1. Keying Conference

a. Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including:
   1) Function of building, flow of traffic, purpose of each area, degree of security required, and plans for future expansion.
   2) Preliminary key system schematic diagram.
   3) Requirements for key control system.
   4) Requirements for access control.
   5) Address for delivery of keys.

2. Pre-installation Conference

a. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
b. Inspect and discuss preparatory work performed by other trades.
c. Inspect and discuss electrical roughing-in for electrified door hardware.
d. Review sequence of operation for each type of electrified door hardware.

e. Review required testing, inspecting, and certifying procedures.
f. Review questions or concerns related to proper installation and adjustment of door hardware.

3. Electrified Hardware Coordination Conference:

a. Prior to ordering electrified hardware, schedule and hold meeting to coordinate door hardware with security, electrical, doors and frames, and other related suppliers.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up for hardware delivered to Project site. Promptly replace products damaged during shipping.
B. Tag each item or package separately with identification coordinated with final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package. Deliver each article of hardware in manufacturer's original packaging.
C. Maintain manufacturer-recommended environmental conditions throughout storage and installation periods.
D. Provide secure lock-up for door hardware delivered to Project. Control handling and installation of hardware items so that completion of Work will not be delayed by hardware losses both before and after installation.
E. Handle hardware in manner to avoid damage, marring, or scratching. Correct, replace or repair products damaged during Work. Protect products against malfunction due to paint, solvent, cleanser, or any chemical agent.
F. Deliver keys to manufacturer of key control system for subsequent delivery to Owner.

1.06 COORDINATION

A. Coordinate layout and installation of floor-recessed door hardware with floor construction. Cast anchoring inserts into concrete.
B. Installation Templates: Distribute for doors, frames, and other work specified to be factory or shop prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.
C. Security: Coordinate installation of door hardware, keying, and access control with Owner's security consultant.
D. Electrical System Roughing-In: Coordinate layout and installation of electrified door hardware with connections to power supplies and building safety and security systems.
E. Existing Openings: Where existing doors, frames and/or hardware are to remain, field verify existing functions, conditions and preparations and coordinate to suit opening conditions and to provide proper door operation.

1.07 WARRANTY

A. Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within published warranty period.

1. Warranty does not cover damage or faulty operation due to improper installation, improper use or abuse.
2. Warranty Period: Beginning from date of Substantial Completion, for durations indicated in manufacturer's published listings.

a. Mechanical Warranty

1) Locks
    a) Schlage ND Series: 10 years
2) Exit Devices
    a) Von Duprin: 3 years
3) Closers
    a) LCN 4000 Series: 30 years

b. Electrical Warranty
1) Locks
    a) Schlage: 1 year
2) Exit Devices
    a) Von Duprin: 1 year

1.08 MAINTENANCE

A. Furnish complete set of special tools required for maintenance and adjustment of hardware, including changing of cylinders.
B. Turn over unused materials to Owner for maintenance purposes.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. The Owner requires use of certain products for their unique characteristics and project suitability to ensure continuity of existing and future performance and maintenance standards. After investigating available product offerings, the Awarding Authority has elected to prepare proprietary specifications. These products are specified with the notation: "No Substitute."

    1. Where "No Substitute" is noted, submittals and substitution requests for other products will not be considered.

B. Approval of manufacturers and/or products other than those listed as "Scheduled Manufacturer" or "Acceptable Manufacturers" in the individual article for the product category shall be in accordance with QUALITY ASSURANCE article, herein.
C. Approval of products from manufacturers indicated in "Acceptable Manufacturers" is contingent upon those products providing all functions and features and meeting all requirements of scheduled manufacturer's product.
D. Where specified hardware is not adaptable to finished shape or size of members requiring hardware, furnish suitable types having same operation and quality as type specified, subject to Architect's approval.

2.02 MATERIALS

A. Fabrication

    1. Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. provide screws according to manufacturer’s recognized installation standards for application intended.

2. Finish exposed screws to match hardware finish, or, if exposed in surfaces of other work, to match finish of this other work including prepared for paint surfaces to receive painted finish.
3. Provide concealed fasteners wherever possible for hardware units exposed when door is closed. Coordinate with “Metal Doors and Frames”, “Flush Wood Doors”, “Stile and Rail Wood Doors” to ensure proper reinforcements. Advise the Architect where visible fasteners, such as thru bolts, are required.

B. Modification and Preparation of Existing Doors: Where existing door hardware is indicated to be removed and reinstalled.

1. Provide necessary fillers, Dutchmen, reinforcements, and fasteners, compatible with existing materials, as required for mounting new opening hardware and to cover existing door and frame preparations.
2. Use materials which match materials of adjacent modified areas.
3. When modifying existing fire-rated openings, provide materials permitted by NFPA 80 as required to maintain fire-rating.

C. Provide screws, bolts, expansion shields, drop plates and other devices necessary for hardware installation.

1. Where fasteners are exposed to view: Finish to match adjacent door hardware material.

D. Cable and Connectors:

1. Where scheduled in the hardware sets, provide each item of electrified hardware and wire harnesses with number and gage of wires enough to accommodate electric function of specified hardware.
2. Provide Molex connectors that plug directly into connectors from harnesses, electric locking and power transfer devices.
3. Provide through-door wire harness for each electrified locking device installed in a door and wire harness for each electrified hinge, electrified continuous hinge, electrified pivot, and electric power transfer for connection to power supplies.

2.03 HINGES

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:

a. Ives 5BB series

2. Acceptable Manufacturers and Products:

a. Hager BB1191/1279 series
b. Stanley FBB series

B. Requirements:

1. Provide hinges conforming to ANSI/BHMA A156.1.
2. Provide five knuckle, ball bearing hinges.
3. 1-3/4 inch (44 mm) thick doors, up to and including 36 inches (914 mm) wide:

a. Exterior: Standard weight, bronze or stainless steel, 4-1/2 inches (114 mm) high

b. Interior: Standard weight, steel, 4-1/2 inches (114 mm) high

4. 1-3/4 inch (44 mm) thick doors over 36 inches (914 mm) wide:

   a. Exterior: Heavy weight, bronze/stainless steel, 5 inches (127 mm) high
   b. Interior: Heavy weight, steel, 5 inches (127 mm) high

5. 2 inches or thicker doors:

   a. Exterior: Heavy weight, bronze or stainless steel, 5 inches (127 mm) high
   b. Interior: Heavy weight, steel, 5 inches (127 mm) high

6. Adjust hinge width for door, frame, and wall conditions to allow proper degree of opening.
7. Provide three hinges per door leaf for doors 90 inches (2286 mm) or less in height, and one additional hinge for each 30 inches (762 mm) of additional door height.
8. Where new hinges are specified for existing doors or existing frames, provide new hinges of identical size to hinge preparation present in existing door or existing frame.
9. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:

   a. Steel Hinges: Steel pins
   b. Non-Ferrous Hinges: Stainless steel pins
   c. Out-Swinging Exterior Doors: Non-removable pins
   d. Out-Swinging Interior Lockable Doors: Non-removable pins
   e. Interior Non-lockable Doors: Non-rising pins

10. Provide hinges with electrified options as scheduled in the hardware sets. Provide with number and gage of wires enough to accommodate electric function of specified hardware. Locate electric hinge at second hinge from bottom or nearest to electrified locking component. Provide mortar guard for each electrified hinge specified.

2.04 CONTINUOUS HINGES

A. Manufacturers:

1. Scheduled Manufacturer:

   a. Ives

2. Acceptable Manufacturers:

   a. Select
   b. Roton

B. Requirements:

1. Provide aluminum geared continuous hinges conforming to ANSI/BHMA A156.26, Grade 1.
2. Provide aluminum geared continuous hinges, where specified in the hardware sets, fabricated from 6063-T6 aluminum.
3. Provide split nylon bearings at each hinge knuckle for quiet, smooth, self-lubricating operation.
4. Provide hinges capable of supporting door weights up to 450 pounds, and successfully tested for 1,500,000 cycles.

5. On fire-rated doors, provide aluminum geared continuous hinges classified for use on rated doors by testing agency acceptable to authority having jurisdiction.
6. Provide aluminum geared continuous hinges with electrified option scheduled in the hardware sets. Provide with number and gage of wires enough to accommodate electric function of specified hardware.
7. Provide hinges 1 inch (25 mm) shorter in length than nominal height of door, unless otherwise noted or door details require shorter length and with symmetrical hole pattern.

2.05 CYLINDRICAL LOCKS – GRADE 1

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:

a. Schlage ND series

B. Requirements:

1. Provide cylindrical locks conforming to ANSI/BHMA A156.2 Series 4000, Grade 1, and UL Listed for 3-hour fire doors.
2. Cylinders: Refer to "KEYING" article, herein.
3. Provide locks with standard 2-3/4 inches (70 mm) backset, unless noted otherwise, with 1/2-inch latch throw. Provide proper latch throw for UL listing at pairs.
4. Provide locksets with separate anti-rotation thru-bolts, and no exposed screws.
5. Provide independently operating levers with two external return spring cassettes mounted under roses to prevent lever sag.
6. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim.
7. Provide electrified options as scheduled in the hardware sets.
8. Lever Trim: Solid cast levers without plastic inserts and wrought roses on both sides.

a. Lever Design: RHO

2.06 EXIT DEVICES

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:

a. Von Duprin 98/35A series

2. Acceptable Manufacturers and Products:

a. Precision APEX 2000 series
b. Falcon 24/25 series

B. Requirements:

1. Provide exit devices tested to ANSI/BHMA A156.3 Grade 1 and UL listed for Panic Exit or Fire Exit Hardware.
2. Cylinders: Refer to "KEYING" article, herein.
3. Provide smooth touchpad type exit devices, fabricated of brass, bronze, stainless steel, or aluminum, plated to standard architectural finishes to match balance of door hardware.

4. Touchpad must extend a minimum of one half of door width. No plastic inserts are allowed in touchpads.
5. Provide exit devices with deadlatching feature for security and for future addition of alarm kits and/or other electrified requirements.
6. Provide exit devices with weather resistant components that can withstand harsh conditions of various climates and corrosive cleaners used in outdoor pool environments.
7. Provide flush end caps for exit devices.
8. Provide exit devices with manufacturer's approved strikes.
9. Provide exit devices cut to door width and height. Install exit devices at height recommended by exit device manufacturer, allowable by governing building codes, and approved by Architect.
10. Mount mechanism case flush on face of doors or provide spacers to fill gaps behind devices. Where glass trim or molding projects off face of door, provide glass bead kits.
11. Provide cylinder or hex-key dogging as specified at non fire-rated openings.
12. Removable Mullions: 2 inches (51 mm) x 3 inches (76 mm) steel tube. Where scheduled as keyed removable mullion, provide type that can be removed by use of a keyed cylinder, which is self-locking when re-installed.
13. Provide factory drilled weep holes for exit devices used in full exterior application, highly corrosive areas, and where noted in hardware sets.
14. Provide electrified options as scheduled.
15. Top latch mounting: double- or single-tab mount for steel doors, face mount for aluminum doors eliminating requirement of tabs, and double tab mount for wood doors.
16. Provide exit devices with optional trim designs to match other lever and pull designs used on the project.

2.07 CYLINDERS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:

   a. Schlage Everest 29 Primus XP

2. Acceptable Manufacturers and Products:

   a. No Substitute

B. Requirements:

1. Provide cylinders/cores, compliant with ANSI/BHMA A156.5; latest revision; cylinder face finished to match lockset, manufacturer’s series as indicated. Refer to “KEYING” article, herein.
2. Provide cylinders in the below-listed configuration(s), distributed throughout the Project as indicated.

   a. High Security: dual-locking cylinder with permanent core requiring restricted, patented keyway. Dual-locking mechanism with interlocking finger pin(s) to check for patented features on keys.

3. Patent Protection: Cylinders/cores requiring use of restricted, patented keys, patent protected.
4. Nickel silver bottom pins.

2.08 KEYING

A. Scheduled System:

1. Existing factory registered system:

a. Provide cylinders/cores keyed into Owner's existing factory registered keying system. Comply with guidelines in ANSI/BHMA A156.28, incorporating decisions made at keying conference.

B. Requirements:

1. Construction Keying:

a. Replaceable Construction Cores.
1) Provide temporary construction cores replaceable by permanent cores, furnished in accordance with the following requirements.
a) 3 construction control keys
b) 12 construction change (day) keys.
2) Owner or Owner's Representative will replace temporary construction cores with permanent cores.

2. Permanent Keying:

a. Provide permanent cylinders/cores keyed by the manufacturer according to the following key system.
1) Master Keying system as directed by the Owner.

b. Forward bitting list and keys separately from cylinders, by means as directed by Owner. Failure to comply with forwarding requirements will be cause for replacement of cylinders/cores involved at no additional cost to Owner.
c. Provide keys with the following features:
1) Material: Nickel silver; minimum thickness of .107-inch (2.3mm)
2) Patent Protection: Keys and blanks protected by one or more utility patent(s).
3) Geographically Exclusive: Where High Security or Security cylinders/cores are indicated, provide nationwide, geographically exclusive key system complying with the following restrictions.

d. Identification:
1) Mark permanent cylinders/cores and keys with applicable blind code for identification. Do not provide blind code marks with actual key cuts.
2) Identification stamping provisions must be approved by the Architect and Owner.
3) Stamp cylinders/cores and keys with Owner's unique key system facility code as established by the manufacturer; key symbol and embossed or stamped with "DO NOT DUPLICATE" along with the "PATENTED" or patent number to enforce the patent protection.
4) Failure to comply with stamping requirements will be cause for replacement of keys involved at no additional cost to Owner.
5) Forward permanent cylinders/cores to Owner, separately from keys, by means as directed by Owner.

e. Quantity: Furnish in the following quantities.
1) Change (Day) Keys: 3 per cylinder/core.
2) Permanent Control Keys: 3.
3) Master Keys: 6.

2.09 DOOR CLOSERS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:

a. LCN 4040XP series

2. Acceptable Manufacturers and Products:

a. Corbin-Russwin DC8000 series
b. Sargent 281 series

B. Requirements:

1. Provide door closers conforming to ANSI/BHMA A156.4 Grade 1 requirements by BHMA certified independent testing laboratory. ISO 9000 certify closers. Stamp units with date of manufacture code.
2. Provide door closers with fully hydraulic, full rack and pinion action with high strength cast iron cylinder, and full complement bearings at shaft.
3. Cylinder Body: 1-1/2-inch (38 mm) diameter with 5/8-inch (16 mm) diameter double heat-treated pinion journal.
4. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
5. Spring Power: Continuously adjustable over full range of closer sizes, and providing reduced opening force as required by accessibility codes and standards.
6. Hydraulic Regulation: By tamper-proof, non-critical valves, with separate adjustment for latch speed, general speed, and backcheck.
7. Provide closers with solid forged steel main arms and factory assembled heavy-duty forged forearms for parallel arm closers.
8. Pressure Relief Valve (PRV) Technology: Not permitted.
9. Finish for Closer Cylinders, Arms, Adapter Plates, and Metal Covers: Powder coating finish which has been certified to exceed 100 hours salt spray testing as described in ANSI Standard A156.4 and ASTM B117, or has special rust inhibitor (SRI).
10. Provide special templates, drop plates, mounting brackets, or adapters for arms as required for details, overhead stops, and other door hardware items interfering with closer mounting.

2.10 PROTECTION PLATES

A. Manufacturers:

1. Scheduled Manufacturer:

a. Ives

2. Acceptable Manufacturers:

a. Burns
b. Trimco

B. Requirements:

1. Provide protection plates with a minimum of 0.050 inch (1 mm) thick, beveled four edges as scheduled. Furnish with sheet metal or wood screws, finished to match plates.
2. Sizes plates 2 inches (51 mm) less width of door on single doors, pairs of doors with a mullion, and doors with edge guards. Size plates 1 inch (25 mm) less width of door on pairs without a mullion or edge guards.
3. At fire rated doors, provide protection plates over 16 inches high with UL label.

2.11 OVERHEAD STOPS AND OVERHEAD STOP/HOLDERS

A. Manufacturers:

1. Scheduled Manufacturers:

a. Glynn-Johnson

2. Acceptable Manufacturers:

a. Rixson
b. Sargent

B. Requirements:

1. Provide overhead stop at any door where conditions do not allow for a wall stop or floor stop presents tripping hazard.
2. Provide friction type at doors without closer and positive type at doors with closer.

2.12 DOOR STOPS AND HOLDERS

A. Manufacturers:

1. Scheduled Manufacturer:

a. Ives

2. Acceptable Manufacturers:

a. Trimco
b. Burns

B. Provide door stops at each door leaf:

1. Provide wall stops wherever possible. Provide concave type where lockset has a push button of thumbturn.
2. Where a wall stop cannot be used, provide universal floor stops.
3. Where wall or floor stop cannot be used, provide overhead stop.
4. Provide roller bumper where doors open into each other and overhead stop cannot be used.

2.13 THRESHOLDS, SEALS, DOOR SWEEPS, AUTOMATIC DOOR BOTTOMS, AND GASKETING

A. Manufacturers:

1. Scheduled Manufacturer:

    a. Zero International

2. Acceptable Manufacturers:

    a. National Guard
    b. Reese

B. Requirements:

1. Provide thresholds, weather-stripping, and gasketing systems as specified and per architectural details. Match finish of other items.
2. Smoke- and Draft-Control Door Assemblies: Where smoke- and draft-control door assemblies are required, provide door hardware that meets requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105.
3. Provide door sweeps, seals, astragals, and auto door bottoms only of type where resilient or flexible seal strip is easily replaceable and readily available.
4. Size thresholds 1/2 inch (13 mm) high by 5 inches (127 mm) wide by door width unless otherwise specified in the hardware sets or detailed in the drawings.

2.14 SILENCERS

A. Manufacturers:

1. Scheduled Manufacturer:

    a. Ives

2. Acceptable Manufacturers:

    a. Burns
    b. Trimco

B. Requirements:

1. Provide "push-in" type silencers for hollow metal or wood frames.
2. Provide one silencer per 30 inches (762 mm) of height on each single frame, and two for each pair frame.
3. Omit where gasketing is specified.

2.15 DOOR POSITION SWITCHES

A. Manufacturers:

1. Scheduled Manufacturer:

    a. Schlage

2. Acceptable Manufacturers:

    a. GE-Interlogix
    b. Sargent

B. Requirements:

1. Provide recessed or surface mounted type door position switches as specified.
2. Coordinate door and frame preparations with door and frame suppliers. If switches are being used with magnetic locking device, provide minimum of 4 inches (102 mm) between switch and magnetic locking device.

2.16 FINISHES

A. FINISH: BHMA 626/652 (US26D); EXCEPT:

1. Hinges at Exterior Doors: BHMA 630 (US32D)
2. Aluminum Geared Continuous Hinges: BHMA 628 (US28)
3. Push Plates, Pulls, and Push Bars: BHMA 630 (US32D)
4. Protection Plates: BHMA 630 (US32D)
5. Overhead Stops and Holders: BHMA 630 (US32D)
6. Door Closers: Powder Coat to Match
7. Wall Stops: BHMA 630 (US32D)
8. Latch Protectors: BHMA 630 (US32D)
9. Weatherstripping: Clear Anodized Aluminum
10. Thresholds: Mill Finish Aluminum

B. FINISH: BHMA 643E/716 (US11); EXCEPT:

1. Door Closers: Powder Coat to Match.
2. Weatherstripping: Dark Bronze Anodized Aluminum.
3. Thresholds: Extruded Architectural Bronze, Oil-Rubbed

PART 3 - EXECUTION

3.01 EXAMINATION

A. Prior to installation of hardware, examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance. Verify doors, frames, and walls have been properly reinforced for hardware installation.
B. Field verify existing doors and frames receiving new hardware and existing conditions receiving new openings. Verify that new hardware is compatible with existing door and frame preparation and existing conditions.
C. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.
D. Submit a list of deficiencies in writing and proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. Mount door hardware units at heights to comply with the following, unless otherwise indicated or required to comply with governing regulations.

1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
2. Custom Steel Doors and Frames: HMMA 831.

3. Interior Architectural Wood Flush Doors: ANSI/WDMA I.S. 1A
4. Installation Guide for Doors and Hardware: DHI TDH-007-20

B. Install door hardware in accordance with NFPA 80, NFPA 101 and provide post-install inspection, testing as specified in section 1.03.E unless otherwise required to comply with governing regulations.
C. Install each hardware item in compliance with manufacturer's instructions and recommendations, using only fasteners provided by manufacturer.
D. Do not install surface mounted items until finishes have been completed on substrate. Protect all installed hardware during painting.
E. Set units level, plumb and true to line and location. Adjust and reinforce attachment substrate as necessary for proper installation and operation.
F. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
G. Install operating parts so they move freely and smoothly without binding, sticking, or excessive clearance.
H. Hinges: Install types and in quantities indicated in door hardware schedule but not fewer than quantity recommended by manufacturer for application indicated.
I. Lock Cylinders:

1. Install construction cores to secure building and areas during construction period.
2. Replace construction cores with permanent cores as indicated in keying section.
3. Furnish permanent cores to Owner for installation.

J. Wiring: Coordinate with Division 26, ELECTRICAL and Division 28 ELECTRONIC SAFETY AND SECURITY sections for:

1. Conduit, junction boxes and wire pulls.
2. Connections to and from power supplies to electrified hardware.
3. Connections to fire/smoke alarm system and smoke evacuation system.
4. Connection of wire to door position switches and wire runs to central room or area, as directed by Architect.
5. Connections to panel interface modules, controllers, and gateways.
6. Testing and labeling wires with Architect's opening number.

K. Door Closers: Mount closers on room side of corridor doors, inside of exterior doors, and stair side of stairway doors from corridors. Mount closers so they are not visible in corridors, lobbies and other public spaces unless approved by Architect.
L. Closer/Holders: Mount closer/holders on room side of corridor doors, inside of exterior doors, and stair side of stairway doors.
M. Power Supplies: Locate power supplies as indicated or, if not indicated, above accessible ceilings or in equipment room, or alternate location as directed by Architect.
N. Thresholds: Set thresholds in full bed of sealant complying with requirements specified in Division 07 Section "Joint Sealants."
O. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they may impede traffic or present tripping hazard.
P. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
Q. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.
R. Door Bottoms and Sweeps: Apply to bottom of door, forming seal with threshold when door is closed.

3.03 ADJUSTING

A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

    1. Spring Hinges: Adjust to achieve positive latching when door can close freely from an open position of 30 degrees.
    2. Electric Strikes: Adjust horizontal and vertical alignment of keeper to properly engage lock bolt.
    3. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.

B. Occupancy Adjustment: Approximately three to six months after date of Substantial Completion, examine and readjust each item of door hardware, including adjusting operating forces, as necessary to ensure function of doors and door hardware.

3.04 CLEANING AND PROTECTION

A. Clean adjacent surfaces soiled by door hardware installation.
B. Clean operating items per manufacturer's instructions to restore proper function and finish.
C. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of Substantial Completion.

3.05 DOOR HARDWARE SCHEDULE

A. The intent of the hardware specification is to specify the hardware for interior and exterior doors, and to establish a type, continuity, and standard of quality. However, it is the door hardware supplier's responsibility to thoroughly review existing conditions, schedules, specifications, drawings, and other Contract Documents to verify the suitability of the hardware specified.
B. Discrepancies, conflicting hardware, and missing items are to be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application.
C. Hardware items are referenced in the following hardware schedule. Refer to the above specifications for special features, options, cylinders/keying, and other requirements.

Abbreviation	Name
BYO	By Others
GLY	Glynn-Johnson Corp
IVE	H.B. Ives
LCN	Lcn Commercial Division
MIS	Misc - Out-Sourced Items
SCE	Schlage Electronic Security
SCH	Schlage Lock Company
VON	Von Duprin
ZER	Zero International Inc

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HARDWARE GROUP NO. 01

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	SALVAGED DOOR	RE-USE ALL EXISTING HARDWARE		

HARDWARE GROUP NO. 02

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	PASSAGE SET	ND10S RHO	626	SCH
1	EA	MOP PLATE	8400 10" X 1" LDW B-CS	630	IVE
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

HARDWARE GROUP NO. 03

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	CONT. HINGE	224XY	US28	IVE
1	EA	PANIC HARDWARE	9847-DT	626	VON
1	EA	PANIC HARDWARE	9847-NL	626	VON
1	EA	RIM CYLINDER	20-057 ICX	626	SCH
1	EA	PRIMUS CORE	20-740 EV D	626	SCH
2	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
2	EA	PA MOUNTING PLATE	4040XP-18PA SRT	689	LCN
2	EA	CUSH SHOE SUPPORT	4040XP-30 SRT	689	LCN
2	EA	BLADE STOP SPACER	4040XP-61 SRT	689	LCN
1	EA	THRESHOLD	655A	A	ZER
1	SET	WEATHERSTRIPPING	BY ALUM FRAME MANUFACTURER		MIS

HARDWARE GROUP NO. 04

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CONT. HINGE	224XY		US28	IVE
2	EA	PANIC HARDWARE	9847-L-06-WH		626	VON
2	EA	RIM CYLINDER	20-057 ICX		626	SCH
2	EA	FSIC CORE	23-030 CKC EV D		626	SCH
2	EA	SURFACE CLOSER	4040XP SCUSH SRI		689	LCN
2	EA	PA MOUNTING PLATE	4040XP-18PA SRT		689	LCN
2	EA	CUSH SHOE SUPPORT	4040XP-30 SRT		689	LCN
2	EA	BLADE STOP SPACER	4040XP-61 SRT		689	LCN
1	EA	THRESHOLD	655A		A	ZER
1	SET	WEATHERSTRIPPING	BY ALUM FRAME MANUFACTURER			MIS

HARDWARE GROUP NO. 05

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	224XY TWP CON		313AN	IVE
1	EA	EU STOREROOM LOCK	ND80TDEU RHO RX 12V/24V DC		643e	SCH
1	EA	PRIMUS CORE	20-740 EV D		622	SCH
1	EA	SURFACE CLOSER	4040XP SCUSH		695	LCN
1	EA	THRESHOLD	655D		D	ZER
1	EA	WIRE HARNESS	CON-XX-P LENGTH AS REQUIRED FOR USE WITH DOOR			SCH
1	EA	WIRE HARNESS	CON-6W FOR USE WITH HINGE			SCH
1	EA	DESK MOUNT BUTTON	660-PB		628	SCE
1	EA	DOOR CONTACT	679-05HM		BLK	SCE
1	SET	WEATHERSTRIPPING	BY ALUM FRAME MANUFACTURER			MIS
1	EA	POWER SUPPLY	BY SECURITY CONTRACTOR			MIS
1	EA	INTERCOM	BY SECURITY CONTRACTOR			MIS

OPERATIONAL DESCRIPTION:
1. DOOR NORMALLY CLOSED AND LOCKED.
2. ENTRY BY INTERCOM WHICH SIGNALS ELECTRIC TRIM OF LOCK TO OPEN AND ALLOW ENTRY. ENTRY ALSO GRANTED VIA PUSH BUTTON.
3. FREE EGRESS AT ALL TIMES VIA THE INSIDE LEVER HANDLE.
4. INSIDE LEVER HANDLE HAS RX SWITCH WHICH WILL SIGNAL ACCESS CONTROL SYSTEM OF A VALID RELEASE.
5. LOCK IS FAIL-SECURE UPON LOSS OF POWER DOOR WILL REMAIN LOCKED.

HARDWARE GROUP NO. 06

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		F643E/716	IVE
1	EA	CLASSROOM LOCK	ND70TD RHO		643e	SCH
1	EA	FSIC CORE	23-030 CKC EV D		613	SCH
1	EA	SURFACE CLOSER	4040XP		695	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		613	IVE
1	EA	WALL STOP	WS406/407CCV		613	IVE
3	EA	SILENCER	SR64		GRY	IVE

HARDWARE GROUP NO. 07

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	224XY TWP CON		313AN	IVE
1	EA	EU STOREROOM LOCK	ND80TDEU RHO RX 12V/24V DC		643e	SCH
1	EA	FSIC CORE	23-030 CKC EV D		613	SCH
1	EA	SURFACE CLOSER	4040XP SCUSH		695	LCN
1	EA	THRESHOLD	655D		D	ZER
1	EA	WIRE HARNESS	CON-XX-P LENGTH AS REQUIRED FOR USE WITH DOOR			SCH
1	EA	WIRE HARNESS	CON-6W FOR USE WITH HINGE			SCH
1	EA	DESK MOUNT BUTTON	660-PB		628	SCE
1	EA	DOOR CONTACT	679-05HM		BLK	SCE
1	SET	WEATHERSTRIPPING	BY ALUM FRAME MANUFACTURER			MIS
1	EA	CARD READER	BY SECURITY CONTRACTOR			MIS
1	EA	POWER SUPPLY	BY SECURITY CONTRACTOR			MIS

OPERATIONAL DESCRIPTION:
1. DOOR NORMALLY CLOSED AND LOCKED.
2. ENTRY BY VALID CREDENTIAL AT CARD READER WHICH SIGNALS ELECTRIC TRIM OF LOCK TO OPEN AND ALLOW ENTRY. ENTRY ALSO GRANTED VIA PUSH BUTTON.
3. INSIDE LEVER HANDLE HAS RX SWITCH WHICH WILL SIGNAL ACCESS CONTROL SYSTEM OF A VALID RELEASE.
4. LOCK IS FAIL-SECURE UPON LOSS OF POWER DOOR WILL REMAIN LOCKED.

HARDWARE GROUP NO. 08

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	224XY		313AN	IVE
1	EA	CORRIDOR LOCK	ND73TD RHO		643e	SCH
1	EA	FSIC CORE	23-030 CKC EV D		613	SCH
1	EA	SURFACE CLOSER	4040XP SCUSH		695	LCN
1	EA	PA MOUNTING PLATE	4040XP-18PA SRT		695	LCN
1	EA	CUSH SHOE SUPPORT	4040XP-30 SRT		695	LCN
1	EA	BLADE STOP SPACER	4040XP-61 SRT		695	LCN
1	EA	SEALS	BY DOOR SUPPLIER			BYO

HARDWARE GROUP NO. 09

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP		F643E/716	IVE
1	EA	STOREROOM LOCK	ND80TD RHO		643e	SCH
1	EA	FSIC CORE	23-030 CKC EV D		613	SCH
1	EA	SURFACE CLOSER	4040XP SCUSH		695	LCN
3	EA	SILENCER	SR64		GRY	IVE

HARDWARE GROUP NO. 10

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	224XY		313AN	IVE
1	EA	CORRIDOR LOCK	ND73TD RHO		643e	SCH
1	EA	FSIC CORE	23-030 CKC EV D		613	SCH
1	EA	FLOOR STOP	FS436		643E/716	IVE
1	EA	SEALS	BY DOOR SUPPLIER			BYO

HARDWARE GROUP NO. 11

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	CORRIDOR LOCK	ND73TD RHO		626	SCH
1	EA	FSIC CORE	23-030 CKC EV D		626	SCH
1	EA	SURFACE CLOSER	4040XP		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	WALL STOP	WS406/407CCV		630	IVE
1	EA	GASKETING	488SBK PSA		BK	ZER

HARDWARE GROUP NO. 12

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP		F643E/716	IVE
1	EA	CLASSROOM LOCK	ND70TD RHO		643e	SCH
1	EA	FSIC CORE	23-030 CKC EV D		613	SCH
1	EA	SURFACE CLOSER	4040XP SCUSH		695	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		613	IVE
3	EA	SILENCER	SR64		GRY	IVE

HARDWARE GROUP NO. 13

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	CORRIDOR LOCK	ND73TD RHO		626	SCH
1	EA	FSIC CORE	23-030 CKC EV D		626	SCH
1	EA	OH STOP	90S		630	GLY
1	EA	SURFACE CLOSER	4040XP		689	LCN
1	EA	MOUNTING PLATE	4040XP-18 SRT		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	WALL STOP	WS406/407CCV		630	IVE
1	EA	GASKETING	488SBK PSA		BK	ZER

A CONFLICT MAY OCCUR BETWEEN THE GJ O/H STOP AND THE CLOSER BODY, THE DROP PLATE MAY NEED TO BE DRILLED OUT TO ALLOW THE THRU-BOLTS OF THE O/H STOP TO BE INSTALLED.

HARDWARE GROUP NO. 14

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	224XY TWP CON		313AN	IVE
1	EA	EU STOREROOM LOCK	ND80TDEU RHO RX 12V/24V DC		643e	SCH
1	EA	PRIMUS CORE	20-740 EV D		622	SCH
1	EA	SURFACE CLOSER	4040XP SCUSH		695	LCN
1	EA	SEALS	BY DOOR SUPPLIER			BYO
1	EA	THRESHOLD	655D		D	ZER
1	EA	WIRE HARNESS	CON-XX-P LENGTH AS REQUIRED FOR USE WITH DOOR			SCH
1	EA	WIRE HARNESS	CON-6W FOR USE WITH HINGE			SCH
1	EA	DESK MOUNT BUTTON	660-PB		628	SCE
1	EA	DOOR CONTACT	679-05HM		BLK	SCE
1	EA	CARD READER	BY SECURITY CONTRACTOR			MIS
1	EA	POWER SUPPLY	BY SECURITY CONTRACTOR			MIS

OPERATIONAL DESCRIPTION:
1. DOOR NORMALLY CLOSED AND LOCKED.
2. ENTRY BY VALID CREDENTIAL AT CARD READER WHICH SIGNALS ELECTRIC TRIM OF LOCK TO OPEN AND ALLOW ENTRY. ENTRY ALSO GRANTED VIA PUSH BUTTON.
3. INSIDE LEVER HANDLE HAS RX SWITCH WHICH WILL SIGNAL ACCESS CONTROL SYSTEM OF A VALID RELEASE.
4. LOCK IS FAIL-SECURE UPON LOSS OF POWER DOOR WILL REMAIN LOCKED.

HARDWARE GROUP NO. 15

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	224XY TWP CON		313AN	IVE
1	EA	EU STOREROOM LOCK	ND80TDEU RHO RX 12V/24V DC		643e	SCH
1	EA	PRIMUS CORE	20-740 EV D		622	SCH
1	EA	SURFACE CLOSER	4040XP SCUSH		695	LCN
1	EA	THRESHOLD	655D		D	ZER
1	EA	WIRE HARNESS	CON-XX-P LENGTH AS REQUIRED FOR USE WITH DOOR			SCH
1	EA	WIRE HARNESS	CON-6W FOR USE WITH HINGE			SCH
1	EA	DESK MOUNT BUTTON	660-PB		628	SCE
1	EA	DOOR CONTACT	679-05HM		BLK	SCE
1	SET	WEATHERSTRIPPING	BY ALUM FRAME MANUFACTURER			MIS
1	EA	POWER SUPPLY	BY SECURITY CONTRACTOR			MIS
1	EA	INTERCOM	BY SECURITY CONTRACTOR			MIS

OPERATIONAL DESCRIPTION:
1. DOOR NORMALLY CLOSED AND LOCKED.
2. ENTRY BY INTERCOM WHICH SIGNALS ELECTRIC TRIM OF LOCK TO OPEN AND ALLOW ENTRY. ENTRY ALSO GRANTED VIA PUSH BUTTON.
3. FREE EGRESS AT ALL TIMES VIA THE INSIDE LEVER HANDLE.
4. INSIDE LEVER HANDLE HAS RX SWITCH WHICH WILL SIGNAL ACCESS CONTROL SYSTEM OF A VALID RELEASE.
5. LOCK IS FAIL-SECURE UPON LOSS OF POWER DOOR WILL REMAIN LOCKED.

END OF SECTION

SECTION 087100 - DOOR HARDWARE

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:

1. Mechanical and electrified door hardware
2. Electronic access control system components
3. Field verification, preparation and modification of existing doors and frames to receive new door hardware.

B. Section excludes:

1. Windows
2. Cabinets (casework), including locks in cabinets
3. Signage
4. Toilet accessories
5. Overhead doors

C. Related Sections:

1. Division 01 Section "Alternates" for alternates affecting this section.
2. Division 06 Section "Rough Carpentry"
3. Division 06 Section "Finish Carpentry"
4. Division 07 Section "Joint Sealants" for sealant requirements applicable to threshold installation specified in this section.
5. Division 08 Sections:

    a. "Metal Doors and Frames"
    b. "Flush Wood Doors"
    c. "Stile and Rail Wood Doors"
    d. "Interior Aluminum Doors and Frames"
    e. "Aluminum-Framed Entrances and Storefronts"
    f. "Stainless Steel Doors and Frames"
    g. "Special Function Doors"
    h. "Entrances"

6. Division 09 sections for touchup, finishing or refinishing of existing openings modified by this section.
7. Division 26 "Electrical" sections for connections to electrical power system and for low-voltage wiring.
8. Division 28 "Electronic Safety and Security" sections for coordination with other components of electronic access control system and fire alarm system.

1.02 REFERENCES

A. UL LLC

1. UL 10B - Fire Test of Door Assemblies
2. UL 10C - Positive Pressure Test of Fire Door Assemblies
3. UL 1784 - Air Leakage Tests of Door Assemblies
4. UL 305 - Panic Hardware

B. DHI - Door and Hardware Institute

1. Sequence and Format for the Hardware Schedule
2. Recommended Locations for Builders Hardware
3. Keying Systems and Nomenclature
4. Installation Guide for Doors and Hardware

C. NFPA – National Fire Protection Association

1. NFPA 70 – National Electric Code
2. NFPA 80 – 2016 Edition – Standard for Fire Doors and Other Opening Protectives
3. NFPA 101 – Life Safety Code
4. NFPA 105 – Smoke and Draft Control Door Assemblies
5. NFPA 252 – Fire Tests of Door Assemblies

D. ANSI - American National Standards Institute

1. ANSI A117.1 – 2017 Edition – Accessible and Usable Buildings and Facilities
2. ANSI/BHMA A156.1 - A156.29, and ANSI/BHMA A156.31 - Standards for Hardware and Specialties
3. ANSI/BHMA A156.28 - Recommended Practices for Keying Systems
4. ANSI/WDMA I.S. 1A - Interior Architectural Wood Flush Doors
5. ANSI/SDI A250.8 - Standard Steel Doors and Frames

1.03 SUBMITTALS

A. General:

1. Submit in accordance with Conditions of Contract and Division 01 Submittal Procedures.
2. Prior to forwarding submittal:

a. Comply with procedures for verifying existing door and frame compatibility for new hardware, as specified in PART 3, ''EXAMINATION'' article, herein.
b. Review drawings and Sections from related trades to verify compatibility with specified hardware.
c. Highlight, encircle, or otherwise specifically identify on submittals: deviations from Contract Documents, issues of incompatibility or other issues which may detrimentally affect the Work.

B. Action Submittals:

1. Product Data: Submit technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.
2. Riser and Wiring Diagrams: After final approval of hardware schedule, submit details of electrified door hardware, indicating:

    a. Wiring Diagrams: For power, signal, and control wiring and including:
        1) Details of interface of electrified door hardware and building safety and security systems.
        2) Schematic diagram of systems that interface with electrified door hardware.
        3) Point-to-point wiring.
        4) Risers.

3. Samples for Verification: If requested by Architect, submit production sample of requested door hardware unit in finish indicated and tagged with full description for coordination with schedule.

    a. Samples will be returned to supplier. Units that are acceptable to Architect may, after final check of operations, be incorporated into Work, within limitations of key coordination requirements.

4. Door Hardware Schedule:

    a. Submit concurrent with submissions of Product Data, Samples, and Shop Drawings. Coordinate submission of door hardware schedule with scheduling requirements of other work to facilitate fabrication of other work critical in Project construction schedule.
    b. Submit under direct supervision of a Door Hardware Institute (DHI) certified Architectural Hardware Consultant (AHC) or Door Hardware Consultant (DHC) with hardware sets in vertical format as illustrated by Sequence of Format for the Hardware Schedule published by DHI.
    c. Indicate complete designations of each item required for each opening, include:
        1) Door Index: door number, heading number, and Architect's hardware set number.
        2) Quantity, type, style, function, size, and finish of each hardware item.
        3) Name and manufacturer of each item.
        4) Fastenings and other pertinent information.
        5) Location of each hardware set cross-referenced to indications on Drawings.
        6) Explanation of all abbreviations, symbols, and codes contained in schedule.
        7) Mounting locations for hardware.
        8) Door and frame sizes and materials.
        9) Degree of door swing and handing.
        10) Operational Description of openings with electrified hardware covering egress, ingress (access), and fire/smoke alarm connections.

5. Key Schedule:

a. After Keying Conference, provide keying schedule that includes levels of keying, explanations of key system's function, key symbols used, and door numbers controlled.
b. Use ANSI/BHMA A156.28 "Recommended Practices for Keying Systems" as guideline for nomenclature, definitions, and approach for selecting optimal keying system.
c. Provide 3 copies of keying schedule for review prepared and detailed in accordance with referenced DHI publication. Include schematic keying diagram and index each key to unique door designations.
d. Index keying schedule by door number, keyset, hardware heading number, cross keying instructions, and special key stamping instructions.
e. Provide one complete bitting list of key cuts and one key system schematic illustrating system usage and expansion. Forward bitting list, key cuts and key system schematic directly to Owner, by means as directed by Owner.
f. Prepare key schedule by or under supervision of supplier, detailing Owner's final keying instructions for locks.

C. Informational Submittals:

1. Provide Qualification Data for Supplier, Installer and Architectural Hardware Consultant.
2. Provide Product Data:

a. Certify that door hardware approved for use on types and sizes of labeled fire-rated doors complies with listed fire-rated door assemblies.
b. Include warranties for specified door hardware.

D. Closeout Submittals:

1. Operations and Maintenance Data: Provide in accordance with Division 01 and include:

a. Complete information on care, maintenance, and adjustment; data on repair and replacement parts, and information on preservation of finishes.
b. Catalog pages for each product.
c. Final approved hardware schedule edited to reflect conditions as installed.
d. Final keying schedule
e. Copy of warranties including appropriate reference numbers for manufacturers to identify project.
f. As-installed wiring diagrams for each opening connected to power, both low voltage and 110 volts.

E. Inspection and Testing:

1. Submit written reports to the Owner and Authority Having Jurisdiction (AHJ) of the results of functional testing and inspection for:

a. fire door assemblies, in compliance with NFPA 80.
b. required egress door assemblies, in compliance with NFPA 101.

1.04 QUALITY ASSURANCE

A. Qualifications and Responsibilities:

1. Supplier: Recognized architectural hardware supplier with a minimum of 5 years documented experience supplying both mechanical and electromechanical door hardware similar in quantity, type, and quality to that indicated for this Project. Supplier to be recognized as a factory direct distributor by the manufacturer of the primary materials with a warehousing facility in the Project's vicinity. Supplier to have on staff, a certified Architectural Hardware Consultant (AHC) or Door Hardware Consultant (DHC) available to Owner, Architect, and Contractor, at reasonable times during the Work for consultation.
2. Installer: Qualified tradesperson skilled in the application of commercial grade hardware with experience installing door hardware similar in quantity, type, and quality as indicated for this Project.
3. Architectural Hardware Consultant: Person who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project and meets these requirements:

    a. For door hardware: DHI certified AHC or DHC.
    b. Can provide installation and technical data to Architect and other related subcontractors.
    c. Can inspect and verify components are in working order upon completion of installation.
    d. Capable of producing wiring diagram and coordinating installation of electrified hardware with Architect and electrical engineers.

4. Single Source Responsibility: Obtain each type of door hardware from single manufacturer.

B. Certifications:

1. Fire-Rated Door Openings:

    a. Provide door hardware for fire-rated openings that complies with NFPA 80 and requirements of authorities having jurisdiction.
    b. Provide only items of door hardware that are listed products tested by UL LLC, Intertek Testing Services, or other testing and inspecting organizations acceptable to authorities having jurisdiction for use on types and sizes of doors indicated, based on testing at positive pressure and according to NFPA 252 or UL 10C and in compliance with requirements of fire-rated door and door frame labels.

2. Smoke and Draft Control Door Assemblies:

    a. Provide door hardware that meets requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105
    b. Comply with the maximum air leakage of 0.3 cfm/sq. ft. (3 cu. m per minute/sq. m) at tested pressure differential of 0.3-inch wg (75 Pa) of water.

3. Electrified Door Hardware

a. Listed and labeled as defined in NFPA 70, Article 100, by testing agency acceptable to authorities having jurisdiction.

4. Accessibility Requirements:

a. Comply with governing accessibility regulations cited in "REFERENCES" article 087100, 1.02.D3 herein for door hardware on doors in an accessible route. This project must comply with all Federal Americans with Disability Act regulations and all Local Accessibility Regulations.

C. Pre-Installation Meetings

1. Keying Conference

a. Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including:
1) Function of building, flow of traffic, purpose of each area, degree of security required, and plans for future expansion.
2) Preliminary key system schematic diagram.
3) Requirements for key control system.
4) Requirements for access control.
5) Address for delivery of keys.

2. Pre-installation Conference

a. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
b. Inspect and discuss preparatory work performed by other trades.
c. Inspect and discuss electrical roughing-in for electrified door hardware.
d. Review sequence of operation for each type of electrified door hardware.
e. Review required testing, inspecting, and certifying procedures.
f. Review questions or concerns related to proper installation and adjustment of door hardware.

3. Electrified Hardware Coordination Conference:

a. Prior to ordering electrified hardware, schedule and hold meeting to coordinate door hardware with security, electrical, doors and frames, and other related suppliers.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up for hardware delivered to Project site. Promptly replace products damaged during shipping.
B. Tag each item or package separately with identification coordinated with final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package. Deliver each article of hardware in manufacturer's original packaging.
C. Maintain manufacturer-recommended environmental conditions throughout storage and installation periods.

D. Provide secure lock-up for door hardware delivered to Project. Control handling and installation of hardware items so that completion of Work will not be delayed by hardware losses both before and after installation.
E. Handle hardware in manner to avoid damage, marring, or scratching. Correct, replace or repair products damaged during Work. Protect products against malfunction due to paint, solvent, cleanser, or any chemical agent.
F. Deliver keys to manufacturer of key control system for subsequent delivery to Owner.

1.06 COORDINATION

A. Coordinate layout and installation of floor-recessed door hardware with floor construction. Cast anchoring inserts into concrete.
B. Installation Templates: Distribute for doors, frames, and other work specified to be factory or shop prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.
C. Security: Coordinate installation of door hardware, keying, and access control with Owner's security consultant.
D. Electrical System Roughing-In: Coordinate layout and installation of electrified door hardware with connections to power supplies and building safety and security systems.
E. Existing Openings: Where existing doors, frames and/or hardware are to remain, field verify existing functions, conditions and preparations and coordinate to suit opening conditions and to provide proper door operation.

1.07 WARRANTY

A. Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within published warranty period.

    1. Warranty does not cover damage or faulty operation due to improper installation, improper use or abuse.
    2. Warranty Period: Beginning from date of Substantial Completion, for durations indicated in manufacturer's published listings.

        a. Mechanical Warranty
            1) Locks
                a) Schlage ND Series: 10 years
            2) Exit Devices
                a) Von Duprin: 3 years
            3) Closers
                a) LCN 4000 Series: 30 years

        b. Electrical Warranty
            1) Locks
                a) Schlage: 1 year
            2) Exit Devices
                a) Von Duprin: 1 year

1.08 MAINTENANCE

A. Furnish complete set of special tools required for maintenance and adjustment of hardware, including changing of cylinders.
B. Turn over unused materials to Owner for maintenance purposes.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. The Owner requires use of certain products for their unique characteristics and project suitability to ensure continuity of existing and future performance and maintenance standards. After investigating available product offerings, the Awarding Authority has elected to prepare proprietary specifications. These products are specified with the notation: "No Substitute."

    1. Where "No Substitute" is noted, submittals and substitution requests for other products will not be considered.

B. Approval of manufacturers and/or products other than those listed as "Scheduled Manufacturer" or "Acceptable Manufacturers" in the individual article for the product category shall be in accordance with QUALITY ASSURANCE article, herein.
C. Approval of products from manufacturers indicated in "Acceptable Manufacturers" is contingent upon those products providing all functions and features and meeting all requirements of scheduled manufacturer's product.
D. Where specified hardware is not adaptable to finished shape or size of members requiring hardware, furnish suitable types having same operation and quality as type specified, subject to Architect's approval.

2.02 MATERIALS

A. Fabrication

    1. Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. provide screws according to manufacturer's recognized installation standards for application intended.
    2. Finish exposed screws to match hardware finish, or, if exposed in surfaces of other work, to match finish of this other work including prepared for paint surfaces to receive painted finish.
    3. Provide concealed fasteners wherever possible for hardware units exposed when door is closed. Coordinate with "Metal Doors and Frames", "Flush Wood Doors", "Stile and Rail Wood Doors" to ensure proper reinforcements. Advise the Architect where visible fasteners, such as thru bolts, are required.

B. Modification and Preparation of Existing Doors: Where existing door hardware is indicated to be removed and reinstalled.

1. Provide necessary fillers, Dutchmen, reinforcements, and fasteners, compatible with existing materials, as required for mounting new opening hardware and to cover existing door and frame preparations.
2. Use materials which match materials of adjacent modified areas.
3. When modifying existing fire-rated openings, provide materials permitted by NFPA 80 as required to maintain fire-rating.

C. Provide screws, bolts, expansion shields, drop plates and other devices necessary for hardware installation.

1. Where fasteners are exposed to view: Finish to match adjacent door hardware material.

D. Cable and Connectors:

1. Where scheduled in the hardware sets, provide each item of electrified hardware and wire harnesses with number and gage of wires enough to accommodate electric function of specified hardware.
2. Provide Molex connectors that plug directly into connectors from harnesses, electric locking and power transfer devices.
3. Provide through-door wire harness for each electrified locking device installed in a door and wire harness for each electrified hinge, electrified continuous hinge, electrified pivot, and electric power transfer for connection to power supplies.

2.03 HINGES

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:

a. Ives 5BB series

2. Acceptable Manufacturers and Products:

a. Hager BB1191/1279 series
b. Stanley FBB series

B. Requirements:

1. Provide hinges conforming to ANSI/BHMA A156.1.
2. Provide five knuckle, ball bearing hinges.
3. 1-3/4 inch (44 mm) thick doors, up to and including 36 inches (914 mm) wide:

a. Exterior: Standard weight, bronze or stainless steel, 4-1/2 inches (114 mm) high
b. Interior: Standard weight, steel, 4-1/2 inches (114 mm) high

4. 1-3/4 inch (44 mm) thick doors over 36 inches (914 mm) wide:

a. Exterior: Heavy weight, bronze/stainless steel, 5 inches (127 mm) high
b. Interior: Heavy weight, steel, 5 inches (127 mm) high

5. 2 inches or thicker doors:

    a. Exterior: Heavy weight, bronze or stainless steel, 5 inches (127 mm) high
    b. Interior: Heavy weight, steel, 5 inches (127 mm) high

6. Adjust hinge width for door, frame, and wall conditions to allow proper degree of opening.
7. Provide three hinges per door leaf for doors 90 inches (2286 mm) or less in height, and one additional hinge for each 30 inches (762 mm) of additional door height.
8. Where new hinges are specified for existing doors or existing frames, provide new hinges of identical size to hinge preparation present in existing door or existing frame.
9. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:

    a. Steel Hinges: Steel pins
    b. Non-Ferrous Hinges: Stainless steel pins
    c. Out-Swinging Exterior Doors: Non-removable pins
    d. Out-Swinging Interior Lockable Doors: Non-removable pins
    e. Interior Non-lockable Doors: Non-rising pins

10. Provide hinges with electrified options as scheduled in the hardware sets. Provide with number and gage of wires enough to accommodate electric function of specified hardware. Locate electric hinge at second hinge from bottom or nearest to electrified locking component. Provide mortar guard for each electrified hinge specified.

2.04 CONTINUOUS HINGES

A. Manufacturers:

1. Scheduled Manufacturer:

    a. Ives

2. Acceptable Manufacturers:

    a. Select
    b. Roton

B. Requirements:

1. Provide aluminum geared continuous hinges conforming to ANSI/BHMA A156.26, Grade 1.
2. Provide aluminum geared continuous hinges, where specified in the hardware sets, fabricated from 6063-T6 aluminum.
3. Provide split nylon bearings at each hinge knuckle for quiet, smooth, self-lubricating operation.
4. Provide hinges capable of supporting door weights up to 450 pounds, and successfully tested for 1,500,000 cycles.
5. On fire-rated doors, provide aluminum geared continuous hinges classified for use on rated doors by testing agency acceptable to authority having jurisdiction.

6. Provide aluminum geared continuous hinges with electrified option scheduled in the hardware sets. Provide with number and gage of wires enough to accommodate electric function of specified hardware.
7. Provide hinges 1 inch (25 mm) shorter in length than nominal height of door, unless otherwise noted or door details require shorter length and with symmetrical hole pattern.

2.05 CYLINDRICAL LOCKS – GRADE 1

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:

a. Schlage ND series

B. Requirements:

1. Provide cylindrical locks conforming to ANSI/BHMA A156.2 Series 4000, Grade 1, and UL Listed for 3-hour fire doors.
2. Cylinders: Refer to "KEYING" article, herein.
3. Provide locks with standard 2-3/4 inches (70 mm) backset, unless noted otherwise, with 1/2-inch latch throw. Provide proper latch throw for UL listing at pairs.
4. Provide locksets with separate anti-rotation thru-bolts, and no exposed screws.
5. Provide independently operating levers with two external return spring cassettes mounted under roses to prevent lever sag.
6. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim.
7. Provide electrified options as scheduled in the hardware sets.
8. Lever Trim: Solid cast levers without plastic inserts and wrought roses on both sides.

a. Lever Design: RHO

2.06 EXIT DEVICES

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:

a. Von Duprin 98/35A series

2. Acceptable Manufacturers and Products:

a. Precision APEX 2000 series
b. Falcon 24/25 series

B. Requirements:

1. Provide exit devices tested to ANSI/BHMA A156.3 Grade 1 and UL listed for Panic Exit or Fire Exit Hardware.
2. Cylinders: Refer to "KEYING" article, herein.

3. Provide smooth touchpad type exit devices, fabricated of brass, bronze, stainless steel, or aluminum, plated to standard architectural finishes to match balance of door hardware.
4. Touchpad must extend a minimum of one half of door width. No plastic inserts are allowed in touchpads.
5. Provide exit devices with deadlatching feature for security and for future addition of alarm kits and/or other electrified requirements.
6. Provide exit devices with weather resistant components that can withstand harsh conditions of various climates and corrosive cleaners used in outdoor pool environments.
7. Provide flush end caps for exit devices.
8. Provide exit devices with manufacturer's approved strikes.
9. Provide exit devices cut to door width and height. Install exit devices at height recommended by exit device manufacturer, allowable by governing building codes, and approved by Architect.
10. Mount mechanism case flush on face of doors or provide spacers to fill gaps behind devices. Where glass trim or molding projects off face of door, provide glass bead kits.
11. Provide cylinder or hex-key dogging as specified at non fire-rated openings.
12. Removable Mullions: 2 inches (51 mm) x 3 inches (76 mm) steel tube. Where scheduled as keyed removable mullion, provide type that can be removed by use of a keyed cylinder, which is self-locking when re-installed.
13. Provide factory drilled weep holes for exit devices used in full exterior application, highly corrosive areas, and where noted in hardware sets.
14. Provide electrified options as scheduled.
15. Top latch mounting: double- or single-tab mount for steel doors, face mount for aluminum doors eliminating requirement of tabs, and double tab mount for wood doors.
16. Provide exit devices with optional trim designs to match other lever and pull designs used on the project.

2.07 CYLINDERS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:

a. Schlage Everest 29 Primus XP

2. Acceptable Manufacturers and Products:

a. No Substitute

B. Requirements:

1. Provide cylinders/cores, compliant with ANSI/BHMA A156.5; latest revision; cylinder face finished to match lockset, manufacturer’s series as indicated. Refer to “KEYING” article, herein.
2. Provide cylinders in the below-listed configuration(s), distributed throughout the Project as indicated.

a. High Security: dual-locking cylinder with permanent core requiring restricted, patented keyway. Dual-locking mechanism with interlocking finger pin(s) to check for patented features on keys.

3. Patent Protection: Cylinders/cores requiring use of restricted, patented keys, patent protected.
4. Nickel silver bottom pins.

2.08 KEYING

A. Scheduled System:

1. Existing factory registered system:

a. Provide cylinders/cores keyed into Owner's existing factory registered keying system. Comply with guidelines in ANSI/BHMA A156.28, incorporating decisions made at keying conference.

B. Requirements:

1. Construction Keying:

a. Replaceable Construction Cores.
1) Provide temporary construction cores replaceable by permanent cores, furnished in accordance with the following requirements.
a) 3 construction control keys
b) 12 construction change (day) keys.
2) Owner or Owner's Representative will replace temporary construction cores with permanent cores.

2. Permanent Keying:

a. Provide permanent cylinders/cores keyed by the manufacturer according to the following key system.
1) Master Keying system as directed by the Owner.

b. Forward bitting list and keys separately from cylinders, by means as directed by Owner. Failure to comply with forwarding requirements will be cause for replacement of cylinders/cores involved at no additional cost to Owner.
c. Provide keys with the following features:
1) Material: Nickel silver; minimum thickness of .107-inch (2.3mm)
2) Patent Protection: Keys and blanks protected by one or more utility patent(s).
3) Geographically Exclusive: Where High Security or Security cylinders/cores are indicated, provide nationwide, geographically exclusive key system complying with the following restrictions.

d. Identification:
1) Mark permanent cylinders/cores and keys with applicable blind code for identification. Do not provide blind code marks with actual key cuts.

2) Identification stamping provisions must be approved by the Architect and Owner.
3) Stamp cylinders/cores and keys with Owner's unique key system facility code as established by the manufacturer; key symbol and embossed or stamped with "DO NOT DUPLICATE" along with the "PATENTED" or patent number to enforce the patent protection.
4) Failure to comply with stamping requirements will be cause for replacement of keys involved at no additional cost to Owner.
5) Forward permanent cylinders/cores to Owner, separately from keys, by means as directed by Owner.

e. Quantity: Furnish in the following quantities.
1) Change (Day) Keys: 3 per cylinder/core.
2) Permanent Control Keys: 3.
3) Master Keys: 6.

2.09 DOOR CLOSERS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:

a. LCN 4040XP series

2. Acceptable Manufacturers and Products:

a. Corbin-Russwin DC8000 series
b. Sargent 281 series

B. Requirements:

1. Provide door closers conforming to ANSI/BHMA A156.4 Grade 1 requirements by BHMA certified independent testing laboratory. ISO 9000 certify closers. Stamp units with date of manufacture code.
2. Provide door closers with fully hydraulic, full rack and pinion action with high strength cast iron cylinder, and full complement bearings at shaft.
3. Cylinder Body: 1-1/2-inch (38 mm) diameter with 5/8-inch (16 mm) diameter double heat-treated pinion journal.
4. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
5. Spring Power: Continuously adjustable over full range of closer sizes, and providing reduced opening force as required by accessibility codes and standards.
6. Hydraulic Regulation: By tamper-proof, non-critical valves, with separate adjustment for latch speed, general speed, and backcheck.
7. Provide closers with solid forged steel main arms and factory assembled heavy-duty forged forearms for parallel arm closers.
8. Pressure Relief Valve (PRV) Technology: Not permitted.
9. Finish for Closer Cylinders, Arms, Adapter Plates, and Metal Covers: Powder coating finish which has been certified to exceed 100 hours salt spray testing as described in ANSI Standard A156.4 and ASTM B117, or has special rust inhibitor (SRI).

10. Provide special templates, drop plates, mounting brackets, or adapters for arms as required for details, overhead stops, and other door hardware items interfering with closer mounting.

2.10 PROTECTION PLATES

A. Manufacturers:

1. Scheduled Manufacturer:

a. Ives

2. Acceptable Manufacturers:

a. Burns
b. Trimco

B. Requirements:

1. Provide protection plates with a minimum of 0.050 inch (1 mm) thick, beveled four edges as scheduled. Furnish with sheet metal or wood screws, finished to match plates.
2. Sizes plates 2 inches (51 mm) less width of door on single doors, pairs of doors with a mullion, and doors with edge guards. Size plates 1 inch (25 mm) less width of door on pairs without a mullion or edge guards.
3. At fire rated doors, provide protection plates over 16 inches high with UL label.

2.11 OVERHEAD STOPS AND OVERHEAD STOP/HOLDERS

A. Manufacturers:

1. Scheduled Manufacturers:

a. Glynn-Johnson

2. Acceptable Manufacturers:

a. Rixson
b. Sargent

B. Requirements:

1. Provide overhead stop at any door where conditions do not allow for a wall stop or floor stop presents tripping hazard.
2. Provide friction type at doors without closer and positive type at doors with closer.

2.12 DOOR STOPS AND HOLDERS

A. Manufacturers:

1. Scheduled Manufacturer:

a. Ives

2. Acceptable Manufacturers:

a. Trimco
b. Burns

B. Provide door stops at each door leaf:

1. Provide wall stops wherever possible. Provide concave type where lockset has a push button of thumbturn.
2. Where a wall stop cannot be used, provide universal floor stops.
3. Where wall or floor stop cannot be used, provide overhead stop.
4. Provide roller bumper where doors open into each other and overhead stop cannot be used.

2.13 THRESHOLDS, SEALS, DOOR SWEEPS, AUTOMATIC DOOR BOTTOMS, AND GASKETING

A. Manufacturers:

1. Scheduled Manufacturer:

a. Zero International

2. Acceptable Manufacturers:

a. National Guard
b. Reese

B. Requirements:

1. Provide thresholds, weather-stripping, and gasketing systems as specified and per architectural details. Match finish of other items.
2. Smoke- and Draft-Control Door Assemblies: Where smoke- and draft-control door assemblies are required, provide door hardware that meets requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105.
3. Provide door sweeps, seals, astragals, and auto door bottoms only of type where resilient or flexible seal strip is easily replaceable and readily available.
4. Size thresholds 1/2 inch (13 mm) high by 5 inches (127 mm) wide by door width unless otherwise specified in the hardware sets or detailed in the drawings.

2.14 SILENCERS

A. Manufacturers:

1. Scheduled Manufacturer:

a. Ives

2. Acceptable Manufacturers:

a. Burns
b. Trimco

B. Requirements:

1. Provide "push-in" type silencers for hollow metal or wood frames.
2. Provide one silencer per 30 inches (762 mm) of height on each single frame, and two for each pair frame.
3. Omit where gasketing is specified.

2.15 DOOR POSITION SWITCHES

A. Manufacturers:

1. Scheduled Manufacturer:

a. Schlage

2. Acceptable Manufacturers:

a. GE-Interlogix
b. Sargent

B. Requirements:

1. Provide recessed or surface mounted type door position switches as specified.
2. Coordinate door and frame preparations with door and frame suppliers. If switches are being used with magnetic locking device, provide minimum of 4 inches (102 mm) between switch and magnetic locking device.

2.16 FINISHES

A. FINISH: BHMA 626/652 (US26D); EXCEPT:

1. Hinges at Exterior Doors: BHMA 630 (US32D)
2. Aluminum Geared Continuous Hinges: BHMA 628 (US28)
3. Push Plates, Pulls, and Push Bars: BHMA 630 (US32D)
4. Protection Plates: BHMA 630 (US32D)
5. Overhead Stops and Holders: BHMA 630 (US32D)
6. Door Closers: Powder Coat to Match

7. Wall Stops: BHMA 630 (US32D)
8. Latch Protectors: BHMA 630 (US32D)
9. Weatherstripping: Clear Anodized Aluminum
10. Thresholds: Mill Finish Aluminum

B. FINISH: BHMA 643E/716 (US11); EXCEPT:

1. Door Closers: Powder Coat to Match.
2. Weatherstripping: Dark Bronze Anodized Aluminum.
3. Thresholds: Extruded Architectural Bronze, Oil-Rubbed

PART 3 - EXECUTION

3.01 EXAMINATION

A. Prior to installation of hardware, examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance. Verify doors, frames, and walls have been properly reinforced for hardware installation.
B. Field verify existing doors and frames receiving new hardware and existing conditions receiving new openings. Verify that new hardware is compatible with existing door and frame preparation and existing conditions.
C. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.
D. Submit a list of deficiencies in writing and proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. Mount door hardware units at heights to comply with the following, unless otherwise indicated or required to comply with governing regulations.

1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
2. Custom Steel Doors and Frames: HMMA 831.
3. Interior Architectural Wood Flush Doors: ANSI/WDMA I.S. 1A
4. Installation Guide for Doors and Hardware: DHI TDH-007-20

B. Install door hardware in accordance with NFPA 80, NFPA 101 and provide post-install inspection, testing as specified in section 1.03.E unless otherwise required to comply with governing regulations.
C. Install each hardware item in compliance with manufacturer's instructions and recommendations, using only fasteners provided by manufacturer.
D. Do not install surface mounted items until finishes have been completed on substrate. Protect all installed hardware during painting.
E. Set units level, plumb and true to line and location. Adjust and reinforce attachment substrate as necessary for proper installation and operation.

F. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
G. Install operating parts so they move freely and smoothly without binding, sticking, or excessive clearance.
H. Hinges: Install types and in quantities indicated in door hardware schedule but not fewer than quantity recommended by manufacturer for application indicated.
I. Lock Cylinders:

1. Install construction cores to secure building and areas during construction period.
2. Replace construction cores with permanent cores as indicated in keying section.
3. Furnish permanent cores to Owner for installation.

J. Wiring: Coordinate with Division 26, ELECTRICAL and Division 28 ELECTRONIC SAFETY AND SECURITY sections for:

1. Conduit, junction boxes and wire pulls.
2. Connections to and from power supplies to electrified hardware.
3. Connections to fire/smoke alarm system and smoke evacuation system.
4. Connection of wire to door position switches and wire runs to central room or area, as directed by Architect.
5. Connections to panel interface modules, controllers, and gateways.
6. Testing and labeling wires with Architect's opening number.

K. Door Closers: Mount closers on room side of corridor doors, inside of exterior doors, and stair side of stairway doors from corridors. Mount closers so they are not visible in corridors, lobbies and other public spaces unless approved by Architect.
L. Closer/Holders: Mount closer/holders on room side of corridor doors, inside of exterior doors, and stair side of stairway doors.
M. Power Supplies: Locate power supplies as indicated or, if not indicated, above accessible ceilings or in equipment room, or alternate location as directed by Architect.
N. Thresholds: Set thresholds in full bed of sealant complying with requirements specified in Division 07 Section "Joint Sealants."
O. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they may impede traffic or present tripping hazard.
P. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
Q. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.
R. Door Bottoms and Sweeps: Apply to bottom of door, forming seal with threshold when door is closed.

3.03 ADJUSTING

A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

1. Spring Hinges: Adjust to achieve positive latching when door can close freely from an open position of 30 degrees.

2. Electric Strikes: Adjust horizontal and vertical alignment of keeper to properly engage lock bolt.
3. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.

B. Occupancy Adjustment: Approximately three to six months after date of Substantial Completion, examine and readjust each item of door hardware, including adjusting operating forces, as necessary to ensure function of doors and door hardware.

3.04 CLEANING AND PROTECTION

A. Clean adjacent surfaces soiled by door hardware installation.
B. Clean operating items per manufacturer's instructions to restore proper function and finish.
C. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of Substantial Completion.

3.05 DOOR HARDWARE SCHEDULE

A. The intent of the hardware specification is to specify the hardware for interior and exterior doors, and to establish a type, continuity, and standard of quality. However, it is the door hardware supplier's responsibility to thoroughly review existing conditions, schedules, specifications, drawings, and other Contract Documents to verify the suitability of the hardware specified.
B. Discrepancies, conflicting hardware, and missing items are to be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application.
C. Hardware items are referenced in the following hardware schedule. Refer to the above specifications for special features, options, cylinders/keying, and other requirements.

Abbreviation	Name
BYO	By Others
GLY	Glynn-Johnson Corp
IVE	H.B. Ives
LCN	Lcn Commercial Division
MIS	Misc - Out-Sourced Items
SCE	Schlage Electronic Security
SCH	Schlage Lock Company
VON	Von Duprin
ZER	Zero International Inc

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HARDWARE GROUP NO. 01

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	SALVAGED DOOR	RE-USE ALL EXISTING HARDWARE		

HARDWARE GROUP NO. 02

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	PASSAGE SET	ND10S RHO	626	SCH
1	EA	MOP PLATE	8400 10" X 1" LDW B-CS	630	IVE
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

HARDWARE GROUP NO. 03

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	CONT. HINGE	224XY	US28	IVE
1	EA	PANIC HARDWARE	9847-DT	626	VON
1	EA	PANIC HARDWARE	9847-NL	626	VON
1	EA	RIM CYLINDER	20-057 ICX	626	SCH
1	EA	PRIMUS CORE	20-740 EV D	626	SCH
2	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
2	EA	PA MOUNTING PLATE	4040XP-18PA SRT	689	LCN
2	EA	CUSH SHOE SUPPORT	4040XP-30 SRT	689	LCN
2	EA	BLADE STOP SPACER	4040XP-61 SRT	689	LCN
1	EA	THRESHOLD	655A	A	ZER
1	SET	WEATHERSTRIPPING	BY ALUM FRAME MANUFACTURER		MIS

HARDWARE GROUP NO. 04

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CONT. HINGE	224XY		US28	IVE
2	EA	PANIC HARDWARE	9847-L-06-WH		626	VON
2	EA	RIM CYLINDER	20-057 ICX		626	SCH
2	EA	FSIC CORE	23-030 CKC EV D		626	SCH
2	EA	SURFACE CLOSER	4040XP SCUSH SRI		689	LCN
2	EA	PA MOUNTING PLATE	4040XP-18PA SRT		689	LCN
2	EA	CUSH SHOE SUPPORT	4040XP-30 SRT		689	LCN
2	EA	BLADE STOP SPACER	4040XP-61 SRT		689	LCN
1	EA	THRESHOLD	655A		A	ZER
1	SET	WEATHERSTRIPPING	BY ALUM FRAME MANUFACTURER			MIS

HARDWARE GROUP NO. 05

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	224XY TWP CON		313AN	IVE
1	EA	EU STOREROOM LOCK	ND80TDEU RHO RX 12V/24V DC		643e	SCH
1	EA	PRIMUS CORE	20-740 EV D		622	SCH
1	EA	SURFACE CLOSER	4040XP SCUSH		695	LCN
1	EA	THRESHOLD	655D		D	ZER
1	EA	WIRE HARNESS	CON-XX-P LENGTH AS REQUIRED FOR USE WITH DOOR			SCH
1	EA	WIRE HARNESS	CON-6W FOR USE WITH HINGE			SCH
1	EA	DESK MOUNT BUTTON	660-PB		628	SCE
1	EA	DOOR CONTACT	679-05HM		BLK	SCE
1	SET	WEATHERSTRIPPING	BY ALUM FRAME MANUFACTURER			MIS
1	EA	POWER SUPPLY	BY SECURITY CONTRACTOR			MIS
1	EA	INTERCOM	BY SECURITY CONTRACTOR			MIS

OPERATIONAL DESCRIPTION:
1. DOOR NORMALLY CLOSED AND LOCKED.
2. ENTRY BY INTERCOM WHICH SIGNALS ELECTRIC TRIM OF LOCK TO OPEN AND ALLOW ENTRY. ENTRY ALSO GRANTED VIA PUSH BUTTON.
3. FREE EGRESS AT ALL TIMES VIA THE INSIDE LEVER HANDLE.
4. INSIDE LEVER HANDLE HAS RX SWITCH WHICH WILL SIGNAL ACCESS CONTROL SYSTEM OF A VALID RELEASE.
5. LOCK IS FAIL-SECURE UPON LOSS OF POWER DOOR WILL REMAIN LOCKED.

HARDWARE GROUP NO. 06

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		F643E/716	IVE
1	EA	CLASSROOM LOCK	ND70TD RHO		643e	SCH
1	EA	FSIC CORE	23-030 CKC EV D		613	SCH
1	EA	SURFACE CLOSER	4040XP		695	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		613	IVE
1	EA	WALL STOP	WS406/407CCV		613	IVE
3	EA	SILENCER	SR64		GRY	IVE

HARDWARE GROUP NO. 07

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	224XY TWP CON		313AN	IVE
1	EA	EU STOREROOM LOCK	ND80TDEU RHO RX 12V/24V DC		643e	SCH
1	EA	FSIC CORE	23-030 CKC EV D		613	SCH
1	EA	SURFACE CLOSER	4040XP SCUSH		695	LCN
1	EA	THRESHOLD	655D		D	ZER
1	EA	WIRE HARNESS	CON-XX-P LENGTH AS REQUIRED FOR USE WITH DOOR			SCH
1	EA	WIRE HARNESS	CON-6W FOR USE WITH HINGE			SCH
1	EA	DESK MOUNT BUTTON	660-PB		628	SCE
1	EA	DOOR CONTACT	679-05HM		BLK	SCE
1	SET	WEATHERSTRIPPING	BY ALUM FRAME MANUFACTURER			MIS
1	EA	CARD READER	BY SECURITY CONTRACTOR			MIS
1	EA	POWER SUPPLY	BY SECURITY CONTRACTOR			MIS

OPERATIONAL DESCRIPTION:
1. DOOR NORMALLY CLOSED AND LOCKED.
2. ENTRY BY VALID CREDENTIAL AT CARD READER WHICH SIGNALS ELECTRIC TRIM OF LOCK TO OPEN AND ALLOW ENTRY. ENTRY ALSO GRANTED VIA PUSH BUTTON.
3. INSIDE LEVER HANDLE HAS RX SWITCH WHICH WILL SIGNAL ACCESS CONTROL SYSTEM OF A VALID RELEASE.
4. LOCK IS FAIL-SECURE UPON LOSS OF POWER DOOR WILL REMAIN LOCKED.

HARDWARE GROUP NO. 08

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	224XY		313AN	IVE
1	EA	CORRIDOR LOCK	ND73TD RHO		643e	SCH
1	EA	FSIC CORE	23-030 CKC EV D		613	SCH
1	EA	SURFACE CLOSER	4040XP SCUSH		695	LCN
1	EA	PA MOUNTING PLATE	4040XP-18PA SRT		695	LCN
1	EA	CUSH SHOE SUPPORT	4040XP-30 SRT		695	LCN
1	EA	BLADE STOP SPACER	4040XP-61 SRT		695	LCN
1	EA	SEALS	BY DOOR SUPPLIER			BYO

HARDWARE GROUP NO. 09

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP		F643E/716	IVE
1	EA	STOREROOM LOCK	ND80TD RHO		643e	SCH
1	EA	FSIC CORE	23-030 CKC EV D		613	SCH
1	EA	SURFACE CLOSER	4040XP SCUSH		695	LCN
3	EA	SILENCER	SR64		GRY	IVE

HARDWARE GROUP NO. 10

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	224XY		313AN	IVE
1	EA	CORRIDOR LOCK	ND73TD RHO		643e	SCH
1	EA	FSIC CORE	23-030 CKC EV D		613	SCH
1	EA	FLOOR STOP	FS436		643E/716	IVE
1	EA	SEALS	BY DOOR SUPPLIER			BYO

HARDWARE GROUP NO. 11

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	CORRIDOR LOCK	ND73TD RHO		626	SCH
1	EA	FSIC CORE	23-030 CKC EV D		626	SCH
1	EA	SURFACE CLOSER	4040XP		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	WALL STOP	WS406/407CCV		630	IVE
1	EA	GASKETING	488SBK PSA		BK	ZER

HARDWARE GROUP NO. 12

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP		F643E/716	IVE
1	EA	CLASSROOM LOCK	ND70TD RHO		643e	SCH
1	EA	FSIC CORE	23-030 CKC EV D		613	SCH
1	EA	SURFACE CLOSER	4040XP SCUSH		695	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		613	IVE
3	EA	SILENCER	SR64		GRY	IVE

HARDWARE GROUP NO. 13

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	CORRIDOR LOCK	ND73TD RHO		626	SCH
1	EA	FSIC CORE	23-030 CKC EV D		626	SCH
1	EA	OH STOP	90S		630	GLY
1	EA	SURFACE CLOSER	4040XP		689	LCN
1	EA	MOUNTING PLATE	4040XP-18 SRT		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	WALL STOP	WS406/407CCV		630	IVE
1	EA	GASKETING	488SBK PSA		BK	ZER

A CONFLICT MAY OCCUR BETWEEN THE GJ O/H STOP AND THE CLOSER BODY, THE DROP PLATE MAY NEED TO BE DRILLED OUT TO ALLOW THE THRU-BOLTS OF THE O/H STOP TO BE INSTALLED.

HARDWARE GROUP NO. 14

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	224XY TWP CON		313AN	IVE
1	EA	EU STOREROOM LOCK	ND80TDEU RHO RX 12V/24V DC		643e	SCH
1	EA	PRIMUS CORE	20-740 EV D		622	SCH
1	EA	SURFACE CLOSER	4040XP SCUSH		695	LCN
1	EA	SEALS	BY DOOR SUPPLIER			BYO
1	EA	THRESHOLD	655D		D	ZER
1	EA	WIRE HARNESS	CON-XX-P LENGTH AS REQUIRED FOR USE WITH DOOR			SCH
1	EA	WIRE HARNESS	CON-6W FOR USE WITH HINGE			SCH
1	EA	DESK MOUNT BUTTON	660-PB		628	SCE
1	EA	DOOR CONTACT	679-05HM		BLK	SCE
1	EA	CARD READER	BY SECURITY CONTRACTOR			MIS
1	EA	POWER SUPPLY	BY SECURITY CONTRACTOR			MIS

OPERATIONAL DESCRIPTION:
1. DOOR NORMALLY CLOSED AND LOCKED.
2. ENTRY BY VALID CREDENTIAL AT CARD READER WHICH SIGNALS ELECTRIC TRIM OF LOCK TO OPEN AND ALLOW ENTRY. ENTRY ALSO GRANTED VIA PUSH BUTTON.
3. INSIDE LEVER HANDLE HAS RX SWITCH WHICH WILL SIGNAL ACCESS CONTROL SYSTEM OF A VALID RELEASE.
4. LOCK IS FAIL-SECURE UPON LOSS OF POWER DOOR WILL REMAIN LOCKED.

HARDWARE GROUP NO. 15

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	224XY TWP CON		313AN	IVE
1	EA	EU STOREROOM LOCK	ND80TDEU RHO RX 12V/24V DC		643e	SCH
1	EA	PRIMUS CORE	20-740 EV D		622	SCH
1	EA	SURFACE CLOSER	4040XP SCUSH		695	LCN
1	EA	THRESHOLD	655D		D	ZER
1	EA	WIRE HARNESS	CON-XX-P LENGTH AS REQUIRED FOR USE WITH DOOR			SCH
1	EA	WIRE HARNESS	CON-6W FOR USE WITH HINGE			SCH
1	EA	DESK MOUNT BUTTON	660-PB		628	SCE
1	EA	DOOR CONTACT	679-05HM		BLK	SCE
1	SET	WEATHERSTRIPPING	BY ALUM FRAME MANUFACTURER			MIS
1	EA	POWER SUPPLY	BY SECURITY CONTRACTOR			MIS
1	EA	INTERCOM	BY SECURITY CONTRACTOR			MIS

OPERATIONAL DESCRIPTION:
1. DOOR NORMALLY CLOSED AND LOCKED.
2. ENTRY BY INTERCOM WHICH SIGNALS ELECTRIC TRIM OF LOCK TO OPEN AND ALLOW ENTRY. ENTRY ALSO GRANTED VIA PUSH BUTTON.
3. FREE EGRESS AT ALL TIMES VIA THE INSIDE LEVER HANDLE.
4. INSIDE LEVER HANDLE HAS RX SWITCH WHICH WILL SIGNAL ACCESS CONTROL SYSTEM OF A VALID RELEASE.
5. LOCK IS FAIL-SECURE UPON LOSS OF POWER DOOR WILL REMAIN LOCKED.

END OF SECTION

SECTION 08 80 00 – GLAZING

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 glazing for the following products, including those specified in other Sections where glazing requirements are specified by reference to this Section:
   1. Windows.
   2. Vision lites / Interior Borrowed Lites.
   3. Entrances and other doors.

B. Related Sections: The following sections contain requirements that relate to this Section.
   1. Division 06 Section "Rough Carpentry”
   2. Division 07 Section “Joint Sealants”
   3. Division 08 Sections "Aluminum Entrances & Storefronts" and "Flush Wood Doors"

C. This work includes all glazing, with the exception that at the East and West additions, the exterior glazing at windows, storefronts and curtainwalls is installed under separate envelope project.

1.3 DEFINITIONS

A. Interspace: Space between lites of an insulating-glass unit that contains dehydrated air or a specified gas.

B. Deterioration of Coated Glass: Defects developed from normal use that are attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in metallic coating.

C. Deterioration of Insulating Glass: Failure of hermetic seal under normal use that is attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.

D. Deterioration of Laminated Glass: Defects developed from normal use that are attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.

1.4 PERFORMANCE REQUIREMENTS

A. General: Provide glazing systems that are produced, fabricated, and installed to withstand normal thermal movement, wind loading, and impact loading (where applicable), without failure including loss or glass breakage attributable to the following: defective manufacture, fabrication, and installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; and other defects in construction.

B. Glass Design: Glass thicknesses indicated on Drawings are for detailing only. Confirm glass thicknesses by analyzing Project loads and in-service conditions. Provide glass lites for the various size openings in the thicknesses and strengths (annealed or heat-treated) to meet or exceed the following criteria:
   1. Minimum glass thicknesses of lites, whether composed of annealed or heat-treated glass, are selected so the worst-case probability of failure does not exceed the following:
      a. 8 lites per 1000 for lites set vertically or not over 15 degrees off vertical and under wind action. Determine minimum thickness of monolithic annealed glass according to ASTM E 1300. For other than monolithic annealed glass, determine thickness per glass manufacturer's standard method of analysis including applying adjustment factors to ASTM E 1300 based on type of glass.

C. Normal thermal movement results from the following maximum change (range) in ambient and surface temperatures acting on glass-framing members and glazing components. Base engineering calculation on materials' actual surface temperatures due to both solar heat gain and nighttime sky heat loss.
   1. Temperature Change (Range): 120 F deg, ambient; 180 F deg, material surfaces.

1.5 SUBMITTALS

A. General: Submit the following according to Conditions of Contract and Division 1 Specification Sections.

B. Product data for each glass product and glazing material indicated.

C. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.

D. Samples for verification purposes of 12-inch square samples of each type of glass indicated except for clear monolithic glass products, and 12-inch long samples of each color required (except black) for each type of sealant or gasket exposed to view. Install sealant or gasket sample between two strips of material representative in color of the adjoining framing system.

E. Product certificates signed by glazing materials manufacturers certifying that their products comply with specified requirements.
   1. Separate certifications are not required for glazing materials bearing manufacturer's permanent labels designating type and thickness of glass, provided labels represent a quality control program of a recognized certification agency or independent testing agency acceptable to authorities having jurisdiction.

F. Compatibility and adhesion test reports from sealant manufacturer indicating that glazing materials were tested for compatibility and adhesion with glazing sealants. Include sealant manufacturer's interpretation of test results relative to sealant performance and recommendations for primers and substrate preparation needed for adhesion.

G. Compatibility test report from manufacturer of insulating glass edge sealant indicating that glass edge sealants were tested for compatibility with other glazing materials including sealants, glazing tape, gaskets, setting blocks, and edge blocks.

H. Product test reports for each type of glazing sealant and gasket indicated, evidencing compliance with requirements specified.

I. Maintenance data for glass and other glazing materials to include in Operating and Maintenance Manual specified in Division 1.

1.6 QUALITY ASSURANCE

A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, except where more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.
   1. FGMA Publications: "FGMA Glazing Manual."
   2. SIGMA Publications: TM-3000 "Vertical Glazing Guidelines."

B. Safety Glass: Products complying with ANSI Z97.1 and testing requirements of 16 CFR Part 1201 for Category II materials.
   1. Subject to compliance with requirements, provide safety glass permanently marked with certification label of Safety Glazing Certification Council (SGCC) or other certification agency acceptable to authorities having jurisdiction.

C. Fire-Resistive Glazing Products for Door Assemblies: Glazing for assemblies that comply with NFPA 80 and that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing to NFPA 257.

D. Fire-Resistive Glazing Products for Window Assemblies: Glazing for assemblies that comply with NFPA 80 and that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing to NFPA 257.

E. Safety Glazing Products: Comply with testing requirements in 16CFR 1201
   1. Subject to compliance with requirements, obtain safety glazing products permanently marked with certification label of the Safety Glazing Certification Council or another certification agency acceptable to authorities having jurisdiction.
   2. Where glazing units, including Kind FT glass and laminated glass, are specified in Part 2 articles for glazing lites more than 9 sq. ft (0.84 sq. m) in exposed surface area of one side, provide glazing products that comply with Category II materials, for lites 9 sq. ft (0.84 sq. m) or less in exposed surface area on one side, provide glazing products that comply with Category I or II materials, except for hazardous locations where Category II materials are required by 16 CFR 1201 and regulations of authorities having jurisdiction.

F. Insulating Glass Certification Program: Provide insulating glass units permanently marked either on spacers or at least one component lite of units with appropriate certification label of inspecting and testing agency indicated below:
   1. Insulating Glass Certification Council (IGCC).
   2. Associated Laboratories, Inc. (ALI).
   3. National Certified Testing Laboratories (NCTL).

G. Glazier Qualifications: Engage an experienced glazier who has completed glazing similar in material, design, and extent to that indicated for Project with a record of successful in-service performance.

H. Single-Source Responsibility for Glass: Obtain glass from one source for each product indicated below:

1. Primary glass of each (ASTM C 1036) type and class indicated.
2. Heat-treated glass of each (ASTM C 1048) condition indicated.
3. Insulating glass of each construction indicated.
4. Fire resistive glass (ASTM E119) of each type and class indicated.

I. Single-Source Responsibility for Glazing Accessories: Obtain glazing accessories from one source for each product and installation method indicated.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Protect glazing materials to comply with manufacturer's directions and as needed to prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

B. Where insulating glass units will be exposed to substantial altitude changes, comply with insulating glass fabricator's recommendations for venting and sealing to avoid hermetic seal ruptures.

1.8 PROJECT CONDITIONS

A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.

1. Do not install glazing sealants when ambient and substrate temperature conditions are outside limits permitted by sealant manufacturer or below 40 deg F (4.4 deg C).

1.9 WARRANTY

A. General: Warranties specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under requirements of the Contract Documents.

B. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer's standard form in which coated-glass manufacturer agrees to replace coated-glass units that deteriorate within specified warranty period. Deterioration of coated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in coating.

1. Warranty Period: 10 years from date of Substantial Completion.

C. Manufacturer's Special Warranty on Laminated Glass: Manufacturer's standard form in which laminated-glass manufacturer agrees to replace laminated-glass units that deteriorate within specified warranty period. Deterioration of laminated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially

obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.

1. Warranty Period: 10 years from date of Substantial Completion.

D. Manufacturer's Special Warranty on Insulating Glass: Manufacturer's standard form in which insulating-glass manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.

1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 GLASS PRODUCTS

A. NOTE: ALL GLASS USED SHALL BE SAFETY GLASS MEETING REQUIREMENTS FOR CPSC 16 CFR 1201.

B. Annealed Float Glass: ASTM C 1036, Type I (transparent glass, flat), Class as indicated below, and Quality q3 (glazing select). Minimum ¼ inch thick.
1. Class 1 (clear) unless otherwise indicated.

C. Heat-Treated Float Glass: ASTM C 1048, Type I (transparent glass, flat), Class 1 (clear), Quality q3 (glazing select), kind as indicated below. Minimum ¼ inch thick.
1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed, unless otherwise indicated.
2. Provide Kind HS (heat-strengthened) float glass in place of annealed float glass where needed to resist thermal stresses induced by differential shading of individual glass lites and to comply with glass design requirements specified in Part 1 "Performance Requirements" Article.
3. For uncoated glass, comply with requirements for Condition A.
4. For coated vision glass, comply with requirements for Condition C (other uncoated glass).
5. Provide Kind FT (fully tempered) float glass in place of annealed or Kind HS (heat-strengthened) float glass where safety glass is indicated

D. Sputter-Coated Float Glass: ASTM C 1376, float glass with metallic-oxide or -nitride coating deposited by vacuum deposition process after manufacture and heat treatment (if any), and complying with other requirements specified.

E. Laminated Glass: ASTM C 1172 and complying with testing requirements in 16 CFR 1201 for Category II materials, and with other requirements specified. Use materials that have a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after fabrication and installation.
1. Interlayer: Polyvinyl butyral of thickness indicated with a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after laminating glass lites and installation
   a. For polyvinyl butyral interlayers, laminate lites in autoclave with heat and pressure.
2. Laminating process: Fabricate laminated glass to produce glass free of foreign substances and air or glass pockets.

F. Insulating-Glass Units, General: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace and complying with ASTM E 774 for Class CBA units and with requirements specified in this Article and in Part 2 "Insulating-Glass Units" Article.
   1. Provide Kind HS (heat-strengthened) float glass in place of annealed glass where needed to resist thermal stresses induced by differential shading of individual glass lites and to comply with glass design requirements specified in Part 1 "Performance Requirements" Article.
   2. Overall Unit Thickness and Thickness of Each Lite: Dimensions indicated for insulating-glass units are nominal and the overall thicknesses of units are measured perpendicularly from outer surfaces of glass lites at unit's edge.
   3. Sealing System: Dual seal, with primary and secondary sealants as follows:
   4. Manufacturer’s standard sealants.
      a. Polyisobutylene and polysulfide.
      b. Polyisobutylene and hot-melt butyl.
      c. Polyisobutylene and silicone.
      d. Polyisobutylene and polyurethane
   5. Spacer Specifications: Manufacturer's standard spacer material and construction.
   6. Spacer Specifications: Manufacturer's standard spacer material and construction complying with the following requirements:
      a. Spacer Material: Aluminum with clear anodic finish.
      b. Corner Construction: Manufacturer's standard corner construction.
   7. Low “E” Glass: Provide nominal 1” insulated glass comprised of inner ¼” pane of clear glass with Low “E” coating, ½” air space, outer ¼” pane of clear glass
   8. Winter U-value: .31
   9. Solar reflectance: 29%
   10. Sealed insulating glass units shall be in conformance to ASTM E 774-92; permanent IGCC certification label for CBA rating level.

2.2 FIRE-RATED GLAZING PRODUCTS

A. Laminated Ceramic Glazing Material: Proprietary Category II safety glazing product in the form of 2 lites of clear ceramic glazing material laminated together to produce a laminated lite of 5/16-inch (8-mm) nominal thickness; polished on both surfaces; weighing 4 lb/sq. ft. (19.5 kg/sq. m); and as follows:
   1. Fire-Protection Rating: As indicated for the assembly in which glazing material is installed, and permanently labeled by a testing and inspecting agency acceptable to authorities having jurisdiction.
   2. Polished on both surfaces, transparent.
   3. Approved products: Fire lite plus premium or approved equal.
   4. Provide glazing resistant to heat rate of rise transfer, compliant with ASTM E 119, where required.

2.3 GLAZING SEALANTS

A. General:

   1. Compatibility: Provide glazing sealants that are compatible with one another and with other materials they will contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
   2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.

3. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.

B. Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 100/50, Use NT.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Dow Corning Corporation; 790.
b. GE Advanced Materials - Silicones; SilPruf LM SCS2700.
c. May National Associates, Inc.; Bondaflex Sil 290.
d. Pecora Corporation; 890.
e. Sika Corporation, Construction Products Division; SikaSil-C990.
f. Tremco Incorporated; Spectrem 1.

2. Applications: For weather seal.

C. Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 25, Use NT.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Dow Corning Corporation; 799.
b. GE Advanced Materials - Silicones; UltraGlaze SSG4000
c. May National Associates, Inc.; Bondaflex Sil 200 GPN or Bondaflex Sil 201 FC.
d. Polymeric Systems, Inc.; PSI-631.
e. Schnee-Morehead, Inc., an ITW company; SM5731 Poly-Glaze Plus.
f. Tremco Incorporated; Proglaze SSG or Tremsil 600.

2. Applications: For structural seal.

D. Glazing Sealant: Acid-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 25, Use NT.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Dow Corning Corporation; 795.
b. General Electric; Siliglaze-II 2800
c. Tremco Incorporated; Spectrum 2

2. Applications: Fire and Safety Rated Glazing

3. Glazing Sealants for Fire-Rated Glazing Products: Products that are approved by testing agencies that listed and labeled fire-resistant glazing products with which they are used for applications and fire-protection ratings indicated.

2.4 GLAZING TAPES

A. Back-Bedding Mastic Glazing Tape: Preformed, butyl-based elastomeric tape with a solids content of 100 percent, nonstaining and nonmigrating in contact with nonporous surfaces, with or without spacer

rod as recommended by tape and glass manufacturers for application indicated, packaged on rolls with a release paper backing, and complying with AAMA 800 for products indicated below:
1. AAMA 806.1.

B. Expanded Cellular Glazing Tape: Closed-cell, polyvinyl chloride foam tape, factory coated with adhesive on both surfaces, packaged on rolls with release liner protecting adhesive, and complying with AAMA 800 for product 810.5.

C. Available Products: Subject to compliance with requirements, glazing tape that may be incorporated in the Work include, but is not limited to, the following:
1. Back-Bedding Mastic Glazing Tape Without Spacer Rod:
   a. Dyna-Seal, Pecora Corp.
   b. PTI 626 Architectural Sealant Tape, Protective Treatments, Inc.
   c. S-M 5710 H.P Poly-Glaze Tape Sealant, Schnee-Morehead, Inc.
   d. SST-800 Tape, Tremco, Inc.
2. Expanded Cellular Glazing Tape:
   a. Norseal V-980 Closed-Cell Glazing Tape, Norton Company.

2.5 GLAZING GASKETS

A. Lock-Strip Gaskets: Neoprene extrusions in size and shape indicated, fabricated into frames with molded corner units and zipper lock strips, complying with ASTM C 542, black.

B. Dense Compression Gaskets: Molded or extruded gaskets of material indicated below, complying with standards referenced with name of elastomer indicated below, and of profile and hardness required to maintain watertight seal:
1. EPDM, ASTM C 864.
2. Silicone, ASTM C 1115.
3. Thermoplastic polyolefin rubber, ASTM C 1115.
4. Any material indicated above.

C. Soft Compression Gaskets: Extruded or molded closed-cell, integral-skinned gaskets of material indicated below, complying with ASTM C 509, Type II, black, and of profile and hardness required to maintain watertight seal:
1. EPDM.
2. Silicone.
3. Thermoplastic polyolefin rubber.
4. Any material indicated above.

D. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the work include, but are not limited to, the following companies.
1. Lock-Strip Gaskets:
   a. Stanlock Div., Griffith Rubber Mills.
2. Preformed Gaskets:
   a. Advanced Elastomer Systems, L.P.
   b. Schnee-Morehead, Inc.
   c. Tremco, Inc.

2.6 MISCELLANEOUS GLAZING MATERIALS

A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials involved for glazing application indicated, and with a proven record of compatibility with surfaces contacted in installation.

B. Cleaners, Primers and Sealers: Type recommended by sealant or gasket manufacturer.

C. Setting Blocks: Elastomeric material with a Shore A durometer hardness of 85 plus or minus 5.

D. Spacers: Elastomeric blocks or continuous extrusions with a Shore A durometer hardness required by glass manufacturer to maintain glass lites in place for installation indicated.

E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side-walking).

F. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

G. Perimeter Insulation for Fire-Resistive Glazing: Product that is approved by testing agency that listed and labeled fire-resistant glazing product with which it is used for application and fire-protection rating indicated.

H. Plastic Foam Joint Fillers: Preformed, compressible, resilient, nonstaining, nonextruding, nonoutgassing, strips of closed-cell plastic foam of density, size, and shape to control sealant depth and otherwise contribute to produce optimum sealant performance.

2.7 FABRICATION OF GLASS AND OTHER GLAZING PRODUCTS

A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.

B. Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites to produce square edges with slight chamfers at junctions of edges and faces.

C. Grind smooth and polish exposed glass edges and corners.

PART 3 - EXECUTION

3.1 GLAZING SCHEDULE

A. Type G1 – 45min Fire Rated, Clear Laminated Safety Glass (Interior U.O.N.)

B. Type G2 – Clear Insulated Laminated Tempered Safety Glass with Security Film (Exterior U.O.N.)

C. Type G3 – Clear Laminated Safety Glass (Interior U.O.N.)

D. Type G4 – Clear Ballistic Glass (Interior U.O.N.)

E. Type G5 – Clear Insulated Laminated Tempered Safety Glass (Exterior U.O.N.)

F. Type G6 – Clear Insulated Ballistic Glass (Exterior U.O.N.)

3.2 EXAMINATION

A. Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:
   1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
   2. Presence and functioning of weep systems.
   3. Minimum required face and edge clearances.
   4. Effective sealing between joints of glass-framing members.

B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that will leave visible marks in the completed work.

C. Do not proceed with glazing until unsatisfactory conditions have been corrected.

3.3 PREPARATION

A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings that are not firmly bonded to substrates.

3.4 GLAZING, GENERAL

A. Comply with combined recommendations of manufacturers of glass, sealants, gaskets, and other glazing materials, except where more stringent requirements are indicated, including those in referenced glazing publications.

B. Glazing channel dimensions as indicated on Drawings provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances. Adjust as required by Project conditions during installation.

C. Protect glass from edge damage during handling and installation as follows:
   1. Use a rolling block in rotating glass units to prevent damage to glass corners. Do not impact glass with metal framing. Use suction cups to shift glass units within openings; do not raise or drift glass with a pry bar. Rotate glass lites with flares or bevels on bottom horizontal edges so edges are located at top of opening, unless otherwise indicated by manufacturer's label.
   2. Remove damaged glass from Project site and legally dispose of off site. Damaged glass is glass with edge damage or other imperfections that, when installed, weaken glass and impair performance and appearance.

D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction sealant-substrate testing.

E. Install elastomeric setting blocks in sill rabbets, sized and located to comply with referenced glazing standard, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.

F. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

3.5 TAPE GLAZING

A. Position tapes on fixed stops so that when compressed by glass their exposed edges are flush with or protrude slightly above sightline of stops.

B. Install tapes continuously but not in one continuous length. Do not stretch tapes to make them fit opening.

C. Where framing joints are vertical, cover these joints by applying tapes to heads and sills first and then to jambs. Where framing joints are horizontal, cover these joints by applying tapes to jambs and then to heads and sills.

D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.

E. Do not remove release paper from tape until just before each lite is installed.

F. Center glass lites in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.

3.6 GASKET GLAZING (DRY)

A. Fabricate compression gaskets in lengths recommended by gasket manufacturer to fit openings exactly, with stretch allowance during installation.

B. Secure compression gaskets in place with joints located at corners to compress gaskets producing a weather tight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

C. Install gaskets so they protrude past face of glazing stops.

3.7 SEALANT GLAZING (WET)

A. Install continuous spacers between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel weep systems until sealants cure. Secure spacers in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.

B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.

C. Tool exposed surfaces of sealants to provide a substantial wash away from glass. Install pressurized gaskets to protrude slightly out of channel to eliminate dirt and moisture pockets.

3.8 LOCK-STRIP GASKET GLAZING

A. Comply with ASTM C 716 and gasket manufacturer's printed recommendations. Provide supplementary wet seal and weep system unless otherwise indicated.

3.9 CLEANING AND PROTECTION

A. Protect exterior glass from breakage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels, and clean surfaces.

B. Protect glass from contact with contaminating substances resulting from construction operations including weld splatter. If, despite such protection, contaminating substances do come into contact with glass, remove them immediately as recommended by glass manufacturer.

C. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for build-up of dirt, scum, alkali deposits, or stains, and remove as recommended by glass manufacturer.

D. Remove and replace glass that is broken, chipped, cracked, abraded, or damaged in any way, including natural causes, accidents and vandalism, during construction period.

E. Wash glass on both faces in each area of Project not more than 4 days prior to date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended by glass manufacturer.

3.10 WASTE MANAGEMENT

A. Coordinate with Section 01 74 19.
   1. Separate and recycle cut-offs and waste materials and material packaging in accordance with Waste Management Plan and to the maximum extent economically feasible and place in designated areas for recycling.
   2. Set aside and protect materials suitable for reuse and/or remanufacturing.
   3. Separate and fold up metal banding; flatten and place along with other metal scrap for recycling in designated area.

END OF SECTION 08 80 00

SECTION 08 83 00 - MIRRORS

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. The work performed under this Section includes the performance criteria, materials, production, and erection of Mirrors for the project and consists of the provision of all plant, materials, labor and equipment and the like necessary and/or required for the complete execution of all Mirrors as required by schedules, keynotes and drawings, as specified herein, and as may be required by conditions and authorities having jurisdiction including, but not limited to the following:

1. Tempered glass mirrors qualifying as safety glazing.

B. Related Sections:

1. Division 08 "Glazing" for glass with reflective coatings used for vision and spandrel lites.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

1. Mirrors. Include description of materials and process used to produce each type of silvered flat glass mirror specified that indicates sources of glass, glass coating components, edge sealer, and quality-control provisions.

B. Shop Drawings: Include mirror elevations, edge details, mirror hardware, and attachments to other work.

C. Samples: For each type of the following products:

1. Mirrors: 12 inches (300 mm) square, including edge treatment on two adjoining edges.
2. Mirror Clips: Full size.
3. Mirror Trim: 12 inches (300 mm) long.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer.

B. Product Certificates: For each type of mirror and mirror mastic, from manufacturer.

C. Preconstruction Test Reports: From mirror manufacturer indicating that mirror mastic was tested for compatibility and adhesion with mirror backing film and substrates on which mirrors are installed.

D. Warranty: Sample of special warranty.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For mirrors to include in maintenance manuals.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.

B. Source Limitations for Mirrors: Obtain mirrors from single source from single manufacturer.

C. Source Limitations for Mirror Accessories: Obtain mirror glazing accessories from single source.

D. Glazing Publications: Comply with the following published recommendations:

1. GANA's "Glazing Manual" unless more stringent requirements are indicated. Refer to this publication for definitions of glass and glazing terms not otherwise defined in this Section or in referenced standards.
2. GANA Mirror Division's "Mirrors, Handle with Extreme Care: Tips for the Professional on the Care and Handling of Mirrors."

E. Safety Glazing Products: For tempered mirrors, provide products complying with testing requirements in 16 CFR 1201 for Category II materials.

F. Preconstruction Mirror Mastic Compatibility Test: Submit mirror mastic products to mirror manufacturer for testing to determine compatibility of mastic with mirror backing film and substrates on which mirrors are installed.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Protect mirrors according to mirror manufacturer's written instructions and as needed to prevent damage to mirrors from moisture, condensation, temperature changes, direct exposure to sun, or other causes.

B. Comply with mirror manufacturer's written instructions for shipping, storing, and handling mirrors as needed to prevent deterioration of silvering, damage to edges, and abrasion of glass surfaces and applied coatings. Store indoors.

1.8 PROJECT CONDITIONS

A. Environmental Limitations: Do not install mirrors until ambient temperature and humidity conditions are maintained at levels indicated for final occupancy.

B. Mirror shall be installed flush with tile.

1.9 WARRANTY

A. Special Warranty: Manufacturer's standard form in which mirror manufacturer agrees to replace mirrors that deteriorate within specified warranty period. Deterioration of mirrors is defined as defects developed from normal use that are not attributed to mirror breakage or to maintaining and cleaning mirrors contrary to manufacturer's written instructions. Defects include discoloration, black spots, and clouding of the silver film.

1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SILVERED FLAT GLASS MIRRORS

A. Refer to Restroom and Accessory Schedule for toilet room mirror bases of design.

B. Where mirror product is not specifically noted otherwise, furnish and install glass Mirrors, General: ASTM C 1503**;** manufactured using copper-free, low-lead mirror coating process.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Arch Aluminum & Glass Co., Inc.
b. Donisi Mirror Company.
c. Gardner Glass, Inc.
d. Guardian Industries.
e. Independent Mirror Industries, Inc.
f. Lenoir Mirror Company. National Glass Industries.
g. Stroupe Mirror Co., Inc.
h. Sunshine Mirror; Westshore Glass Corp.
i. Virginia Mirror Company, Inc.
j. Walker Glass Co., Ltd.

C. Tempered Clear Glass: Mirror Glazing Quality, for blemish requirements; and comply with ASTM C 1048 for Kind FT, Condition A, tempered float glass before silver coating is applied.

1. Nominal Thickness: 6.0 mm.

2.2 MISCELLANEOUS MATERIALS

A. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.

B. Edge Sealer: Coating compatible with glass coating and approved by mirror manufacturer for use in protecting against silver deterioration at mirrored glass edges.

C. Mirror Mastic: An adhesive setting compound, asbestos-free, produced specifically for setting mirrors and certified by both mirror manufacturer and mastic manufacturer as compatible with glass coating and substrates on which mirrors will be installed.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Franklin International; Titebond Division.
b. Laurence, C. R. Co., Inc.
c. Macco Adhesives; Liquid Nails Division.
d. OSI Sealants, Inc.
e. Palmer Products Corporation.
f. Pecora Corporation.
g. Royal Adhesives & Sealants; Gunther Mirror Mastics Division.
h. Sommer & Maca Industries, Inc.

2. Adhesive shall have a VOC content of not more than 70 g/L when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

D. Film Backing for Safety Mirrors: Film backing and pressure-sensitive adhesive; both compatible with mirror backing paint as certified by mirror manufacturer.

2.3 MIRROR HARDWARE

A. Aluminum J-Channels: Aluminum extrusions with a return deep enough to produce a glazing channel to accommodate mirrors of thickness indicated and in lengths required to cover bottom and top edges of each mirror in a single piece.

1. Bottom Trim: J-channels formed with front leg and back leg not less than 3/8 and 7/8 inch (9.5 and 22 mm) in height, respectively, and a thickness of not less than 0.05 inch (1.3 mm).

a. Products: Subject to compliance with requirements, provide one of the following:

1) Laurence, C. R. Co., Inc.; CRL Standard "J" Channel.
2) Sommer & Maca Industries, Inc.; Aluminum Shallow Nose "J" Moulding Lower Bar.
3) Sommer & Maca Industries, Inc.; Heavy Gauge Aluminum Shallow Nose "J" Moulding Lower Bar.

2. Top Trim: J-channels formed with front leg and back leg not less than 5/8 and 1 inch (16 and 25 mm) in height, respectively, and a thickness of not less than 0.062 inch (1.57 mm).

    a. Products: Subject to compliance with requirements, provide one of the following:

        1) Laurence, C. R. Co., Inc.; CRL Deep "J" Channel.
        2) Sommer & Maca Industries, Inc.; Aluminum Deep Nose "J" Moulding Upper Bar.
        3) Sommer & Maca Industries, Inc.; Heavy Gauge Aluminum Deep Nose "J" Moulding Lower Bar.

3. Finish: Clear bright anodized.

B. Fasteners: Fabricated of same basic metal and alloy as fastened metal and matching it in finished color and texture where fasteners are exposed.

C. Anchors and Inserts: Provide devices as required for mirror hardware installation. Provide toothed or lead-shield expansion-bolt devices for drilled-in-place anchors. Provide galvanized anchors and inserts for applications on inside face of exterior walls and where indicated.

2.4 FABRICATION

A. Mirror Sizes: To suit Project conditions, and before tempering**,** cut mirrors to final sizes and shapes.

B. Cutouts: Fabricate cutouts before tempering for notches and holes in mirrors without marring visible surfaces. Locate and size cutouts so they fit closely around penetrations in mirrors.

C. Mirror Edge Treatment: Rounded polished.

1. Seal edges of mirrors with edge sealer after edge treatment to prevent chemical or atmospheric penetration of glass coating.
2. Require mirror manufacturer to perform edge treatment and sealing in factory immediately after cutting to final sizes.

D. Film-Backed Safety Mirrors: Apply film backing with adhesive coating over mirror backing paint as recommended in writing by film-backing manufacturer to produce a surface free of bubbles, blisters, and other imperfections.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, over which mirrors are to be mounted, with Installer present, for compliance with installation tolerances, substrate preparation, and other conditions affecting performance of the Work.

B. Verify compatibility with and suitability of substrates, including compatibility of mirror mastic with existing finishes or primers.

C. Proceed with installation only after unsatisfactory conditions have been corrected and surfaces are dry.

3.2 PREPARATION

A. Comply with mastic manufacturer's written installation instructions for preparation of substrates, including coating substrates with mastic manufacturer's special bond coating where applicable.

3.3 INSTALLATION

A. General: Install mirrors to comply with mirror manufacturer's written instructions and with referenced GANA publications. Mount mirrors accurately in place in a manner that avoids distorting reflected images.

B. Mirrors shall be installed flush with face of tile.

C. Provide a minimum air space of 1/8 inch (3 mm) between back of mirrors and mounting surface for air circulation between back of mirrors and face of mounting surface.

D. Wall-Mounted Mirrors: Install mirrors with mastic and mirror hardware. Attach mirror hardware securely to mounting surfaces with mechanical fasteners installed with anchors or inserts as applicable. Install fasteners so heads do not impose point loads on backs of mirrors.

1. Top and Bottom Aluminum J-Channels: Provide setting blocks 1/8 inch (3 mm) thick by 4 inches (100 mm) long at quarter points. To prevent trapping water, provide, between setting blocks, two slotted weeps not less than 1/4 inch (6.4 mm) wide by 3/8 inch (9.5 mm) long at bottom channel.
2. Install mastic as follows:

    a. Apply barrier coat to mirror backing where approved in writing by manufacturers of mirrors and backing material.
    b. Apply mastic to comply with mastic manufacturer's written instructions for coverage and to allow air circulation between back of mirrors and face of mounting surface.
    c. After mastic is applied, align mirrors and press into place while maintaining a minimum air space of 1/8 inch (3 mm) between back of mirrors and mounting surface.

3.4 CLEANING AND PROTECTION

A. Protect mirrors from breakage and contaminating substances resulting from construction operations.

B. Do not permit edges of mirrors to be exposed to standing water.

C. Maintain environmental conditions that will prevent mirrors from being exposed to moisture from condensation or other sources for continuous periods of time.

D. Wash exposed surface of mirrors not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash mirrors as recommended in writing by mirror manufacturer.

3.5 WASTE MANAGEMENT

A. Coordinate with Section 01 74 19.

1. Separate and recycle cut-offs and waste materials and material packaging in accordance with Waste Management Plan and to the maximum extent economically feasible and place in designated areas for recycling.
2. Set aside and protect materials suitable for reuse and/or remanufacturing.
3. Separate and fold up metal banding; flatten and place along with other metal scrap for recycling in designated area

END OF SECTION 08 83 00

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SECTION 08 87 17 - SAFETY AND SECURITY GLAZING FILMS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Glazing film applied to existing and new glazing assemblies.

B. New Glazing: Factory or shop install film to glazing before installation in frames.

C. Glazing assemblies to receive film are indicated on drawings.

1.02 RELATED REQUIREMENTS

A. Section 08 11 13 - Hollow Metal Doors and Frames: New doors with glazing to receive film.

B. Section 08 41 13 - aluminum entrances and storefronts: New glazing to receive film.

D. Section 08 80 00 - Glazing: New glazing to received film (as indicated on drawings).

1.03 ABBREVIATIONS AND ACRONYMS

A. CFR - Code of Federal Regulations.

B. GSA - General Services Administration.

1.04 REFERENCE STANDARDS

A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials; current edition.

B. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test; 2015.

C. ASTM C1184 - Standard Specification for Structural Silicone Sealants; 2014.

D. ASTM D882 - Standard Test Method for Tensile Properties of Thin Plastic Sheeting; 2012.

E. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2016.

F. GSA TS01 - Standard Test Method for Glazing and Window Systems Subject to Dynamic Overpressure Loadings; General Services Administration; 2003.

1.05 SUBMITTALS

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

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Record of product certification for safety requirements.
   2. Preparation instructions and recommendations.
   3. Storage and handling requirements and recommendations.
   4. Installation methods.

C. Shop Drawings: Detailing installation of film, anchoring accessories, and sealant.

D. Samples: For each film product to be used, minimum size 4 inches by 6 inches, representing actual product, color, and patterns.

E. Samples, Supplemental Anchors: Where supplemental anchors are necessary to achieve specified performance submit detailed information in accordance with substitution procedures; include two samples, minimum length 2 inches.

F. Test Reports: Detailed reports of full-scale chamber tests to specified criteria, using assemblies identical to those required for this project.

G. Specimen Warranty.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Glazing film manufacturer specializing in manufacture of safety glazing films with minimum 10 years successful experience.

B. Installer Qualifications: Certified by glazing film manufacturer.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of authorities having jurisdiction.

1.08 FIELD CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.09 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Provide 10 year manufacturer's replacement warranty to cover film against peeling, cracking, discoloration, and deterioration.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Basis of Design: ArmoredOne 23 mil #AOTSF23, by Armored One LLC, 386 N Midler Ave, Syracuse, NY 13206, www.armoredone.com/contact/

D. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 SAFETY AND SECURITY GLAZING FILM

A. Safety Glazing: Retrofit existing glazing assemblies to provide impact resistance complying with ANSI Z97.1 and 16 CFR 1201, Category II.
   1. 1/4 inch thick clear annealed glass.
   2. 1” insulated safety glass
   3. Surface applied film.
   4. Requiring no supplemental anchoring devices.

2.03 MATERIALS

A. Security Glazing Film:

   1. Transparent polyester film for permanent bonding to glass.

2. Final installed product must be a minimum of 0.023 inches (23 Mil) thick.
   a. Installing multiple layers of thinner film to accomplish the required thickness is not allowed.
3. Adhesive Type: Pressure sensitive.
4. Tensile Strength: ASTM D-882, 32,000 psi minimum.
5. Breaking Strength: ASTM D-882, 640 lbs. / inch.
6. Elongation at Break: ASTM D-882, 230%
7. Haze: ASTM D1003, <4%
8. Color b: ASTM D2244, 4.2
9. Visible Light Transmission: 87%
10. Visible Light Reflected (Int): 12%
11. Visible Light Reflected (Ext): 12%
12. UV Block:>99%
13. Total Solar Energy Reflected: 11%
14. Total Solar Energy Transmitted: 77%
15. Total Solar Energy Absorbed: 12%
16. Shading Coefficient: 0.93
17. Total Solar Energy Rejected: 19%
18. Solar Heat Gain Coefficient: 0.81
19. U-Value Winter: 1.03
20. K-Value Winter: 5.85
21. Glare Reduction: 3%
22. Surface Burning Characteristics: Flame spread index of 25, maximum, and smoke developed index of 450, maximum, when tested in accordance with ASTM E84 (Class A).

B. Retrofit existing glazing assemblies to provide impact resistance and forced/attack resistance complying with WEY-SA-C1, ANSI Z97. I and CPSC 16 CFR 1201 Category II, ASTM E330, UL972, EN356 P4A, and GSA Level C as specified:

C. Provide supplemental anchoring system as required to meet forced entry resistance requirements.

D. Light Transmission of Film Applied on 1/4-inch-Thick Clear Annealed Glass:

1. Visible light Transmittance: 86 percent.

E. Anchoring System: DOW 995 or GE SCS2000 SilPruf Structural Sealant with high impact styrene trim.

PART 3 EXECUTION

3.1 EXAMINATION

A. Field -Applied Film: Verify that existing conditions are adequate for proper application and performance of film.

B. Examine glass and frames. Verify that existing conditions are adequate for proper application and performance of film.

C. Verify glass is not cracked, chipped, broken, or damaged.

D. Verify that frames are securely anchored and free of defects.

E. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean glass of dust, dirt, paint, oil, grease, mildew, mold, and other contaminants that would inhibit adhesion.

B. Immediately prior to applying film, thoroughly wash glass with neutral cleaning solution.

C. Protect adjacent surfaces.

D. Do not begin installation until substrates have been properly prepared.

3.3 INSTALLATION

A. Do not apply glazing film when surface temperature is less that 40 degrees F or if precipitation is imminent.

B. Install in accordance with manufacturer's instructions, without air bubbles, wrinkles, streaks, bands, thin spots, pinholes, or gaps, as required to achieve specified performance.

C. Accurately cut film with straight edges to required sizes allowing 1/16 inch to 1/8 inch gap at perimeter of glazed panel unless otherwise required by anchorage method.

D. Seams: Seam film only as required to accommodate material sizes; form seams vertically without overlaps and gaps; do not install with horizontal seams.

E. Supplemental Anchors: Install in accordance with manufacturer's instructions and shop drawings.

F. Clean glass and anchoring accessories following installation. Remove excess sealants and other glazing materials from adjacent finished surfaces.

G. Remove labels and protective covers.

3.4 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

END OF SECTION

SECTION 09 03 70 – NEW BONDED TERRAZZO TO MATCH EXISTING TERRAZZO FLOORING

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. The procedures include general guidelines offered by GSA (US Government Services Administration) to follow when restoring terrazzo in early twentieth century buildings. It identifies specific design issues and outlines recommended installation solutions that have the least visual or physical impact on the historic materials. The work of this Section includes performance criteria and consists of the provision of all plant, materials, labor and equipment and the like necessary and/or required for the complete execution of all terrazzo work: installing new bonded terrazzo to replace existing severely damaged portions of existing terrazzo floors, or to enlarge or alter an area of existing/historic terrazzo floors and installation of construction / expansion joints.

B. Related Requirements:

1. Division 07 "Joint Sealants" for sealants installed with terrazzo.

1.3 DEFINITIONS

A. Aggregate: Marble chips / and aggregates similar to original installation.

1.4 REFERENCES

A. NTMA Standards: Comply with specified provisions and recommendations of the National Terrazzo and Mosaic Association, Inc. (NTMA): http://www.ntma.com/

1.5 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review methods and procedures related to terrazzo including, but not limited to, the following:

a. Inspect and discuss condition of substrate and other preparatory work performed by other trades.

b. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
c. Review special terrazzo designs and patterns.

1.6 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Sustainable Submittals:

1. Product Data: For adhesives, documentation including printed statement of VOC content.
2. Product Data: For sealers, documentation including printed statement of VOC content.
3. Product Data: For terrazzo flooring, documentation from an independent testing agency indicating compliance with the FloorScore Standard.
4. Laboratory Test Reports: For adhesives and flooring system, documentation indicating that products comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

C. Shop Drawings: Include terrazzo installation requirements. Include plans, elevations, sections, component details, and attachments to other work. Show layout of the following:

1. Divider strips.
2. Control-joint strips.
3. Expansion-joint strips.
4. Accessory strips.
5. Abrasive strips.

D. Samples: For each exposed product and for each color and texture specified, 6 inches (150 mm) in size.

E. Samples for Initial Selection: NTMA color plates showing the full range of colors and patterns available for each terrazzo type.

F. Samples for Verification: For each type, material, color, and pattern of terrazzo and accessory required showing the full range of color, texture, and pattern variations expected. Label each terrazzo sample to identify manufacturer's matrix color and aggregate types, sizes, and proportions. Prepare Samples of same thickness and from same material to be used for the Work, in size indicated below:

1. Terrazzo: 6-inch- (150-mm-) square Samples.
2. Accessories: 6-inch- (150-mm-) long Samples of each exposed strip item required.

1.7 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Material Certificates: For each type of terrazzo material or product, from manufacturer.

1.8 CLOSEOUT SUBMITTALS

A. Maintenance Data: For terrazzo to include in maintenance manuals.

1.9 QUALITY ASSURANCE

A. Installer Qualifications: An installer who is a contractor member of NTMA.

B. Source Limitations for Aggregates: Obtain each color, grade, type, and variety of granular materials from single source with resources to provide materials of consistent quality in appearance and physical properties.

C. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Build mockups for terrazzo including accessories.

a. Size: Minimum 100 sq. ft. (9 sq. m) of typical poured-in-place flooring condition for each color and pattern in locations directed by Architect.

2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project site in supplier's original wrappings and containers, labeled with source's or manufacturer's name, material or product brand name, and lot number if any.

B. Store materials in their original, undamaged packages and containers, inside a well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.

1.11 FIELD CONDITIONS

A. Environmental Limitations: Maintain temperature above 50 deg F (10 deg C) for 48 hours before and during terrazzo installation.

B. Weather Limitations: Proceed with rustic terrazzo installation only when forecasted weather conditions permit work to be performed according to NTMA's written recommendations and temperatures remain above 45 deg F (7.2 deg C).

C. Field Measurements: Verify actual dimensions of construction contiguous with precast terrazzo by field measurements before fabrication.

D. Provide permanent lighting or, if permanent lighting is not in place, simulate permanent lighting conditions during terrazzo installation.

E. Close spaces to traffic during terrazzo application and for not less than 24 hours after application unless manufacturer recommends a longer period.

F. Control and collect water and dust produced by grinding operations. Protect adjacent construction from detrimental effects of grinding operations.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. NTMA Standards: Comply with NTMA's "Terrazzo Specifications and Design Guide" and with written recommendations for terrazzo type indicated unless more stringent requirements are specified.

B. FloorScore Compliance: Terrazzo floors shall comply with requirements of FloorScore Standard.

C. Low-Emitting Materials: Flooring system shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.2 MATERIALS

A. Portland Cement: ASTM C150, Type I, except as modified to comply with NTMA requirements for compressive strength. Obtain cement from a single source for each required color.
1. Provide non-staining white cement for terrazzo matrix.

B. Sand: ASTM C33

C. Water: Clean, free of oil, soluble salts or other deleterious substances.

D. Aggregate: Natural, sound, crushed marble chips without excessive flats or flakes, complying with NTMA requirements. When matching existing terrazzo, the original aggregate types and ratios are often found listed on original drawings.
1. Colors and gradation of aggregate sizes as required to match original existing intact materials and patterns.
2. Aggregate colors and matrix pigments should be matched after cleaning or taken from the interior of core samples.

E. Matrix Pigments: Pure mineral or synthetic pigments, resistant to alkalies and non-fading. Mix pigments with matrix to provide required colors.

F. Curing Compound: Liquid-membrane-forming compound, ASTM C309, Type 1.

G. Divider Strips in new spaces and restored spaces:
1. Depth and style required for terrazzo type and thickness. Divider strips should be of solid composition and match historic profiles (size, color, material).
2. Materials: brass. Do not use coated divider strips.

H. Use conventional terrazzo grinding equipment rather than lighter type machines.

I. Accessory Strips: Match width, material and color of divider strips, unless otherwise required. Provide following types of accessory strips as required for complete installation.
   1. Control Joint Strips: Double or split units, 1/8" wide, of same material and color as divider strips with 1/8" wide full-depth filler, laminated between strips.
   2. Adhesive Bonding Agent: Epoxy or polyester resin.

2.3 MIXES

A. Underbed: One part portland cement to 4-1/2 parts sand and sufficient water to provide workability at as low a slump as possible.

B. Terrazzo Topping: One 94 pound bag of portland cement as per 200 pounds of marble chips and approximately 5 gallons of water.
   1. Add color pigment as required to match existing color. Do not exceed, however, 2 pounds of pigment per bag of cement.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine the terrazzo to determine the type of terrazzo topping used. Match marble chips and matrix for existing terrazzo by size, mineral content and color. See Submittals. Color samples should be taken after cleaning.

B. Perform a thorough examination of the existing conditions. Perform any necessary tests on an inconspicuous surface to determine the current conditions and appropriate steps and materials necessary for replication and replacement of select areas of existing terrazzo surfaces.

3.2 PREPARATION

A. Surface Preparation:
   1. Clean and prepare substrate to comply with NTMA specifications for type of terrazzo application indicated. Clean substrate of loose chips and foreign matter. Grind concrete substrate to provide surfaces within tolerances required by NTMA for type of terrazzo application.
   2. For cementitious terrazzo, comply with NTMA recommendations for proportioning mixes, installation of strips, and for placing, curing, grinding, grouting and finishing.
   3. Exercise extreme care to ensure fluids from grinding operation do not react with divider or control joint strips to produce a stain on aggregate or discolor strips.
   4. Delay grinding and finishing until heavy trade work is completed and construction traffic through the area is restricted.
   5. Provide terrazzo bases, thresholds, stair treads and landings, without interruptions of seams,except where divider strips, control joints and expansion joints are required. Place and finish terrazzo around obstructions to achieve continuous color, pattern and finish.
   6. Provide control joints where required by installing angle-type divider strips back-to-back with neoprene rubber filler cemented between strips, flush with finish floor.

3.3 ERECTION, INSTALLATION AND APPLICATION

A. Match the historic character and pattern of the terrazzo in all spaces containing or contiguous with existing terrazzo.

B. Sand Cushion (floating) Terrazzo: Comply with NTMA "Guide Specification for Bonded Terrazzo".
1. Used where structural movement is anticipated from settling, expansion, contraction, or vibration, which may cause injury to the terrazzo topping;
2. The overall thickness of the underbed and topping needs to be at least 3 inches.
3. The concrete slab is covered with a thin bed of dry sand, over which is laid a waterproof membrane and reinforcing wire mesh.
4. Install the terrazzo underbed to 5/8 inch below the finished floor line.
5. Place divider strips and then pour terrazzo topping.

C. Bonded-to-Concrete Terrazzo: Comply with NTMA "Guide Specification for Bonded Terrazzo".
1. Used in all general areas-corridors, lobbies,rooms, sidewalks, etc.
2. The minimum overall thickness (most common) is 1-3/4 inches; With reinforcing, 2 or 2-1/2 inches is appropriate.
3. Thoroughly clean and soak the base slab with water.
4. Slush it with dry portland cement to ensure a good bond.
5. Install the underbed followed by the placing of divider strips and terrazzo topping.

D. Monolithic Terrazzo: Installed at 5/8 inch thick, it is bonded to or made integral with the prepared slab.

E. Thin Terrazzo Toppings: Installed at 3/8 inch thick on concrete slab which has first been covered with adhesive bonding agent, i.e., polysulfide liquid polymer.

F. Surfacing: Grout cured terrazzo topping in accordance with NTMA specifications.
1. Delay grinding and finishing until heavy trade work is completed and construction traffic through the area is restricted.
2. Finish by fine grinding with abrasive grit of size specified by NTMA, or as otherwise required to match original intact material.
3. Grind and polish the new areas, patches, and the entire floor as required to produce a clean, smooth, and uniform finish, capable of being sealed and polished to match the original installation.
4. **NOTE: EXERCISE CAUTION WHEN GRINDING NEAR DIVIDER STRIPS.**
5. Cover with vapor barrier sheets to prevent quick hydration.

3.4 ADJUSTING/CLEANING

A. Keep terrazzo free of acids and oils.

B. Protect the floor, especially the grouting, with a penetrating type seal.

C. Daily Cleaning:
1. Daily sweeping with a cotton-wick floor brush, treated with a non-oily dressing, will control dust and make maintenance easier.
2. Regular damp-mopping keeps the surface free from dirt accumulations.

D. Periodic Cleaning:
   1. Machine buffing on a regular basis removes traffic marks and restores luster.
   2. Touching up with sealer in traffic areas as needed protects the surface.
   3. Periodic machine scrubbing removes heavy accumulations of dirt.
   4. Seal and wax as needed.
   5. Use a penetrating type terrazzo seal.
   6. Avoid seals which may turn yellow and discolor.
   7. Normal stripping and buffing procedures are suitable.

E. Clean terrazzo after installation and finishing operations are completed, complying with sealer manufacturer's instructions.

F. Apply sealer to cleaned terrazzo surfaces to comply with sealer manufacturer's instructions.

G. Protect terrazzo from damage and wear during construction operation.

3.5 WASTE MANAGEMENT

A. Coordinate with Division 01.
   1. Separate and recycle cut-offs and waste materials and material packaging in accordance with Waste Management Plan and to the maximum extent economically feasible and place in designated areas for recycling.
   2. Set aside and protect materials suitable for reuse and/or remanufacturing.
   3. Separate and fold up metal banding; flatten and place along with other metal scrap for recycling in designated area.

END OF SECTION 09 03 70

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SECTION 09 22 16 - NON-STRUCTURAL METAL FRAMING

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. Non-load-bearing steel framing systems for interior gypsum board assemblies.
2. Suspension systems for interior gypsum ceilings, soffits, and grid systems.

B. Related Requirements:

1. None

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.4 INFORMATIONAL SUBMITTALS

A. Evaluation Reports: For dimpled steel studs and runners and firestop tracks, from ICC-ES.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate non-load-bearing steel framing, provide materials and construction identical to those tested in assembly indicated, according to ASTM E 119 by an independent testing agency.

B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated, according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

2.2 FRAMING SYSTEMS

A. Framing Members, General: Comply with ASTM C 754 for conditions indicated.

1. Steel Sheet Components: Comply with ASTM C 645 requirements for metal unless otherwise indicated.
2. Protective Coating: ASTM A 653/A 653M, G40 (Z120), Coating with equivalent corrosion resistance of ASTM A 653/A 653M, G40 (Z120), hot-dip galvanized unless otherwise indicated.

B. Studs and Runners: ASTM C 645. Use either steel studs and runners or dimpled steel studs and runners.

1. Steel Studs and Runners:

a. Thickness: 20 ga. **Unless otherwise indicated**
b. Depth: As indicated on Drawings.

C. Slip-Type Head Joints: Where indicated, provide one of the following:

1. Single Long-Leg Runner System: ASTM C 645 top runner with 2-inch- (51-mm-) deep flanges in thickness not less than indicated for studs, installed with studs friction fit into top runner and with continuous bridging located within 12 inches (305 mm) of the top of studs to provide lateral bracing.
2. Double-Runner System: ASTM C 645 top runners, inside runner with 2-inch- (51-mm-) deep flanges in thickness not less than indicated for studs and fastened to studs, and outer runner sized to friction fit inside runner.
3. Deflection Track: Steel sheet top runner manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.

a. Products: Subject to compliance with requirements, provide one of the following or approved equal:

1) Dietrich Metal Framing; SLP-TRK Slotted Deflection Track.
2) MBA Building Supplies; FlatSteel Deflection Track or Slotted Deflecto Track.
3) Steel Network Inc. (The); VertiTrack VTD Series.
4) Superior Metal Trim; Superior Flex Track System (SFT).
5) Telling Industries; Vertical Slip Track.

D. Firestop Tracks: Top runner manufactured to allow partition heads to expand and contract with movement of the structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs.

1. Products: Subject to compliance with requirements, provide one of the following, or approved equal:

a. Fire Trak Corp.; Fire Trak System.
b. Grace Construction Products; FlameSafe FlowTrak System.

E. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.

1. Minimum Base-Metal Thickness: 0.0219 inch (0.556 mm).

F. Cold-Rolled Channel Bridging: Steel, 0.053-inch (1.34-mm) minimum base-metal thickness, with minimum 1/2-inch- (13-mm-) wide flanges.

1. Depth: As indicated on Drawings.
2. Clip Angle: Not less than 1-1/2 by 1-1/2 inches (38 by 38 mm), 0.068-inch- (1.72-mm-) thick, galvanized steel.

G. Hat-Shaped, Rigid Furring Channels: ASTM C 645.

1. Minimum Base-Metal Thickness: 0.0219 inch (0.556 mm).
2. Depth: 7/8 inch (22.2 mm).

H. Resilient Furring Channels: 1/2-inch- (13-mm-) deep, steel sheet members designed to reduce sound transmission.

1. Configuration: Asymmetrical or hat shaped.

I. Cold-Rolled Furring Channels: 0.053-inch (1.34-mm) uncoated-steel thickness, with minimum 1/2-inch- (13-mm-) wide flanges.

1. Depth: As indicated on Drawings.
2. Furring Brackets: Adjustable, corrugated-edge type of steel sheet with minimum uncoated-steel thickness of 0.033 inch (0.8 mm).
3. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch- (1.59-mm-) diameter wire, or double strand of 0.048-inch- (1.21-mm-) diameter wire.

J. Z-Shaped Furring: With slotted or nonslotted web, face flange of 1-1/4 inches (32 mm), wall attachment flange of 7/8 inch (22 mm), minimum uncoated-metal thickness of 0.018 inch (0.45 mm), and depth required to fit insulation thickness indicated.

2.3 SUSPENSION SYSTEMS

A. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch- (1.59-mm-) diameter wire, or double strand of 0.048-inch- (1.21-mm-) diameter wire.

B. Hanger Attachments to Concrete:

1. Anchors: Fabricated from corrosion-resistant materials with holes or loops for attaching wire hangers and capable of sustaining, without failure, a load equal to 5 times that imposed by construction as determined by testing according to ASTM E 488 by an independent testing agency.
2. Powder-Actuated Fasteners: Suitable for application indicated, fabricated from corrosion-resistant materials with clips or other devices for attaching hangers of type indicated, and capable of sustaining, without failure, a load equal to 10 times that imposed by construction as determined by testing according to ASTM E 1190 by an independent testing agency.

C. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.16 inch (4.12 mm) in diameter.

D. Flat Hangers: Steel sheet, 1 by 3/16 inch (25 by 5 mm) by length indicated.

E. Carrying Channels: Cold-rolled, commercial-steel sheet with a base-metal thickness of 0.053 inch (1.34 mm) and minimum 1/2-inch- (13-mm-) wide flanges.

F. Furring Channels (Furring Members):

1. Cold-Rolled Channels: 0.053-inch (1.34-mm) uncoated-steel thickness, with minimum 1/2-inch- (13-mm-) wide flanges, 3/4 inch (19 mm) deep.
2. Steel Studs and Runners: ASTM C 645.
3. Dimpled Steel Studs and Runners: ASTM C 645.
4. Hat-Shaped, Rigid Furring Channels: ASTM C 645, 7/8 inch (22 mm) deep.
5. Resilient Furring Channels: 1/2-inch- (13-mm-) deep members designed to reduce sound transmission.

G. Grid Suspension System for Gypsum Board Ceilings: ASTM C 645, direct-hung system composed of main beams and cross-furring members that interlock.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Armstrong World Industries, Inc.; Drywall Grid Systems.
b. Chicago Metallic Corporation; Drywall Grid System.
c. USG Corporation; Drywall Suspension System.

2.4 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards.

1. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.

B. Isolation Strip at Exterior Walls: Provide one of the following:

1. Asphalt-Saturated Organic Felt: ASTM D 226, Type I (No. 15 asphalt felt), nonperforated.
2. Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8 inch (3.2 mm) thick, in width to suit steel stud size.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Suspended Assemblies: Coordinate installation of suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive hangers at spacing required to support the Work and that hangers will develop their full strength.

1. Furnish concrete inserts and other devices indicated to other trades for installation in advance of time needed for coordination and construction.

B. Coordination with Sprayed Fire-Resistive Materials:

1. Before sprayed fire-resistive materials are applied, attach offset anchor plates or ceiling runners (tracks) to surfaces indicated to receive sprayed fire-resistive materials. Where offset anchor plates are required, provide continuous plates fastened to building structure not more than 24 inches (610 mm) o.c.
2. After sprayed fire-resistive materials are applied, remove them only to extent necessary for installation of non-load-bearing steel framing. Do not reduce thickness of fire-resistive materials below that required for fire-resistance ratings indicated. Protect adjacent fire-resistive materials from damage.

3.3 INSTALLATION, GENERAL

A. Installation Standard: ASTM C 754.

1. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.

B. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.

C. Install bracing at terminations in assemblies.

D. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

3.4 INSTALLING FRAMED ASSEMBLIES

A. Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.

1. Single-Layer Application: 16 inches (406 mm) o.c. unless otherwise indicated.
2. Multilayer Application: 16 inches (406 mm) o.c. unless otherwise indicated.
3. Tile Backing Panels: 16 inches (406 mm)] o.c. unless otherwise indicated.

B. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.

C. Install studs so flanges within framing system point in same direction.

D. Install tracks (runners) at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts penetrating partitions above ceiling.

1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.

    a. Install two studs at each jamb unless otherwise indicated.
    b. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch (13-mm) clearance from jamb stud to allow for installation of control joint in finished assembly.
    c. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.

3. Other Framed Openings: Frame openings other than door openings the same as required for door openings unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.
4. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.

    a. Firestop Track: Where indicated, install to maintain continuity of fire-resistance-rated assembly indicated.

5. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.
6. Curved Partitions:

    a. Bend track to uniform curve and locate straight lengths so they are tangent to arcs.
    b. Begin and end each arc with a stud, and space intermediate studs equally along arcs. On straight lengths of no fewer than two studs at ends of arcs, place studs 6 inches (150 mm) o.c.

E. Direct Furring:

1. Screw to wood framing.
2. Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches (610 mm) o.c.

F. Z-Furring Members:

1. Erect insulation, specified in Section 072100 "Thermal Insulation," vertically and hold in place with Z-furring members spaced 24 inches (610 mm) o.c.
2. Except at exterior corners, securely attach narrow flanges of furring members to wall with concrete stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches (610 mm) o.c.
3. At exterior corners, attach wide flange of furring members to wall with short flange extending beyond corner; on adjacent wall surface, screw-attach short flange of furring

channel to web of attached channel. At interior corners, space second member no more than 12 inches (305 mm) from corner and cut insulation to fit.

G. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch (3 mm) from the plane formed by faces of adjacent framing.

3.5 INSTALLING SUSPENSION SYSTEMS

A. Install suspension system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.

1. Hangers: 48 inches (1219 mm) o.c.
2. Carrying Channels (Main Runners): 48 inches (1219 mm) o.c.
3. Furring Channels (Furring Members): 16 inches (406 mm) o.c.

B. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.

C. Suspend hangers from building structure as follows:

1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.

    a. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.

2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.

    a. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced installation standards.

3. Wire Hangers: Secure by looping and wire tying, either directly to structures or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause hangers to deteriorate or otherwise fail.
4. Flat Hangers: Secure to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices and fasteners that are secure and appropriate for structure and hanger, and in a manner that will not cause hangers to deteriorate or otherwise fail.
5. Do not attach hangers to steel roof deck.
6. Do not attach hangers to permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.
7. Do not attach hangers to rolled-in hanger tabs of composite steel floor deck.
8. Do not connect or suspend steel framing from ducts, pipes, or conduit.

D. Fire-Resistance-Rated Assemblies: Wire tie furring channels to supports.

E. Seismic Bracing: Sway-brace suspension systems with hangers used for support.

F. Grid Suspension Systems: Attach perimeter wall track or angle where grid suspension systems meet vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.

G. Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet (3 mm in 3.6 m) measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

3.6 WASTE MANAGEMENT

A. Coordinate with Section 017423.

1. Separate and recycle cut-offs and waste materials and material packaging in accordance with Waste Management Plan and to the maximum extent economically feasible and place in designated areas for recycling.
2. Set aside and protect materials suitable for reuse and/or remanufacturing.
3. Separate and fold up metal banding; flatten and place along with other metal scrap for recycling in designated area.

END OF SECTION 092216

SECTION 09 29 00 - GYPSUM BOARD

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. This section includes the performance criteria, materials, production, and erection of gypsum board for the project. The work performed under this Section consists of the provision of all plant, materials, labor and equipment and the like necessary and/or required for the complete execution of all gypsum board as required by this section, schedules, keynotes and drawings including, but not limited to the following.

1. Interior gypsum board.
2. Moisture resistant gypsum board (all wet locations and as tile backer)
3. Trim.

B. Related Requirements:
1. Section 09 22 16 "Non-Structural Metal Framing" for non-structural framing and suspension systems that support gypsum board panels.

1.3 PERFORMANCE REQUIREMENTS

A. Structural Performance of Ceiling Suspension Systems: Ceiling suspension systems and cantilevered ceiling soffits shall withstand the effects of gravity and seismic effects.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings for Gypsum Board Ceiling Systems: Include reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, and as reviewed by a qualified professional engineer using input from installers of the items involved:.

1. Layout of all ceilings/soffits with dimensions based on as-built construction
2. Gypsum board ceiling suspension-system members.
3. Miscellaneous metal/steel framing sizing for soffits and cantilevers
4. Method of attaching hangers to building structure.

a. Furnish layouts and sizing for cast-in-place anchors, clips, metal framing, miscellaneous steel shapes, and other ceiling attachment devices whose installation is specified in other Sections.

5. Size and location of initial access modules for suspended gypsum board ceilings and soffits.
6. Ceiling-mounted items including lighting fixtures, diffusers, grilles, speakers, sprinklers, access panels, and special moldings.
7. Minimum Drawing Scale: 1/8 inch = 1 foot (1:96) for layout drawings, 1 inch = 1 foot for detail drawings

C. Evaluation Reports: For each ceiling suspension system and anchor and fastener type, from ICC-ES.

D. Field quality-control reports.

E. Samples: For the following products:

1. Trim Accessories: Full-size Sample in 12-inch- (300-mm-) long length for each trim accessory indicated.
2. Textured Finishes: 12” x 12” sample for each textured finish indicated and on same backing indicated for Work.

1.5 QUALITY ASSURANCE

A. Mockups: Before beginning gypsum board installation, install mockups of at least 100 sq. ft. (9 sq. m) in surface area to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Install mockups for the following:

a. Each level of gypsum board finish indicated for use in exposed locations.
b. Each texture finish indicated.

2. Apply or install final decoration indicated, including painting and wallcoverings, on exposed surfaces for review of mockups.
3. Simulate finished lighting conditions for review of mockups.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 DELIVERY, STORAGE AND HANDLING

A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

1.7 FIELD CONDITIONS

A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.

B. Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned.

C. Do not install panels that are wet, those that are moisture damaged, and those that are mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.

PART 2 - Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.

B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

2.2 GYPSUM BOARD, GENERAL

A. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.3 INTERIOR GYPSUM BOARD

A. Manufacturers: Subject to compliance with requirements, provide products by the following:

1. National Gypsum Company
2. American Gypsum.
3. CertainTeed Corp.
4. Georgia-Pacific Gypsum LLC.
5. Lafarge North America Inc.
6. USG Corporation.

B. Gypsum Wallboard: ASTM C 1396/C 1396M.

1. Thickness: 5/8 inch (12.7 mm).
2. Long Edges: Tapered.

C. Gypsum Board, Type X: ASTM C 1396/C 1396M.

1. Thickness: 5/8 inch (15.9 mm).
2. Long Edges: Tapered.

D. Flexible Gypsum Board: ASTM C 1396/C 1396M. Manufactured to bend to fit radii and to be more flexible than standard regular-type gypsum board of same thickness.

1. Thickness: 1/4 inch (6.4 mm).
2. Long Edges: Tapered.

E. Gypsum Ceiling Board: ASTM C 1396/C 1396M.

1. Thickness: 1/2 inch (12.7 mm).
2. Long Edges: Tapered.

A. Abuse-Resistant Gypsum Board: ASTM C 1629/C 1629M. **(At all whiteboard walls)**

1. Products Paper Faced, ASTM C 1396: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
   a. National Gypsum Company; Hi-Abuse XP.
2. Products Glass-Mat Faced, ASTM C 1658: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
   a. National Gypsum Company; eXP Interior Extreme AR Gypsum Panel.
3. Core**:** 5/8 inch (15.9 mm), Type X.
4. Long Edges: Tapered.
5. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.
6. Surface Abrasion Resistance: Level 3 in accordance with ASTM C 1629.
7. Indentation Resistance: Level 1 in accordance with ASTM C 1629.
8. Soft Body Impact Resistance: Level 2 in accordance with ASTM C 1629.

B. Impact-Resistant Gypsum Board: ASTM C 1629/C 1629M.

1. Products Paper Faced, ASTM C 1396: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
   a. National Gypsum Company; Hi-Impact XP.
2. Products Glass-Mat Faced, ASTM C 1658: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
   a. Georgia-Pacific Gypsum LLC; DensArmor Plus Impact-Resistant Interior Panel.
   b. National Gypsum Company; eXP Interior Extreme IR Gypsum Panel.
3. Core**:** 5/8 inch (15.9 mm), Type X.
4. Long Edges: Tapered.
5. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.
6. Surface Abrasion Resistance: Level 3 in accordance with ASTM C 1629.
7. Indentation Resistance: Level 1 in accordance with ASTM C 1629.
8. Soft Body Impact Resistance: Level 3 in accordance with ASTM C 1629.
9. Hard Body Impact Resistance: Level 2 in accordance with ASTM C 1629.

C. Moisture- and Mold-Resistant Gypsum Board: ASTM C 1396/C 1396M. With moisture- and mold-resistant core and paper surfaces. **(At all bathroom locations)**

1. Core: 5/8 inch (15.9 mm), Type X.
2. Long Edges: Tapered.
3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

D. Glass-Mat Interior Gypsum Board: ASTM C 1658/C 1658M. With fiberglass mat laminated to both sides. Specifically designed for interior use, where indicated on Drawings. Retain "Products" Subparagraph and list of manufacturers and products below to require specific products or a comparable product from other manufacturers. **(At all plumbing walls, with or without tile)**

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

   a. Georgia-Pacific Gypsum LLC; DensArmor Plus.
   b. National Gypsum Company; eXP Interior Extreme.

2. Core: 5/8 inch, Type X.
3. Long Edges: Tapered.
4. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

2.4 TRIM ACCESSORIES

A. Interior Trim: ASTM C 1047.

1. Material: Galvanized or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized steel sheet.
2. Shapes:

   a. Cornerbead.
   b. Bullnose bead.
   c. LC-Bead: J-shaped; exposed long flange receives joint compound.
   d. L-Bead: L-shaped; exposed long flange receives joint compound.
   e. U-Bead: J-shaped; exposed short flange does not receive joint compound.
   f. Expansion (control) joint.
   g. Curved-Edge Cornerbead: With notched or flexible flanges.

2.5 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C 475/C 475M.

B. Joint Tape:

1. Interior Gypsum Board: Paper.
2. Glass-Mat Gypsum Sheathing Board: 10-by-10 glass mesh.

C. Joint Compound for Interior Gypsum Board: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.

1. Prefilling: At open joints, rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound.
2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.

    a. Use setting-type compound for installing paper-faced metal trim accessories.

3. Fill Coat: For second coat, use setting-type, sandable topping compound.
4. Finish Coat: For third coat, use setting-type, sandable topping compound.
5. Skim Coat: For final coat of Level 5 finish, use setting-type, sandable topping compound.

2.6 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.

B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.

1. Laminating adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

C. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.

1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch (0.84 to 2.84 mm) thick.

D. Sound Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.

1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.

E. Acoustical Joint Sealant: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.

1. Products: Subject to compliance with requirements, provide product by one of the following:

    a. Accumetric LLC; BOSS 824 Acoustical Sound Sealant.
    b. Grabber Construction Products; Acoustical Sealant GSC.
    c. Pecora Corporation
    d. Specified Technologies, Inc.; Smoke N Sound Acoustical Sealant.
    e. USG Corporation; SHEETROCK Acoustical Sealant.

2. Acoustical joint sealant shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

F. Thermal Insulation: As specified in Section 07 21 00 "Thermal Insulation."

G. Vapor Retarder: As specified in Section 07 21 00 "Thermal Insulation."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates including welded hollow-metal frames and framing, with Installer present, for compliance with requirements and other conditions affecting performance.

B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLYING AND FINISHING PANELS, GENERAL

A. Comply with ASTM C 840 and Gypsum Association GA 214-10.

B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.

C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch (1.5 mm) of open space between panels. Do not force into place.

D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.

E. Form control and expansion joints with space between edges of adjoining gypsum panels.

F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.

1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. (0.7 sq. m) in area.
2. Fit gypsum panels around ducts, pipes, and conduits.
3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch- (6.4- to 9.5-mm-) wide joints to install sealant.

G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch- (6.4- to 12.7-mm-) wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.

I. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written recommendations for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.

J. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

3.3 APPLYING INTERIOR GYPSUM BOARD

A. Install interior gypsum board in the following locations:

1. Wallboard Type: As indicated on Drawings.
2. Type X: As indicated on Drawings and at all fire rated assemblies.
3. Flexible Type: As indicated on Drawings.
4. Ceiling Type: As indicated on Drawings.
5. Abuse-Resistant Type: At interior of exterior walls and whiteboard walls.
6. Impact-Resistant Type: At lobbies, entries and corridors
7. Moisture- and Mold-Resistant Type: As indicated on Drawings and at all wet areas and as tile backer.
8. Glass-Mat Interior Type: At all plumbing wall with or without tile.

B. Single-Layer Application:

1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing unless otherwise indicated.
2. On partitions/walls, apply gypsum panels horizontally (perpendicular to framing) unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.

    a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
    b. At stairwells and other high walls, install panels horizontally unless otherwise indicated or required by fire-resistance-rated assembly.

3. On Z-furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
4. Fastening Methods: Apply gypsum panels to supports with steel drill screws.

C. Multilayer Application:

1. On ceilings, apply gypsum board indicated for base layers before applying base layers on walls/partitions; apply face layers in same sequence. Apply base layers at right angles to framing members and offset face-layer joints one framing member, 16 inches (400 mm) minimum, from parallel base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly.

2. On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.
3. On Z-furring members, apply base layer vertically (parallel to framing) and face layer either vertically (parallel to framing) or horizontally (perpendicular to framing) with vertical joints offset at least one furring member. Locate edge joints of base layer over furring members.
4. Fastening Methods: Fasten base layers and face layers separately to supports with screws.

D. Laminating to Substrate: Where gypsum panels are indicated as directly adhered to a substrate (other than studs, joists, furring members, or base layer of gypsum board), comply with gypsum board manufacturer's written recommendations and temporarily brace or fasten gypsum panels until fastening adhesive has set.

E. Curved Surfaces:

1. Install panels horizontally (perpendicular to supports) and unbroken, to extent possible, across curved surface plus 12-inch- (300-mm-) long straight sections at ends of curves and tangent to them.
2. For double-layer construction, fasten base layer to studs with screws 16 inches (400 mm) o.c. Center gypsum board face layer over joints in base layer, and fasten to studs with screws spaced 12 inches (300 mm) o.c.

3.4 INSTALLING TRIM ACCESSORIES

A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.

B. Control Joints: Install control joints at locations indicated on Drawings and according to ASTM C 840 and in specific locations approved by Architect for visual effect.

C. Interior Trim: Install in the following locations:

1. Cornerbead: Use at outside corners unless otherwise indicated.
2. Bullnose Bead: Use at outside corners.
3. LC-Bead: Use at exposed panel edges.
4. L-Bead: Use where indicated.
5. U-Bead: Use at exposed panel edges and where indicated.
6. Curved-Edge Cornerbead: Use at curved openings.

3.5 FINISHING GYPSUM BOARD

A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.

B. Prefill open joints, rounded or beveled edges, and damaged surface areas.

C. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.

D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840 and Gypsum Association GA 214-10:

1. Level 1:

a. All joints and interior angles shall have tape set in joint compound. Surface shall be free of excess joint compound. Minor tool marks and ridges are acceptable:

1) At ceiling plenum areas, concealed areas, behind metal lockers, behind built-in millwork, and where indicated.

2. Level 2:

a. All joints and interior angles shall have tape embedded in joint compound and wiped with joint knife leaving a thin coating of joint compound over all joints and interior angles. Fastener heads and accessories shall be covered with a coat of joint compound. Surface shall be free of excess joint compound. Minor tools marks and ridges are acceptable. Joint compound applied over the body of the tape at the time of tape embedment shall be considered a separate coat of joint compound and shall satisfy the conditions of this level:

1) At gypsum panels that are substrate for tile or acoustical tile, and where indicated on Drawings.

3. Level 3:

a. All joints and interior angles shall have tape embedded in joint compound and shall be immediately wiped with joint knife leaving a thin coating of joint compound over all joints and interior angles. One additional coat of joint compound shall be applied over all joints and interior angles. Fastener heads and accessories shall be covered with two separate coats of joint compound. All joint compound shall be smooth and free of tool marks and ridges:

1) At panel surfaces receiving medium- or heavy-textured finishes before painting, or heavy wallcoverings where lighting conditions are not critical, and where indicated on Drawings.

4. Level 4:

a. All joints and interior angles shall have tape embedded in joint compound and shall be immediately wiped with joint knife leaving a thin coating of joint compound over all joints and interior angles. Two separate coats of joint compound shall be applied over all flat joints and one separate coat of joint compound shall be applied over interior angles. Fastener heads and accessories shall be covered with three separate coats of joint compound. All joint compound shall be smooth and free of tool marks and ridges. Prepared surfaces shall be coated with drywall primer prior to application of final finishes:

1) At panel surfaces receiving light-textured finishes, wallcoverings, and flat paints, and at panel surfaces that will be exposed to view unless otherwise indicated. This is generally the standard exposed finish, unless noted otherwise. Not recommended where glossy or semi-glass enamel paints are specified.

b. Primer and its application to surfaces are specified in other Section 099123 “Painting.”

5. Level 5:

a. All joints and interior angles shall have tape embedded in joint compound and shall be immediately wiped with joint knife leaving a thin coating of joint compound over all joints and interior angles. Two separate coats of joint compound shall be applied over all flat joints and one separate coat of joint compound shall be applied over interior angles. Fastener heads and accessories shall be covered with three separate coats of joint compound. A thin skim coat of joint compound trowel applied, or a material manufactured especially for this purpose and applied in accordance with manufacturer’s recommendations, applied to entire surface. The surface shall be smooth and free of tool marks and ridges. Prepared surfaces shall be coated with drywall primer prior to application of final finishes:

1) At panel surfaces receiving gloss and semigloss enamels and other surfaces subject to severe lighting, and where indicated on Drawings.

b. Primer and its application to surfaces are specified in other Section 099123 “Painting.”

3.6 PROTECTION

A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.

B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.

C. Remove and replace panels that are wet, moisture damaged, and mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

3.7 WASTE MANAGEMENT

A. Coordinate with Section 01 74 19.

1. Separate and recycle cut-offs and waste materials and material packaging in accordance with Waste Management Plan and to the maximum extent economically feasible and place in designated areas for recycling.
2. Set aside and protect materials suitable for reuse and/or remanufacturing.
3. Separate and fold up metal banding; flatten and place along with other scrap for recycling.

END OF SECTION 09 29 00

SECTION 09 30 13 - CERAMIC TILE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:
   1. Ceramic tile.
   2. Porcelain tile.
   3. Stone thresholds installed as part of tile installations.

B. Related Sections include the following:
   1. Division 9 Section "Gypsum Board Assemblies" for glass mat, water resistant gypsum backing board installed in gypsum wallboard assemblies.

1.3 PERFORMANCE REQUIREMENTS

A. Static Coefficient of Friction: For tile installed on walkway surfaces, provide products with the following values as determined by testing identical products per ASTM C 1028:
   1. Level Surfaces: Minimum 0.6.

B. Load-Bearing Performance: For ceramic tile installed on walkway surfaces, provide installations rated for the following load-bearing performance level based on testing assemblies according to ASTM C 627 that are representative of those indicated for this Project:
   1. Moderate: Passes cycles 1 through 10.

1.4 SUBMITTALS

A. Product Data: For each type of tile, mortar, grout, and other products specified.

B. Shop Drawings: For the following:
   1. Tile patterns and locations.
   2. Widths, details, and locations of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces.

C. Tile Samples for Initial Selection: Manufacturer's color charts consisting of actual tiles or sections of tiles showing the full range of colors, textures, and patterns available for each type and composition of tile indicated. Include Samples of accessories involving color selection.

D. Samples for Verification: Of each item listed below, prepared on Samples of size and construction indicated. Where products involve normal color and texture variations, include Sample sets showing the full range of variations expected.
   1. Each type and composition of tile and for each color and texture required, at least 12 inches square, mounted on braced cementitious backer units, and with grouted joints using product complying with specified requirements and approved for completed work in color or colors selected by Architect.
   2. Full-size units of each type of trim and accessory for each color required.
   3. Stone thresholds in 6-inch lengths.

E. Product Certificates: Signed by manufacturers certifying that the products furnished comply with requirements.

F. Qualification Data: For firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names of architects and owners, and other information specified.

G. Setting Material Test Reports: Indicate and interpret test results for compliance of tile-setting and -grouting products with specified requirements.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced installer who has completed tile installations similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.

B. Source Limitations for Tile: Obtain each color, grade, finish, type, composition, and variety of tile from one source with resources to provide products from the same production run for each contiguous area of consistent quality in appearance and physical properties without delaying the Work.

C. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from a single manufacturer and each aggregate from one source or producer.

D. Source Limitations for Other Products: Obtain each of the following products specified in this Section from one source and by a single manufacturer for each product:
   1. Stone thresholds.
   2. Joint sealants.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirement of ANSI A137.1 for labeling sealed tile packages.

B. Prevent damage or contamination to materials by water, freezing, foreign matter, and other causes.

C. Handle tile with temporary protective coating on exposed surfaces to prevent coated surfaces from contacting backs or edges of other units. If coating does contact bonding surfaces of tile, remove coating from bonding surfaces before setting tile.

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Do not install tile until construction in spaces is completed and ambient temperature and humidity conditions are being maintained to comply with referenced standards and manufacturer's written instructions.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   1. Tile Products:
      a. American Olean Tile Company.
      b. Crossville Tile
      c. ProSpec LLC.
      d. Dal-Tile Corporation.
      e. Emser Tile
      f. Stone Source
      g. Horizon Tile

B. Tile-Setting and -Grouting Materials:
      a. American Olean Tile Company.
      b. ProSpec LLC.
      c. Bostik.
      d. Dal-Tile Corporation.
      e. Laticrete International, Inc.
      f. Mapei Corporation.

2.2 PRODUCTS, GENERAL

A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1, "Specifications for Ceramic Tile," for types, compositions, and other characteristics indicated.
   1. Provide tile complying with Standard Grade requirements, unless otherwise indicated.

B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI standards referenced in "Setting Materials" and "Grouting Materials" articles.

C. Colors, Textures, and Patterns: Where manufacturer's standard products are indicated for tile, grout, and other products requiring selection of colors, surface textures, patterns, and other appearance characteristics, provide specific products or materials complying with the following requirements:

1. See Finish Schedule for exact tile product information.

D. Factory Blending: For tile exhibiting color variations within the ranges selected during Sample submittals, blend tile in the factory and package so tile units taken from one package show the same range in colors as those taken from other packages and match approved Samples.

E. Mounting: Where factory-mounted tile is required, provide back- or edge-mounted tile assemblies as standard with manufacturer, unless another mounting method is indicated.
1. Where tile is indicated for installation in wet areas, do not use back- or edge-mounted tile assemblies unless tile manufacturer specifies in writing that this type of mounting is suitable for these kinds of installations and has a record of successful in-service performance.

2.3 WALL TILE

A. Porcelain Wall Tile Basis of Design: Crossville “Alaska” & Dal-Tile “Color Wave” tile complying with the following requirements:

1. Composition: Porcelain.
2. Module Size: Varies. Refer to Finish Schedule
3. Thickness: 5/16 inch.
4. Colors: As noted on finish schedule.
5. Pattern and Borders: Contrasting color patterns and borders as directed by the Architect

B. Trim Units: Provide tile trim units to match color and characteristics of adjoining flat tile and to comply with the following requirements:
1. Size: As indicated, coordinated with sizes and coursing of adjoining flat tile where applicable.
2. Shapes: As follows, selected from manufacturer's standard shapes:
   a. Round Incorner Base for Thin-Set Mortar Installations: Coved.
   b. 2x8 bullnose where specified on Finish Schedule.
   c. Wainscot Cap for Thin-Set Mortar Installations: Stainless steel trim.
   d. External Corners for Thin-Set Mortar Installations: Stainless steel trim.
   e. Internal Corners: Field-butted square corners, except with coved base and cap angle pieces designed to member with stretcher shapes.

2.4 STONE THRESHOLDS

A. General: Provide stone thresholds that are uniform in color and finish, fabricated to sizes and profiles indicated to provide transition between tile surfaces and adjoining finished floor surfaces.
1. Fabricate thresholds to heights indicated, but not more than 1/2 inch above adjoining finished floor surfaces, with transition edges beveled on a slope of no greater than 1:2.

B. Marble Thresholds: Provide marble thresholds complying with ASTM C 503 requirements for exterior use and with a minimum abrasive-hardness value of 10 per ASTM C 241.
1. As selected from manufacturer’s standard colors and finishes.

2.5 SETTING MATERIALS

A. Organic Adhesive: ANSI A136.1, Type I as recommended by manufacturer.

B. Tile Setting Adhesive: Elastomeric, waterproof, liquid applied.

2.6 GROUTING MATERIALS

A. Dry-Set Grout: ANSI A118.6, color as selected from the manufacturer’s standard range of colors.

2.7 ELASTOMERIC SEALANTS

A. General: Provide manufacturer's standard chemically curing, elastomeric sealants of base polymer and characteristics indicated that comply with applicable requirements of Division 7 Section "Joint Sealants."

B. Colors: Provide colors of exposed sealants to match colors of grout in tile adjoining sealed joints, unless otherwise indicated.

C. Walls: One-Part, Mildew-Resistant Silicone Sealant: ASTM C 920; Type S; Grade NS; Class 25; Uses NT, G, A, and, as applicable to nonporous joint substrates indicated, O; formulated with fungicide, intended for sealing interior ceramic tile joints and other nonporous substrates that are subject to in-service exposures of high humidity and temperature extremes.

D. Floors: Multipart, Pourable Urethane Sealant for Use T: ASTM C 920; Type M; Grade P; Class 25; Uses T, M, A, and, as applicable to joint substrates indicated, O.

E. Available Products: Subject to compliance with requirements, products which may be incorporated into the Work include, but are not limited to, the following:
   1. One-Part, Mildew-Resistant Silicone Sealants:
      a. Dow Corning 786; Dow Corning Corporation.
      b. Sanitary 1700; GE Silicones.
      c. Pecora 898 Sanitary Silicone Sealant; Pecora Corp.
      d. Rhodorsil 6B White; Rhone-Poulenc, Inc.
      e. Tremsil 600 White; Tremco, Inc.
   2. Multipart, Pourable Urethane Sealants:
      a. Chem-Calk 550; Bostik.
      b. Vulkem 245; Mameco International, Inc.
      c. NR-200 Urexpan; Pecora Corp.
      d. THC-900; Tremco, Inc.

2.8 MISCELLANEOUS MATERIALS

A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland-cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.

B. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.

2.9 MIXING MORTARS AND GROUT

A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.

B. Add materials, water, and additives in accurate proportions.

C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

2.10 FINISHING AND EDGE PROTECTION FOR WALLS

A. Install stainless steel edge trim at horizontal and vertical corners of tile installations. Profiles for each location to be selected by Architect.

B. Basis of Design: Schluter Systems, Plattsburgh, N.Y.
1. Bullnose
2. Straight profile with anchoring leg
3. Rounded outer corner with anchoring leg

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile.
1. Verify that substrates for setting tile are firm; dry; clean; free from oil, waxy films, and curing compounds; and within flatness tolerances required by referenced ANSI A108 series of tile installation standards for installations indicated.
2. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed before installing tile.
3. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust latter in consultation with Architect.

B. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Remove coatings, including curing compounds, and other substances that contain soap, wax, oil, or silicone and are incompatible with tile-setting materials by using a terrazzo or concrete grinder, a drum sander, or a polishing machine equipped with a heavy-duty wire brush.

B. Provide concrete substrates for tile floors installed with dry-set or latex-portland cement mortars that comply with flatness tolerances specified in referenced ANSI A108 series of tile installation standards for installations indicated.
   1. Use trowelable leveling and patching compounds per tile-setting material manufacturer's written instructions to fill cracks, holes, and depressions.
   2. Remove protrusions, bumps, and ridges by sanding or grinding.

C. Blending: For tile exhibiting color variations within the ranges selected during Sample submittals, verify that tile has been blended in the factory and packaged so tile units taken from one package show the same range in colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

3.3 INSTALLATION, GENERAL

A. ANSI Tile Installation Standards: Comply with parts of ANSI A108 series of tile installation standards in "Specifications for Installation of Ceramic Tile" that apply to types of setting and grouting materials and to methods indicated.

B. TCA Installation Guidelines: TCA's "Handbook for Ceramic Tile Installation." Comply with required TCA installation methods.

C. Extend tile work into recesses and under or behind equipment and fixtures to form a complete covering without interruptions, unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.

D. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.

E. Jointing Pattern: Lay tile in grid pattern, unless otherwise indicated. Align joints when adjoining tiles on floor, base, walls, and trim are the same size. Lay out tile work and center tile fields in both directions in each space or on each wall area. Adjust to minimize tile cutting. Provide uniform joint widths, unless otherwise indicated.
   1. For tile mounted in sheets (if any), make joints between tile sheets the same width as joints within tile sheets so joints between sheets are not apparent in finished work.

F. Lay out tile wainscots to next full tile beyond dimensions indicated.

G. Expansion Joints: Locate expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.
   1. Locate joints in tile surfaces directly above joints in concrete substrates.

H. Grout tile to comply with the requirements of the following tile installation standards:

1. For ceramic tile grouts (sand-portland cement, dry-set, commercial portland cement, and latex-portland cement grouts), comply with ANSI A108.10.

3.4 WALL TILE INSTALLATION

A. Install types of tile designated for wall installations to comply with TCA installation methods and ANSI setting-bed standards.

B. Joint Widths: Install tile on walls with the following joint widths:
   1. Ceramic Mosaic Tile: 1/16 inch.
   2. Wall Tile: 1/16 inch.

3.5 EDGE PROTECTION INSTALLATION FOR WALLS

A. Install as per manufacturer’s instructions as an integral component during wall tile installation.

3.6 CLEANING AND PROTECTING

A. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.
   1. Remove latex-portland cement grout residue from tile as soon as possible.
   2. Unglazed tile may be cleaned with acid solutions only when permitted by tile and grout manufacturer's written instructions, but no sooner than 10 days after installation. Protect metal surfaces, cast iron, and vitreous plumbing fixtures from effects of acid cleaning. Flush surface with clean water before and after cleaning.

B. Finished Tile Work: Leave finished installation clean and free of cracked, chipped, broken, unbonded, and otherwise defective tile work.

C. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer that ensure tile is without damage or deterioration at the time of Substantial Completion.
   1. When recommended by tile manufacturer, apply a protective coat of neutral protective cleaner to completed tile walls and floors. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear.
   2. Prohibit foot and wheel traffic from tiled floors for at least 7 days after grouting is completed.

D. Before final inspection, remove any cleaner from tile surfaces.

3.7 WASTE MANAGEMENT

A. Coordinate with Section 01 74 19.

   1. Separate and recycle cut-offs and waste materials and material packaging in accordance with Waste Management Plan and to the maximum extent economically feasible and place in designated areas for recycling.

2. Set aside and protect materials suitable for reuse and/or remanufacturing.
3. Separate and fold up metal banding; flatten and place along with other scrap for recycling.

END OF SECTION 09 30 13

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

Drawings and general conditions of Contract, including General and Supplementary Conditions and Divisions-1 Specification sections apply to work of this section.

1.2 SUMMARY

A. Section Includes

1. Acoustical ceiling panels
2. Exposed grid suspension system
3. Wire hangers, fasteners, main runners, cross tees, and wall angle moldings
4. Perimeter Trim

B. Related Selections

1. Section 09 51 00 - Acoustical Ceilings
2. Section 09 53 00 - Acoustical Ceiling Suspension Assemblies
3. Section 09 20 00 - Plaster and Gypsum Board
4. Section 02 42 00 - Removal and Salvage of Construction Materials
5. Divisions 23 - HVAC Air Distribution
7. Division 26 - Electrical

C. Alternates

1. Prior Approval: Unless otherwise provided for in the Contract documents, proposed product substitutions may be submitted no later than TEN (10) working days prior to the date established for receipt of bids. Acceptability of a proposed substitution is contingent upon the Architect's review of the proposal for acceptability and approved products will be set forth by the Addenda. If included in a Bid are substitute products that have not been approved by Addenda, the specified products shall be provided without additional compensation.

2. Submittals that do not provide adequate data for the product evaluation will not be considered. The proposed substitution must meet all requirements of this section, including but not necessarily limited to, the following: Single source materials suppliers (if specified in Section 1.5); Underwriters' Laboratories Classified Acoustical performance; Panel design, size, composition, color, and finish; Suspension system component profiles and sizes; Compliance with the referenced standards.

1.3 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. ASTM A 1008 Standard Specification for Steel, Sheet, Cold Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability
2. ASTM A 641 Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire

3. ASTM A 653 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process
4. ASTM C 423 Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method
5. ASTM C 635 Standard Specification for Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings
6. ASTM C 636 Recommended Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels
7. ASTM D 3273 Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber
8. ASTM E 84 Standard Test Method for Surface Burning Characteristics of Building Materials
9. ASTM E 119 Standard Test Methods for Fire Tests of Building Construction and Material

A. Armstrong Fire Guard Products

10. ASTM E 580 Installation of Metal Suspension Systems in Areas Requiring Moderate Seismic Restraint
11. ASTM E 1111 Standard Test Method for Measuring the Interzone Attenuation of Ceilings Systems
12. ASTM E 1414 Standard Test Method for Airborne Sound Attenuation Between Rooms Sharing a Common Ceiling Plenum
13. ASTM E 1264 Classification for Acoustical Ceiling Products

B. International Building Code

C. ASHRAE Standard 62.1-2004, Ventilation for Acceptable Indoor Air Quality

D. NFPA 70 National Electrical Code

E. ASCE 7 American Society of Civil Engineers, Minimum Design Loads for Buildings and Other Structures

F. International Code Council-Evaluation Services - AC 156 Acceptance Criteria for Seismic Qualification Testing of Non-structural Components

G. International Code Council-Evaluation Services Report - Seismic Engineer Report

1. ESR 1308 - Armstrong Suspension Systems

H. International Association of Plumbing and Mechanical Officials - Seismic Engineer Report

1. 0244 - Armstrong Single Span Suspension System

I. California Department of Public Health CDPH/EHLB Emission Standard Method Version 1.1 2010

J. LEED - Leadership in Energy and Environmental Design is a set of rating systems for the design, construction, operation, and maintenance of green buildings

1.4 SYSTEM DESCRIPTION

Continuous/Wall-to-Wall

1.5 SUBMITTALS

A. Product Data: Submit manufacturer's technical data for each type of acoustical ceiling unit and suspension system required.

B. Samples: Minimum 6 inch x 6 inch samples of specified acoustical panel; 8 inch long samples of exposed wall molding and suspension system, including main runner and 4 foot cross tees.

C. Shop Drawings: Layout and details of acoustical ceilings show locations of items that are to be coordinated with or supported by the ceilings.

D. Certifications: Manufacturer's certifications that products comply with specified requirements, including laboratory reports showing compliance with specified tests and standards. For acoustical performance, each carton of material must carry an approved independent laboratory classification of NRC, CAC, and AC.

E. If the material supplied by the acoustical subcontractor does not have an Underwriter's Laboratory classification of acoustical performance on every carton, subcontractor shall be required to send material from every production run appearing on the job to an independent or NVLAP approved laboratory for testing, at the architect's or owner's discretion. All products not conforming to manufacturer's current published values must be removed, disposed of and replaced with complying product at the expense of the Contractor performing the work.

1.6 QUALITY ASSURANCE

A. Single-Source Responsibility: Provide acoustical panel units and grid components by a single manufacturer.

1. Fire Performance Characteristics: Identify acoustical ceiling components with appropriate markings of applicable testing and inspecting organization.

2. Surface Burning Characteristics: As follows, tested per ASTM E 84 and complying with ASTM E 1264 Classification.

3. Fire Resistance: As follows tested per ASTM E119 and listed in the appropriate floor or roof design in the Underwriters Laboratories Fire Resistance Directory

B. Acoustical Panels: As with other architectural features located at the ceiling, may obstruct or skew the planned fire sprinkler water distribution pattern through possibly delay or accelerate the activation of the sprinkler or fire detection systems by channeling heat from a fire either toward or away from the device. Designers and installers are advised to consult a fire protection engineer, NFPA 13, or their local codes for guidance where automatic fire detection and suppression systems are present.

C. Coordination of Work: Coordinate acoustical ceiling work with installers of related work including, but not limited to building insulation, gypsum board, light fixtures, mechanical systems, electrical systems, and sprinklers.

1.7 DELIVERY, STORAGE AND HANDLING

A. Deliver acoustical ceiling units to project site in original, unopened packages and store them in a fully enclosed space where they will be protected against damage from moisture, direct sunlight, surface contamination, and other causes.

B. Before installing acoustical ceiling units, permit them to reach room temperature and a stabilized moisture content.

C. Handle acoustical ceiling units carefully to avoid chipping edges or damaged units in any way.

1.8 PROJECT CONDITIONS

A. Space Enclosure:

HumiGuard Plus Ceilings: Building areas to receive ceilings shall be free of construction dust and debris. Products with HumiGuard Plus performance and hot dipped galvanized steel, aluminum or stainless steel suspension systems can be installed up to 120°F (49°C) and in spaces before the building is enclosed, where HVAC systems are cycled or not operating. Cannot be used in exterior applications where standing water is present or where moisture will come in direct contact with the ceiling.

1.9 ALTERNATE CONSTRUCTION WASTE DISPOSAL

A. Ceiling material being reclaimed must be kept dry and free from debris

B. Contact the Armstrong Recycle Center a consultant will verify the condition of the material and that it meets the Armstrong requirements for recycling. The Armstrong consultant with provide assistance to facilitate the recycling of the ceiling.

1.10 WARRANTY

A. Acoustical Panel: Submit a written warranty executed by the manufacturer, agreeing to repair or replace panels that fail within the warranty period. Failures include, but are not limited to the following:

1. Acoustical Panels: Sagging and warping

2. Grid System: Rusting and manufacturer's defects

B. Warranty Period:

1. Acoustical panels: Ten (10) years from date of substantial completion.

2. Grid: Ten (10) years from date of substantial completion.

3. Acoustical panels and grid systems with HumiGuard Plus or HumiGuard Max performance supplied by one source manufacturer is Thirty (30) years from date of substantial completion.

C. The Warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under the requirements of the Contract Documents.

1.11 MAINTENANCE

A. Extra Materials: Deliver extra materials to Owner. Furnish extra materials described below that match products installed. Packaged with protective covering for storage and identified with appropriate labels.

1. Acoustical Ceiling Units: Furnish quality of full-size units equal to 5.0 percent of amount installed.

2. Exposed Suspension System Components: Furnish quantity of each exposed suspension component equal to 2.0 percent of amount installed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Ceiling Panels:

1. Hunter Douglas Woodwright Linear Box Series

B. Suspension Systems:

1. Armstrong World Industries, Inc.

C: Perimeter Systems

1. Armstrong World Industries, Inc.

2.2.1 ACOUSTICAL CEILING UNITS

A. Acoustical Panels Type AP

1. Surface Texture: Fine
2. Composition: Fiberglass
3. Color: Per Drawings

4. Size: Per drawings
5. Noise Reduction Coefficient(NRC): ASTM C 423; Classified with UL label on product carton 0.95.
6. Ceiling Attenuation Class (CAC) :
7. Sabin: N/A
8. Articulation Class (AC): ASTM E 1111; 190
9. Flame Spread: ASTM E 1264; Class A (UL)
10. Dimensional Stability: HumiGuard Plus
11. Recycle Content: Post-Consumer - 12% Pre-Consumer Waste - 59%, if possible.

2.3.1 METAL SUSPENSION SYSTEMS

A. Components: Main beams and cross tees, base metal and end detail, fabricated from commercial quality hot dipped galvanized steel complying with ASTM A 653. Main beams and cross tees are double-web steel construction with exposed flange design. Exposed surfaces chemically cleansed, capping pre-finished galvanized steel in baked polyester paint. Main beams and cross tees shall have rotary stitching.

a. Structural Classification: ASTM C 635 Intermediate Duty
b. Color: White and match the actual color of the selected ceiling tile, unless noted otherwise.
c. Acceptable Product: Suprafine XL 9/16" Exposed Tee as manufactured by Armstrong World Industries

B. Attachment Devices: Size for five times design load indicated in ASTM C 635, Table 1, Direct Hung unless otherwise indicated.

C. Wire for Hangers and Ties: ASTM A 641, Class 1 zinc coating, soft annealed, with a yield stress load of at least time three design load, but not less than 12 gauge.

D. Edge Moldings and Trim

PART 3 - EXECUTION

3.1 EXAMINATION

A. Do not proceed with installation until all wet work such as concrete, terrazzo, plastering and painting has been completed and thoroughly dried out, unless expressly permitted by manufacturer's printed recommendations. (Exception: HumiGuard Max Ceilings)

3.2 PREPARATION

A. Measure each ceiling area and establish layout of acoustical units to balance border widths at opposite edges of each ceiling. Avoid use of less than half width units at borders, and comply with reflected ceiling plans. Coordinate panel layout with mechanical and electrical fixtures.

B. Coordination: Furnish layouts for preset inserts, clips, and other ceiling anchors whose installation is specified in other sections.

1. Furnish concrete inserts and similar devices to other trades for installation well in advance of time needed for coordination of other work.

3.3 INSTALLATION

A. Follow manufacturer installation instructions.

B. Install suspension system and panels in accordance with the manufacturer's instructions, and in compliance with ASTM C 636 and with the authorities having jurisdiction.

C. Suspend main beam from overhead construction with hanger wires spaced 4-0 on center along the length of the main runner. Install hanger wires plumb and straight.

D. Install wall moldings at intersection of suspended ceiling and vertical surfaces. Miter corners where wall moldings intersect or install corner caps.

E. For reveal edge panels: Cut and reveal or rabbet edges of ceiling panels at border areas and vertical surfaces.

F. Install acoustical panels in coordination with suspended system, with edges resting on flanges of main runner and cross tees. Cut and fit panels neatly against abutting surfaces. Support edges by wall moldings.

3.4 ADJUSTING AND CLEANING

A. Replace damaged and broken panels.

B. Clean exposed surfaces of acoustical ceilings, including trim, edge moldings, and suspension members. Comply with manufacturer's instructions for cleaning and touch up of minor finish damage. Remove any ceiling products that cannot be successfully cleaned and or repaired. Replace with attic stock or new product to eliminate evidence of damage.

C. Before disposing of ceilings, contact the Armstrong Recycling Center at 877-276-7876, select option #1 then #8 to review with a consultant the condition and location of building where the ceilings will be removed. The consultant will verify the condition of the material and that it meets the Armstrong requirements for recycling. The Armstrong consultant with provide assistance to facilitate the recycle of the ceiling.

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SECTION 09 51 23 - ACOUSTICAL CEILING TILES

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. This section includes the performance criteria, materials, production, and erection of continuous/wall-to-wall acoustical tile ceilings for the project. The work performed under this Section consists of the provision of all plant, materials, labor and equipment and the like necessary and/or required for the complete execution of all acoustical tile ceilings as required by the this section, schedules, keynotes and drawings, including, but not limited to the following:

1. Acoustical tiles for ceilings.
2. Exposed grid suspension systems.
3. Wire hangers, fasteners, main runners, cross tees, and wall angle moldings.
4. Perimeter trim

1.3 PRE-INSTALLATION MEETINGS

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

1.4 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.

D. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of size indicated below.

1. Acoustical Tile: Set of full-size Samples of each type, color, pattern, and texture.
2. Concealed Suspension-System Members: 6-inch- (150-mm-) long Sample of each type.
3. Exposed Moldings and Trim: Set of 6-inch- (150-mm-) long Samples of each type and color.

1.5 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. Ceiling suspension-system members.
2. Method of attaching hangers to building structure.

a. Furnish layouts for cast-in-place anchors, clips, and other ceiling attachment devices whose installation is specified in other Sections.

3. Size and location of initial access modules for acoustical tile.
4. Ceiling-mounted items including lighting fixtures, diffusers, grilles, speakers, sprinklers, access panels, and special moldings.
5. Minimum Drawing Scale: 1/8 inch = 1 foot (1:96).

B. Qualification Data: For testing agency.

C. Product Test Reports: For each acoustical tile ceiling, for tests performed by manufacturer and witnessed by a qualified testing agency.

D. Evaluation Reports: For each acoustical tile ceiling suspension system and anchor and fastener type, from ICC-ES.

E. Field quality-control reports.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For finishes to include in maintenance manuals.

1.7 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Acoustical Ceiling Units: Full-size tiles equal to **2** percent of quantity installed.
2. Suspension-System Components: Quantity of each concealed grid and exposed component equal to **2** percent of quantity installed.

1.8 QUALITY ASSURANCE

A. Testing Agency Qualifications: Qualified according to the National Voluntary Laboratory Accreditation Program (NVLAP) for testing indicated.

B. Single-Source Responsibility: Provide acoustical panel units and grid components by a single manufacturer.

C. Acoustical Panels: As with other architectural features located at the ceiling, may obstruct or skew the planned fire sprinkler water distribution pattern through possibly delay or accelerate the activation of the sprinkler or fire detection systems by channeling heat from a fire either toward or away from the device. Designers and installers are advised to consult a fire protection engineer, NFPA 13, or their local codes for guidance where automatic fire detection and suppression systems are present.

D. Coordination of Work: Coordinate acoustical ceiling work with installers of related work including, but not limited to building insulation, gypsum board, light fixtures, mechanical systems, electrical systems, and sprinklers.

E. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Build mockup of typical ceiling area as shown on Drawings.
2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver acoustical tiles, 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 tiles, permit them to reach room temperature and a stabilized moisture content.

C. Handle acoustical tiles carefully to avoid chipping edges or damaging units in any way.

1.10 WARRANTY

A. Acoustical Panel: Submit a written warranty executed by the manufacturer, agreeing to repair or replace panels that fail within the warranty period. Failures include, but are not limited to the following:
1. Acoustical Panels: Sagging and warping
2. Grid System: Rusting and manufacturer's defects
3.

B. Warranty Period:
1. Acoustical panels: Ten (10) years from date of substantial completion.
2. Grid: Ten (10) years from date of substantial completion.
3. Acoustical panels and grid systems with HumiGuard Plus or HumiGuard Max performance supplied by one source manufacturer is Thirty (30) years from date of substantial completion.

C. The Warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under the requirements of the Contract Documents.

1.11 FIELD CONDITIONS

A. Environmental Limitations: Do not install acoustical tile ceilings until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

1. Pressurized Plenums: Operate ventilation system for not less than 48 hours before beginning acoustical tile ceiling installation.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Seismic Performance: Acoustical ceiling shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

1. Design and size components to withstand seismic loads in accordance with the minimum established by ASTM C636.

B. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Flame-Spread Index: Comply with ASTM E 1264 for Class A materials.
2. Smoke-Developed Index: 50 or less.

C. Fire-Resistance Ratings: Comply with ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

2.2 ACOUSTICAL TILES, GENERAL

A. Source Limitations: Obtain each type of acoustical ceiling tile and supporting suspension system from single source from single manufacturer.

B. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent (refer to specific acoustic tile).

C. Acoustical Tile Standard: Provide manufacturer's standard tiles of configuration indicated that comply with ASTM E 1264 classifications as designated by types, patterns, acoustical ratings, and light reflectances unless otherwise indicated.

1. Mounting Method for Measuring NRC: Type E-400; plenum mounting in which face of test specimen is 15-3/4 inches (400 mm) away from test surface according to ASTM E 795.

D. Acoustical Tile Colors and Patterns: Match appearance characteristics indicated for each product type.

1. Where appearance characteristics of acoustical tiles are indicated by referencing pattern designations in ASTM E 1264 and not manufacturers' proprietary product designations, provide products selected by Architect from each manufacturer's full range that comply with requirements indicated for type, pattern, color, light reflectance, acoustical performance, edge detail, and size.

E. Provide glass-fiber based panels made with binder containing no urea formaldehyde.

2.3 ACOUSTICAL TILES

A. Basis-of-Design Product: Subject to compliance with requirements, provide Armstrong Industries products as indicated on Drawings or comparable product by one of the following:
1. CertainTeed Corp.
2. USG Interiors, Inc.; Subsidiary of USG Corporation.

B. ACT-1: Armstrong Optima Tegular, 3257 (Classrooms/Corridors or as indicated in drawings)
1. Surface Texture: Fine.
2. Composition: Fiberglass.
3. Color: White.
4. Size: 24IN x 48IN
5. Edge Profile: Square Tegular 9/16IN for interface with Suprafine XL 9/16" Exposed Tee grid.
6. Noise Reduction Coefficient(NRC): ASTM C 423; Classified with UL label on product carton 0.95.
7. Ceiling Attenuation Class (CAC)
8. Sabin: N/A
9. Articulation Class (AC): ASTM E 1111; 190.
10. Flame Spread: ASTM E 1264; Class A (UL).
11. Light Reflectance White Panel: ASTM E 1477; 0.90.
12. Dimensional Stability: HumiGuard Plus.
13. Recycle Content: Post-Consumer - 12% Pre-Consumer Waste - 59%.

C. ACT-2: Armstrong Cirrus High NRC, 565 (As indicated in drawings)
1. Surface Texture: Medium.
2. Composition: Mineral Fiber
3. Color: White.
4. Size: 24IN x 48IN
5. Edge Profile: Square Lay-In for interface with AL Prelude 15/16” Exposed Tee grid.
6. Noise Reduction Coefficient(NRC): ASTM C 423; Classified with UL label on product carton 0.75.
7. Ceiling Attenuation Class (CAC) ASTM C 1414; Classified with UL label (class A) on product carton; minimum rating = 35
8. Sabin: N/A
9. Articulation Class (AC): ASTM E 1111; 190.

10. Flame Spread: ASTM E 1264; Class A (UL).
11. Light Reflectance White Panel: ASTM E 1477; 0.86.
12. Dimensional Stability: HumiGuard Plus.
13. Anti Mold/ Mildew & Bacteria: Totally inorganic product
14. Recycle Content: 67%

D. ACT-3: Armstrong Formations Curves Cloud Kits, (As indicated in drawings)
1. Tile: Armstrong Ultima 2x2
2. Surface Texture: Medium.
3. Composition: Mineral Fiber
4. Color: White.
5. Size: Varies. Refer to drawings.
6. Edge Profile: Square Lay-In for interface with AL Prelude 15/16” Exposed Tee grid.
7. Suspension System and trim colors: 3 colors (Mist, Pacific & Rainstorm)
8. Axiom Trim: Vector for Formations 2”
9. Ceiling Attenuation Class (CAC) ASTM C 1414; Classified with UL label (class A) on product carton; minimum rating = 35
10. Sabin: N/A
11. Articulation Class (AC): ASTM E 1111; 190.
12. Flame Spread: ASTM E 1264; Class A (UL).
13. Light Reflectance White Panel: ASTM E 1477; 0.86.
14. Dimensional Stability: HumiGuard Plus.

2.4 METAL SUSPENSION SYSTEMS, GENERAL

A. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

B. Metal Suspension-System Standard: Provide manufacturer's standard metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable requirements in ASTM C 635/C 635M.

C. Wire Hangers, Braces, and Ties: Provide wires complying with the following requirements:

1. Zinc-Coated, Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
2. Size: Select wire diameter so its stress at three times hanger design load (ASTM C 635/C 635M, Table 1, "Direct Hung") will be less than yield stress of wire, but provide not less than 0.135-inch- (3.5-mm-) diameter wire.

D. Flat Hangers: Mild steel, zinc coated or protected with rust-inhibitive paint.

E. Angle Hangers: Angles with legs not less than 7/8 inch (22 mm) wide; formed with 0.04-inch- (1-mm-) thick, galvanized-steel sheet complying with ASTM A 653/A 653M, G90 (Z275) coating designation; with bolted connections and 5/16-inch- (8-mm-) diameter bolts.

F. Seismic Struts: Manufacturer's standard compression struts designed to accommodate lateral forces.

G. Seismic Clips: Manufacturer's standard seismic clips designed and spaced to secure acoustical tiles in-place.

2.5 METAL SUSPENSION SYSTEM

A. Basis-of-Design Product: Subject to compliance with requirements, Armstrong product or provide comparable product by one of the following:

1. Armstrong World Industries, Inc.
2. USG Interiors, Inc.; Subsidiary of USG Corporation.

B. Pair suspension systems with the following ACT and ATC types:
1. ACT-1: 9/16 inch Suprafine XL.
2. ACT-2: AL Prelude 15/16” Exposed Tee grid.
3. ACT-3: AL Prelude 15/16” Exposed Tee grid.

C. Direct-Hung, Double-Web Suspension System Components: Main beams and cross tees, base metal and end detail, fabricated from commercial quality hot dipped galvanized steel complying with ASTM A 653. Main beams and cross tees are double-web steel construction with exposed flange design. Exposed surfaces chemically cleansed, capping prefinished galvanized steel in baked polyester paint. Main beams and cross tees shall have rotary stitching.
   a. Structural Classification: ASTM C 635 Intermediate Duty
   b. Color: White and match the actual color of the selected ceiling tile, unless noted otherwise.
   c. Acceptable Product: Suprafine XL 9/16" Exposed Tee as manufactured by Armstrong World Industries

D. Attachment Devices: Size for five times design load indicated in ASTM C 635, Table 1, Direct Hung unless otherwise indicated.

E. Wire for Hangers and Ties: ASTM A 641, Class 1 zinc coating, soft annealed, with a yield stress load of at least time three design load, but not less than 12 gauge.
   1. Access: Upward and end pivoted or side pivoted, with initial access openings of size indicated below and located throughout ceiling within each module formed by main and cross runners, with additional access available by progressively removing remaining acoustical tiles.

2.6 METAL EDGE MOLDINGS AND TRIM

A. Manufacturers – Basis of Design: Subject to compliance with requirements, Armstrong product or provide comparable product by one of the following:
   1. USG Interiors, Inc.; Subsidiary of USG Corporation.

B. Products – 2” Axiom trim, or equal

C. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations complying with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension-system runners.

1. Provide manufacturer's standard edge moldings that fit acoustical tile edge details and suspension systems indicated and that match width and configuration of exposed runners unless otherwise indicated.
2. For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.

2.7 ACOUSTICAL SEALANT

A. Products: Subject to compliance with requirements, provide one of the following:

1. Acoustical Sealant for Exposed and Concealed Joints:

a. Pecora Corporation; AC-20 FTR Acoustical and Insulation Sealant.
b. USG Corporation; SHEETROCK Acoustical Sealant.

2. Acoustical Sealant for Concealed Joints:

a. Henkel Corporation; OSI Sealants Pro-Series SC-175 Rubber Base Sound Sealant.
b. Pecora Corporation; AIS-919.
c. Tremco, Inc.; Tremco Acoustical Sealant.

B. Acoustical Sealant: Manufacturer's standard sealant complying with ASTM C 834 and effective in reducing airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.

1. Exposed and Concealed Joints: Nonsag, paintable, nonstaining latex sealant.
2. Concealed Joints: Nondrying, nonhardening, nonskinning, nonstaining, gunnable, synthetic-rubber sealant.
3. Acoustical sealant shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.8 MISCELLANEOUS MATERIALS

A. Acoustical Tile Adhesive: Type recommended by acoustical tile manufacturer, bearing UL label for Class 0-25 flame spread.

1. Adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

B. Staples: 5/16-inch- (8-mm-) long, divergent-point staples.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, including structural framing and substrates to which acoustical tile ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine acoustical tiles before installation. Reject acoustical tiles that are wet, moisture damaged, or mold damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Testing Substrates: Before installing adhesively applied tiles on wet-placed substrates such as cast-in-place concrete or plaster, test and verify that moisture level is below tile manufacturer's recommended limits.

B. Measure each ceiling area and establish layout of acoustical tiles to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width tiles at borders, and comply with layout shown on reflected ceiling plans.

3.3 INSTALLATION OF SUSPENDED ACOUSTICAL TILE CEILINGS

A. General: Install acoustical panel 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. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
3. 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.
4. 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.
5. 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.

6. 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.
7. 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.
8. Do not attach hangers to steel deck tabs.
9. Do not attach hangers to steel roof deck. Attach hangers to structural members.
10. 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.
11. 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 tile ceiling area and where necessary to conceal edges of acoustical tiles.

1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
2. 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.
3. 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. Arrange directionally patterned acoustical tiles as follows:

1. As indicated on reflected ceiling plans.

G. Install acoustical tiles in coordination with suspension system and exposed moldings and trim. Place splines or suspension-system flanges into kerfed edges so tile-to-tile joints are closed by double lap of material.

1. Fit adjoining tile to form flush, tight joints. Scribe and cut tile for accurate fit at borders and around penetrations through tile.
2. Hold tile field in compression by inserting leaf-type, spring-steel spacers between tile and moldings, spaced 12 inches (305 mm) o.c.
3. Protect lighting fixtures and air ducts to comply with requirements indicated for fire-resistance-rated assembly.

3.4 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a qualified special inspector to perform the following special inspections:

1. Compliance of seismic design.

B. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections and prepare test reports.

C. Perform the following tests and inspections of completed installations of acoustical tile ceiling hangers and anchors and fasteners in successive stages and when installation of ceiling suspension systems on each floor has reached 20 percent completion but no tiles have been installed. Do not proceed with installations of acoustical tile ceiling hangers for the next area until test results for previously completed installations of acoustical tile ceiling hangers show compliance with requirements.

1. Within each test area, testing agency will select one of every 10 power-actuated fasteners and postinstalled anchors used to attach hangers to concrete and will test them for 200 lbf (890 N) of tension; it will also select one of every two postinstalled anchors used to attach bracing wires to concrete and will test them for 440 lbf (1957 N) of tension.
2. When testing discovers fasteners and anchors that do not comply with requirements, testing agency will test those anchors not previously tested until 20 pass consecutively and then will resume initial testing frequency.

D. Acoustical tile ceiling hangers and anchors and fasteners will be considered defective if they do not pass tests and inspections.

E. Prepare test and inspection reports.

3.5 CLEANING

A. Clean exposed surfaces of acoustical tile ceilings, including trim and edge moldings. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage. Remove and replace tiles and other ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

3.6 WASTE MANAGEMENT

A. Coordinate with Section 01 74 19.

1. Separate and recycle cut-offs and waste materials and material packaging in accordance with Waste Management Plan and to the maximum extent economically feasible and place in designated areas for recycling.
2. Set aside and protect materials suitable for reuse and/or remanufacturing.
3. Separate and fold up metal banding; flatten and place along with other metal scrap for recycling in designated area.

END OF SECTION 09 51 23

SECTION 09 65 13 - RESILIENT BASE 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. This section includes the performance criteria, materials, production, and erection of resilient base and accessories for the project. The work performed under this Section consists of the provision of all plant, materials, labor and equipment and the like necessary and/or required for the complete execution of all resilient base and accessories as required by this section, schedules, keynotes and drawings, including, but not limited to the following:

1. Resilient base.
2. Resilient molding accessories.

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, not less than 12 inches (300 mm) long.

C. Samples for Initial Selection: For each type of product indicated.

D. Samples for Verification: For each type of product indicated and for each color, texture, and pattern required in manufacturer's standard-size Samples, but not less than 12 inches (300 mm) long.

E. Product Schedule: For resilient base and accessory products. Use same designations indicated on Drawings.

1.4 MAINTENANCE MATERIAL SUBMITTALS

A. No extra material to be purchased for purpose of attic stock. All left over material from construction to constitute attic stock – store, maintain and protect accordingly. Package with protective covering for storage and identified with labels describing contents.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F (10 deg C) or more than 90 deg F (32 deg C).

1.6 FIELD CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F (21 deg C) or more than 95 deg F (35 deg C), in spaces to receive resilient products during the following time periods:

1. 48 hours before installation.
2. During installation.
3. 48 hours after installation.

B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F (13 deg C) or more than 95 deg F (35 deg C).

C. Install resilient products after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. FloorScore Compliance: Resilient base shall comply with requirements of FloorScore certification.

2.2 THERMOPLASTIC-RUBBER BASE

A. Basis of Design: Subject to compliance with requirements, provide Tarkett; Baseworks 4 ” **or** comparable products by one of the following:

1. Mannington
2. Armstrong World Industries, Inc.
3. Burke Mercer Flooring Products, Division of Burke Industries Inc.
4. Flexco.
5. Mondo Rubber International, Inc.
6. Nora Systems, Inc.
7. Roppe Corporation, USA.
8. VPI, LLC, Floor Products Division.

B. Product Standard: Tarkett Baseworks Cove Base.

1. Group: I (solid, homogeneous).
2. Style and Location:

1) Profile: 4” Cove

C. Thickness: 5/16"(7.94 mm).

D. Height: 4 "

E. Lengths: Length shall not be less than 1/3 of the length of a wall but not less than 3’-0 whichever is longer.

F. Outside Corners: Pre-Mitered.

G. Inside Corners: Pre-Mitered.

H. Colors: Black See Drawings

2.3 RUBBER MOLDING ACCESSORY

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Tarkett
2. Mannington
3. Roppe Corporation, USA.
4. VPI, LLC, Floor Products Division.

B. Description: Rubber cap for cove carpet; cap for cove resilient flooring; carpet bar for tackless installations; carpet edge for glue-down applications; nosing for carpet; nosing for resilient flooring; reducer strip for resilient flooring; joiner for tile and carpet; transition strips.

C. Profile and Dimensions: As indicated.

D. Locations: Provide rubber molding accessories in areas indicated.

E. Colors and Patterns: As selected by Architect from full range of industry colors.

2.4 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by resilient-product manufacturer for applications indicated.

B. Adhesives: Water-resistant type recommended by resilient-product manufacturer for resilient products and substrate conditions indicated.

1. Adhesives shall have a VOC content of 50 g/L or less except that adhesive for rubber stair treads shall have a VOC content of 60 g/L or less.

C. Metal Edge Strips: Extruded aluminum with mill finish of width shown, of height required to protect exposed edges of flooring, and in maximum available lengths to minimize running joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

1. Installation of resilient products indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.

B. Concrete Substrates for Resilient Stair Accessories: Prepare horizontal surfaces according to ASTM F 710.

1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
3. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 9 pH.
4. Moisture Testing: Proceed with installation only after substrates pass testing according to manufacturer's written recommendations, but not less stringent than the following:

    a. Perform anhydrous calcium chloride test according to ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m) in 24 hours.
    b. Perform relative humidity test using in situ probes according to ASTM F 2170. Proceed with installation only after substrates have maximum 75 percent relative humidity level.

C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.

D. Do not install resilient products until they are the same temperature as the space where they are to be installed.

1. At least 48 hours in advance of installation, move resilient products and installation materials into spaces where they will be installed.

E. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient products.

3.3 RESILIENT BASE INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient base.

B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.

C. Install resilient base in lengths as long as practical without gaps at seams and with tops of adjacent pieces aligned.

D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.

E. Do not stretch resilient base during installation.

F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.

G. Preformed Corners: Install preformed corners before installing straight pieces.

H. Job-Formed Corners:

1. Outside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches (76 mm) in length.

    a. Form without producing discoloration (whitening) at bends.

2. Inside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches (76 mm) in length.

    a. Miter or cope corners to minimize open joints.

3.4 RESILIENT ACCESSORY INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient accessories.

B. Resilient Stair Accessories:

1. Use stair-tread-nose filler to fill nosing substrates that do not conform to tread contours.
2. Tightly adhere to substrates throughout length of each piece.
3. For treads installed as separate, equal-length units, install to produce a flush joint between units.

C. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of floor covering that would otherwise be exposed.

3.5 CLEANING AND PROTECTION

A. Comply with manufacturer's written instructions for cleaning and protecting resilient products.

B. Perform the following operations immediately after completing resilient-product installation:

1. Remove adhesive and other blemishes from exposed surfaces.
2. Sweep and vacuum horizontal surfaces thoroughly.
3. Damp-mop horizontal surfaces to remove marks and soil.

C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

D. Cover resilient products subject to wear and foot traffic until Substantial Completion.

3.6 WASTE MANAGEMENT

A. Coordinate with Section 01 74 19.

1. Separate and recycle cut-offs and waste materials and material packaging in accordance with Waste Management Plan and to the maximum extent economically feasible and place in designated areas for recycling.
2. Set aside and protect materials suitable for reuse and/or remanufacturing.
3. Separate and fold up metal banding; flatten and place along with other scrap for recycling.

END OF SECTION 09 65 13

SECTION 09 65 19 - RESILIENT FLOORING

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. This section includes the performance criteria, materials, production, and erection of resilient tile flooring, and rubber stair treads for the project. The work performed under this Section consists of the provision of all plant, materials, labor and equipment and the like necessary and/or required for the complete execution of all floor tile as required by this section.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples: Full-size units of each color and pattern of floor tile required.

C. Product Schedule: Use same designations indicated on Drawings.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For each type of flooring to include in maintenance manuals.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra material that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Floor tile: Furnish one box for every 50 boxes or a fraction thereof of each type, color and pattern of floor tile installed.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs workers for this Project who are competent in techniques required by manufacturer for floor tile installation and seaming method indicated.

   1. Engage an installer who employs workers for this Project who are trained or certified by floor tile manufacturer for installation techniques required.

B. Fire-Test-Response Characteristics: 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. Critical Radiant Flux: 0.45 W/sq. cm or greater when tested per ASTM E 648.
   2. Smoke Density: Maximum specific optical density of 450 or less when tested per ASTM E 662.

C. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

   1. Build mockups for flooring including resilient base and accessories.

      a. Size: Minimum 100 sq. ft. (9.3 sq. m) for each type, color, and pattern in locations directed by Architect.

   2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
   3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store flooring and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F (10 deg C) or more than 90 deg F (32 deg C). Store floor tiles on flat surfaces.

1.8 FIELD CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F (21 deg C) or more than 95 deg F (35 deg C) in spaces to receive floor tile during the following time periods:

   1. 48 hours before installation.
   2. During installation.
   3. 48 hours after installation.

B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F (13 deg C) or more than 95 deg F (35 deg C).

C. Close spaces to traffic during flooring installation.

D. Close spaces to traffic for 48 hours after flooring installation.

E. Install flooring after other finishing operations, including painting, have been completed.

F. Do not install resilient flooring over concrete slabs until they are sufficiently cured and dry to achieve a bond with the adhesive in accordance with the manufacturer’s recommended bond and moisture tests.

1.9 EXTRA MATERIALS

A. Furnish extra material described below, before installation begins, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Luxury Vinyl Tile: Full size units equal to 10 percent of amount installed for each type indicated but not less than 100 square feet.

PART 2 - PRODUCTS

2.1 RESILIENT VINYL TILE.

A. Vinyl Composition Floor Tile: Products complying with ASTM F 1066.

B. Luxury Vinyl Tile (LVT): Provide vinyl composition floor tile (Composition 1, non-asbestos) complying with the following Available Products; MANNINGTON or approved equal.
   1. Pattern: STRAND, STRUCTURE, GROOVE
   2. Color: PER DRAWINGS
   3. Class: Class 3 (through-pattern tile).
   4. Wearing Surface: Smooth.
   5. Thickness:
   6. Size: PER DRAWINGS

2.2 RESILIENT SHEET FLOORING.

A. Sheet Flooring: Products complying with ASTM F 2034.

B. Linoleum Sheet Flooring: Provide vinyl composition floor tile (Composition 1, non-asbestos) complying with the following Available Products; Forbo Marmoleum or approved equal.
   1. Pattern: Piano
   2. Color: PER DRAWINGS
   3. Class: Class 1 (through-pattern).
   4. Wearing Surface: Smooth.
   5. Thickness:
   6. Size: PER DRAWINGS

2.3 RUBBER TILE FLOORING

A. Resilient rubber athletic flooring.

B. Basis of Design: Subject to compliance with requirements, provide the product indicated on drawings or comparable product to the following:
   1. “Aspire” by PLAE:
      a. Material: Virgin EPDM rubber and recycled SBR rubber.
      b. Composition: Consists of three layers: EPDM rubber wear layer, dense SBR rubber shock absorption layer and footed SBR rubber base layer. Wear layer

provides aesthetic slip resistance surface for maximum safety. SBR layer provide shock absorption and cushioning.
c. Surface: Hammered
d. Back of Tile: Double-sanded smooth
e. Tile Size: 2x2
f. Thickness: 1inch
g. Color: See drawings

2. Source Quality: Obtain recycled rubber resilient flooring materials from a single manufacturer.

2.4 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by floor tile manufacturer for applications indicated.

B. Adhesives: Water-resistant type recommended by manufacturer to suit resilient products and substrate conditions indicated.

C. Edge Strips: Provide resilient transition and/or reducer strips to match flooring, as required to accommodate changes in floor heights and/or materials.

D. Adhesives for Solid Vinyl Tile: As recommended by manufacturer to meet site conditions.
1. Basis of design:
a. Tarkett 800 Pressure Sensitive Adhesive
b. Tarkett 940 Two-Part Polyurethane Adhesive
c. Tarkett 120 SpraySmart Adhesive (up to 7 pounds moisture \ 85% relative humidity and less than 11 pH)

E. Adhesives for Solid Sheet Flooring: As recommended by manufacturer to meet site conditions.
1. Basis of design:
a. Forbo L885
b. Forbo Sustain 1195
c. Forbo Sustain 1299
d. Forbo Sustain 100
e. Forbo 660

F. Floor Polish: Provide protective, liquid floor-polish products recommended by floor tile manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of floor tile.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare substrates according to floor tile manufacturer's written instructions to ensure adhesion of resilient products.

B. Concrete Substrates: Prepare according to manufacturer's written instructions to ensure adhesion of resilient flooring.

1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by floor tile manufacturer. Do not use solvents.
3. Alkalinity and Adhesion Testing: Perform tests recommended by floor tile manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 9 pH.
4. Moisture Testing: Proceed with installation only after substrates pass testing according to floor tile manufacturer's written recommendations, but not less stringent than the following:

    a. Perform anhydrous calcium chloride test according to ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 5 lb of water/1000 sq. ft. in 24 hours.
    b. Perform relative humidity test using in situ probes according to ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level.

C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.

D. For wood subfloors, verify the following:
1. Underlayment over subfloor complies with requirements specified in Division 6 Section "Rough Carpentry."
2. Underlayment surface is free of irregularities and substances that may interfere with adhesive bond, show through surface, or stain flooring.

E. Floor covering shall not be installed over expansion joints.

F. Do not install floor tiles until they are the same temperature as the space where they are to be installed.

1. At least 48 hours in advance of installation, move resilient floor tile and installation materials into spaces where they will be installed.

G. Do not proceed with installation until unsatisfactory conditions have been corrected.

H. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient floor tile.

3.3 FLOOR TILE INSTALLATION

A. Comply with manufacturer's written instructions for installing floor tile.

B. Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so 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.

1. Lay tiles in pattern indicated.

C. Match floor tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.

1. Lay tiles with grain running in one direction in pattern of colors and sizes indicated.

D. Scribe, cut, and fit floor tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.

E. Extend floor tiles into toe spaces, door reveals, closets, and similar openings. Extend floor tiles to center of door openings.

F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent marking device.

G. Install floor tiles on covers for telephone and electrical ducts, building expansion-joint covers, and similar items in finished floor areas. Maintain overall continuity of color and pattern between pieces of tile installed on covers and adjoining tiles. Tightly adhere tile edges to substrates that abut covers and to cover perimeters.

H. Adhere floor tiles to flooring substrates using a full spread of 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.

3.4 CLEANING AND PROTECTION

A. Comply with manufacturer's written instructions for cleaning and protecting floor tile.

B. Perform the following operations immediately after completing floor tile installation:

1. Remove adhesive and other blemishes from exposed surfaces.
2. Sweep and vacuum surfaces thoroughly.
3. Damp-mop surfaces to remove marks and soil.

C. Protect floor tile from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

D. Floor Polish, in areas specified: Remove soil, adhesive, and blemishes from floor tile surfaces before applying liquid floor polish.

1. Apply two coat(s).

E. Cover floor tile until Substantial Completion.

3.5 WASTE MANAGEMENT

A. Coordinate with Section 01 74 19.

1. Separate and recycle cut-offs and waste materials and material packaging in accordance with Waste Management Plan and to the maximum extent economically feasible and place in designated areas for recycling.
2. Set aside and protect materials suitable for reuse and/or remanufacturing.
3. Separate and fold up metal banding; flatten and place along with other scrap for recycling.

END OF SECTION 09 65 19

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SECTION 09 67 23 - RESINOUS FLOORING

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 this Section.

1.2 SUMMARY

A. Definitions: Resinous flooring includes penetrating, moisture tolerant, two-component epoxy primer, a high performance, three-component mortar consisting of epoxy resin, curing agent and selected, graded aggregates blended with inorganic pigments, a two-component, general service epoxy coating and a selected, graded aggregate.

B. Related Work
   1. Division 3 Self Leveling Toppings
   2. Division 7 Section Joint Sealers

1.3 SUBMITTALS

A. Product Data: Submit manufacturer's technical data, installation instructions, and general recommendations for each resinous flooring material required. Include certification indicating compliance of materials with requirements.

B. Samples: Submit, for verification purposes, 4-inch square samples of each type of resinous flooring required, applied to a rigid backing, in color and finish indicated.
   1. For initial selection of colors and finishes, submit manufacturer's color charts showing full range of colors and finishes available.

1.4 QUALITY ASSURANCE

A. Single Source Responsibility: Obtain primary resinous flooring materials including primers, resins, hardening agents, finish or sealing coats from a single manufacturer with not less than ten years of successful experience in manufacturing and installing principal materials described in this section. Contractor shall have completed at least five projects of similar size and complexity; Stonhard, Palma, or approved equal. Provide secondary materials only of type and from source recommended by manufacturer of primary materials.

B. Pre-Installation Conference
   1. General contractor shall arrange a meeting not less than thirty days prior to starting work.
   2. Attendance
      a. General Contractor
      b. Architect/Owner's Representative

c. Manufacturer/Installer's Representative

C. ISO 9002: All materials, including primers, resins, curing agents, finish coats, aggregates and sealants are manufactured and tested under an ISO 9002 registered quality system.

1.5 DELIVERY, STORAGE AND HANDLING

A. Material shall be delivered to job site and checked by flooring contractor for completeness and shipping damage prior to job start.

B. All materials used shall be factory pre-weighed and pre-packaged in single, easy to manage batches to eliminate on site mixing errors. No on site weighing or volumetric measurements allowed.

C. Material shall be stored in a dry, enclosed area protected from exposure to moisture. Temperature of storage area shall be maintained between 60 and 85°F/16 and 30°C.

1.6 PROJECT CONDITIONS

A. Concrete substrate shall be properly cured for a minimum of 30 days. A vapor barrier must be present for concrete subfloors on or below grade, or as indicated based on manufacturer's requirements and slab moisture content. Otherwise, an osmotic pressure resistant grout must be installed prior to the resinous flooring.

B. Utilities, including electric, water, heat (air temperature between 60 and 85°F/16 and 30°C) and finished lighting to be supplied by General Contractor.

C. Job area to be free of other trades during, and for a period of 24 hours, after floor installation.

D. Protection of finished floor from damage by subsequent trades shall be the responsibility of the General Contractor.

1.7 WARRANTY

A. Manufacturer shall furnish a single, written warranty covering both material and workmanship for a period of one (1) full year from date of installation.

PART 2 - PRODUCTS

2.1 COLORS

A. Colors: Per finish schedule

2.2 EPOXY FLOORING & BASE

A. Basis of Design: Dur-A-Flex, Inc., 95 Goodwin Street, East Hartford, CT 06108, Phone: (860) 528-9838, Fax: (860) 528-2802 Or Approved Equal

B. System Materials:
   a. Primer: Dur-A-Flex, Inc, Dur-A-Glaze #4 WB resin and hardener.
   b. First Broadcast Coat: Dur-A-Flex, Inc, Dur-A-Gard OPF resin and hardener.
      i. Chips: Dur-A-Flex, Inc. Macro Decorative Colored Chips.
   c. Second Broadcast and Grout Coat: Dur-A-Flex, Inc. Dur-A-Glaze #4 resin and Water Clear hardener.
      ii. Chips: Dur-A-Flex, Inc. Macro Decorative Colored Chips.
   d. Grout coat: Dur-A-Flex, Inc. Dur-A-Glaze #4 resin and Water Clear hardener.
   e. Topcoat: Dur-A-Flex, Inc. Armor Top resin, hardener and grit.

C. Patch Materials
   a. Shallow Fill and Patching: Use Dur-A-Flex, Inc. Dur-A-Glaze #4 Cove Rez.
   b. Deep Fill and Sloping Material (over ¼ inch): Use Dur-A-Flex, Inc. Dur-A-Crete.

D. PRODUCT REQUIREMNTS:

1. Physical Properties: Provide flooring system in which physical properties of topping including aggregate, when tested in accordance with standards or procedures referenced below, are as follows:

A. Primer	Dur-A-Glaze #4 WB
1. Percent Solids	56 %
2. VOC	2 g/L
3. Bond Strength to Concrete ASTM D 4541	550 psi, substrates fails
4. Hardness, ASTM D 3363	3H
5. Elongation, ASTM D 2370	9 %
6. Flexibility (1/4: Cylindrical mandrel), ASTM D 1737	Pass
7. Impact Resistance, MIL D-2794	>160
6. Abrasion Resistance ASTM D 4060, CS 17 wheel, 1,000 g Load	30 mg loss

B. Broadcast Coat	Dur-A-Gard OPF
1. Percent Solids	100 %
2. VOC	59 g/L
3. Compressive Strength, ASTM D 695	16,000 psi
4. Tensile Strength, ASTM D 638	3,800 psi
5. Flexural Strength, ASTM D 790	4,000 psi
6. Abrasion Resistance, ASTM D 4060 C-10 Wheel, 1,000 gm load, 1,000 cycles	35 mg loss
7. Flame Spread/NFPA-101, ASTM E 84	Class A
8. Impact Resistance MIL D-3134	0.025 inch Max
9. Water Absorption. MIL D-3134	Pass
10. Potlife @ 70 F	20-25 minutes

C. Broadcast Coat and Grout Coat	Dur-A-Glaze #4 Water Clear

1.	Percent Solids	100 %
2.	VOC	3.8 g/L
3.	Compressive Strength, ASTM D 695	11,200 psi
4.	Tensile Strength, ASTM D 638	2,100 psi
5.	Flexural Strength, ASTM D 790	5,100 psi
6.	Abrasion Resistance, ASTM D 4060 C-10 Wheel, 1,000 gm load, 1,000 cycles	29 mg loss
7.	Flame Spread/NFPA-101, ASTM E 84	Class A
8.	Impact Resistance MIL D-24613	0.0007 inches, no cracking or delamination
9.	Water Absorption. MIL D-24613	Nil
10.	Potlife @ 70 F	20 minutes

D. Topcoat — Armor Top

1.	Percent Solids		95 %
2.	VOC		0 g/L
3.	Tensile Strength, ASTM D 2370		7,000 psi
4.	Adhesion, ASTM 4541		Substrate Failure
5.	Hardness, ASTM D 3363		4H
6.	60^0 Gloss ASTM D 523		70
7.	Abrasion Resistance, ASTM D4060	Gloss	Satin
	CS 17 wheel (1,000 g load) 1,000 cycles	4	8 mg loss with grit
		10	12 mg loss without grit
8.	Pot Life, 70 F, 50% RH		2 Hours
9.	Full Chemical Resistance		7 days

2. Other manufacturers as approved by Architect.

2.3 JOINT SEALANT MATERIALS

A. Type produced by manufacturer of resinous flooring system for type of service and joint condition indicated.

PART 3 - EXECUTION

3.1 PREPARATION

A. Substrate: Concrete preparation shall be by mechanical means and include use of a scabbler, scarifier or shot blast machine for removal of bond inhibiting materials such as curing compounds or laitance.

3.2 APPLICATION

A. General: Apply each component of resinous flooring system in compliance with manufacturer's directions to produce a uniform monolithic wearing surface of thickness indicated, uninterrupted except at divider strips, sawn joints or other types of joints (if any), indicated or required.

B. Primer: Mix and apply primer over properly prepared substrate with strict adherence to manufacturer's installation procedures and coverage rates. Coordinate timing of primer application with application of troweled mortar to ensure optimum adhesion between resinous flooring materials and substrate.

C. Troweled Mortar: Mix mortar material according to manufacturer's recommended procedures. Uniformly spread mortar over substrate using manufacturer's specially designed screed box adjusted to manufacturer's recommended height. Hand trowel apply mixed material over freshly primed substrate using stainless steel finishing trowels.

D. Coating/Texture: Remove any surface imperfections by lightly abrading and vacuuming the floor surface. Mix coating and texture according to manufacturer's recommended procedures. Squeegee apply and backroll textured coating with strict adherence to manufacturer's installation procedures and coverage rates.

3.3 FIELD QUALITY CONTROL

A. The right is reserved to invoke the following material testing procedure at any time, and any number of times during period of flooring application.

B. The Owner will engage service of an independent testing laboratory to sample materials being used on the job site. Samples of material will be taken, identified and sealed, and certified in presence of Contractor.

C. Testing laboratory will perform tests for any of characteristics specified, using applicable testing procedures referenced herein, or if none referenced, in manufacturer's product data.

D. If test results show materials being used do not comply with specified requirements, Contractor may be directed by Owner to stop work; remove non-complying materials; pay for testing; reapply flooring materials to properly prepared surfaces which had previously been coated with unacceptable materials.

3.4 CURING, PROTECTION AND CLEANING

A. Cure resinous flooring materials in compliance with manufacturer's directions, taking care to prevent contamination during stages of application and prior to completion of curing process. Close area of application for a minimum of 24 hours.

B. Protect resinous flooring materials from damage and wear during construction operation. Where temporary covering is required for this purpose, comply with manufacturer's recommendations for protective materials and method of application. General Contractor is responsible for protection and cleaning of surfaces after final coats.

C. Cleaning: Remove temporary covering and clean resinous flooring just prior to final inspection. Use cleaning materials and procedures recommended by resinous flooring manufacturer.

3.5 WASTE MANAGEMENT

A. Coordinate with Division 01.

1. Separate and recycle cut-offs and waste materials and material packaging in accordance with Waste Management Plan and to the maximum extent economically feasible and place in designated areas for recycling.
2. Set aside and protect materials suitable for reuse and/or remanufacturing.
3. Separate and fold up metal banding; flatten and place along with other metal scrap for recycling in designated area.

END OF SECTION 09 67 23

SECTION 09 68 13 - TILE CARPETING

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. This section includes the performance criteria, materials, production, and erection of carpet tile for the project. The work performed under this Section consists of the provision of all plant, materials, labor and equipment and the like necessary and/or required for the complete execution of all carpet tile as required by the this section, schedules, keynotes and drawings, including, but not limited to the following:

1. Modular, tufted carpet tile.

B. Related Requirements:

1. Division 03: “Self-Leveling Toppings”

2. Division 09: "Resilient Base and Accessories", "Resilient Tile Flooring" for resilient wall base and accessories installed with carpet tile.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review methods and procedures related to carpet tile installation including, but not limited to, the following:

a. Review delivery, storage, and handling procedures.
b. Review ambient conditions and ventilation procedures.
c. Review subfloor preparation procedures.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include manufacturer's written data on physical characteristics, durability, and fade resistance.
2. Include installation recommendations for each type of substrate.

B. Shop Drawings: Show the following:

1. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet tiles.
2. Carpet tile type, color, and dye lot.
3. Type of subfloor.
4. Type of installation.
5. Pattern of installation.
6. Pattern type, location, and direction.
7. Pile direction.
8. Type, color, and location of insets and borders.
9. Type, color, and location of edge, transition, and other accessory strips.
10. Transition details to other flooring materials.

C. Samples: For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.

1. Carpet Tile: Full-size Sample.
2. Exposed Edge, Transition, and Other Accessory Stripping: 12-inch- (300-mm-) long Samples.

D. Product Schedule: For carpet tile. Use same designations indicated on Drawings.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Product Test Reports: For carpet tile, for tests performed by a qualified testing agency.

C. Sample Warranty: For special warranty.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For carpet tiles to include in maintenance manuals. Include the following:

1. Methods for maintaining carpet tile, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.
2. Precautions for cleaning materials and methods that could be detrimental to carpet tile.

1.7 MAINTENANCE MATERIAL SUBMITTALS

A. No extra material to be purchased for purpose of attic stock. All left over material from construction to constitute attic stock – store, maintain and protect accordingly. Package with protective covering for storage and identified with labels describing contents.

1.8 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who is certified by the International Certified Floorcovering Installers Association at the Master II certification level.

B. Fire-Test-Response Ratings: Where indicated, provide carpet tile identical to those of assemblies tested for fire response according to NFPA 253 by a qualified testing agency.

C. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.

1. Build mockups at locations and in sizes shown on Drawings.
2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Comply with CRI 104.

1.10 FIELD CONDITIONS

A. Comply with CRI 104 for temperature, humidity, and ventilation limitations.

B. Environmental Limitations: Do not deliver or install carpet tiles until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at occupancy levels during the remainder of the construction period.

C. Do not install carpet tiles over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended by carpet tile manufacturer.

D. Where demountable partitions or other items are indicated for installation on top of carpet tiles, install carpet tiles before installing these items.

1.11 WARRANTY

A. Special Warranty for Carpet Tiles: Manufacturer agrees to repair or replace components of carpet tile installation that fail in materials or workmanship within specified warranty period.

1. Warranty does not include deterioration or failure of carpet tile due to unusual traffic, failure of substrate, vandalism, or abuse.
2. Failures include, but are not limited to, more than 10 percent edge raveling, snags, runs, dimensional stability, excess static discharge, loss of tuft bind strength, loss of face fiber, and delamination.
3. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 CARPET TILE

A. All carpet tile products to be Class A rated.

B. Basis-of-Design Product: Subject to compliance with requirements, provide:

1. Mohawk Group, Bigelow “Color Balance” Modular tile.
2. Color: As per schedule on drawings
3. Pattern: Match Architect's samples.
4. Construction: Tufted
5. Surface Texture: Textured pattern loop
6. Gauge: 1/2 (47.00 rows per 10 cm)
7. Dye Method: Solution Dyed
8. Fiber Type: Nylon
9. Backing System: Ecoflex NXT
10. Size: 12 inches by 36 inches
11. Installation: Half-Lap
12. Soil Release Technology
13. Performance Characteristics: Foot Traffic Recommendation TARR: Heavy

2.2 INSTALLATION ACCESSORIES

A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet tile manufacturer.

B. Adhesives: Water-resistant, mildew-resistant, nonstaining, pressure-sensitive type to suit products and subfloor conditions indicated, that complies with flammability requirements for installed carpet tile and is recommended by carpet tile manufacturer for releasable installation.

1. Adhesives shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

C. Metal Edge/Transition Strips: Extruded aluminum with satin finish of profile and width shown, of height required to protect exposed edge of carpet, and of maximum lengths to minimize running joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet tile performance. Examine carpet tile for type, color, pattern, and potential defects.

B. Concrete Subfloors: Verify that concrete slabs comply with ASTM F 710 and the following:

1. Slab substrates are dry and free of curing compounds, sealers, hardeners, and other materials that may interfere with adhesive bond. Determine adhesion and dryness characteristics by performing bond and moisture tests recommended by carpet tile manufacturer.

2. Subfloor finishes comply with requirements specified in Section 033000 "Cast-in-Place Concrete" for slabs receiving carpet tile.
3. Subfloors are free of cracks, ridges, depressions, scale, and foreign deposits.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. General: Comply with CRI 104, Section 6.2, "Site Conditions; Floor Preparation," and with carpet tile manufacturer's written installation instructions for preparing substrates indicated to receive carpet tile installation.

B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch (3 mm) wide or wider and protrusions more than 1/32 inch (0.8 mm) unless more stringent requirements are required by manufacturer's written instructions.

C. Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by carpet tile manufacturer.

D. Broom and vacuum clean substrates to be covered immediately before installing carpet tile.

3.3 INSTALLATION

A. General: Comply with CRI 104, Section 14, "Carpet Modules," and with carpet tile manufacturer's written installation instructions.

B. Installation Method: As recommended in writing by carpet tile manufacturer.

C. Maintain dye lot integrity. Do not mix dye lots in same area.

D. Cut and fit carpet tile to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet tile manufacturer.

E. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.

F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on finish flooring as marked on subfloor. Use nonpermanent, nonstaining marking device.

G. Install pattern parallel to walls and borders.

3.4 CLEANING AND PROTECTION

A. Perform the following operations immediately after installing carpet tile:

1. Remove excess adhesive, seam sealer, and other surface blemishes using cleaner recommended by carpet tile manufacturer.
2. Remove yarns that protrude from carpet tile surface.
3. Vacuum carpet tile using commercial machine with face-beater element.

B. Perform the following operations for existing carpet tile:
1. Vacuum carpet tile using commercial machine with face-beater element.
2. Remove stains and spots using cleaners as recommended by the carpet tile manufacturer.

C. Protect installed carpet tile to comply with CRI 104, Section 16, "Protecting Indoor Installations."

D. Protect carpet tile against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet tile manufacturer.

3.5 WASTE MANAGEMENT

A. Coordinate with Section 01 74 19.

1. Separate and recycle cut-offs and waste materials and material packaging in accordance with Waste Management Plan and to the maximum extent economically feasible and place in designated areas for recycling.
2. Set aside and protect materials suitable for reuse and/or remanufacturing.
3. Separate and fold up metal banding; flatten and place along with other metal scrap for recycling in designated area.

END OF SECTION 09 68 13

SECTION 09 84 33 - SOUND-ABSORBING WALL UNITS

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 shop-fabricated, fabric-wrapped panel units tested for acoustical performance, including:
   1. Custom fabricated acoustical wall panels.

1.3 REFERENCES

A. ASTM International
   1. ASTM C423 Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
   2. ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials.
   3. ASTM E795 Standard Practices for Mounting Test Specimens During Sound Absorption Tests.

1.4 DEFINITIONS

A. NRC: Noise Reduction Coefficient.

B. SAA: Sound Absorption Average.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of fabric facing**,** panel edge, core material, and mounting indicated.

B. Sustainable Submittals:

   1. Product Data: For products having recycled content, documentation indicating percentages by weight of postconsumer and preconsumer recycled content. Include statement indicating cost for each product having recycled content.
   2. Product Data: For composite wood products used in sound-absorbing wall units, documentation indicating that product contains no urea formaldehyde.
   3. Laboratory Test Reports: For installation adhesives, composite wood products and sound-absorbing wall units, documentation indicating that products comply with the testing and product requirements of the California Department of Health Services' "Standard Practice

for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

C. Shop Drawings: For sound-absorbing wall and ceiling units. Include mounting devices and details; details at panel head, base, joints, and corners; and details at ceiling, floor base, and wall intersections. Indicate panel edge and core materials.

1. Include elevations showing panel sizes and direction of fabric weave and pattern matching.

D. Samples for Initial Selection: For each type of fabric facing from sound-absorbing wall unit manufacturer's full range.

E. Samples for Verification: For the following products, prepared on Samples of size indicated below:

1. Fabric: Full-width by approximately 36-inch- (900-mm-) long Sample, but not smaller than required to show complete pattern repeat, from dye lot to be used for the Work, and with specified treatments applied. Mark top and face of fabric.
2. Panel Edge: 12-inch- (300-mm-) long Sample(s) showing each edge profile, corner, and finish.
3. Core Material: 12-inch- (300-mm-) square Sample at corner.
4. Mounting Devices: Full-size Samples.
5. Assembled Panels: Approximately 36 by 36 inches (900 by 900 mm), including joints and mounting methods.

1.6 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Elevations and other details, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:

1. Electrical outlets, switches, and thermostats.
2. Items penetrating or covered by sound-absorbing wall units including the following:

a. Lighting fixtures.
b. Air outlets and inlets.
c. Speakers.
d. Alarms.
e. Sprinklers.
f. Access panels.

3. Show operation of hinged and sliding components covered by or adjacent to sound-absorbing wall units.

B. Product Certificates: For each type of sound-absorbing wall unit, from manufacturer.

A. Test Reports: Certified test reports showing compliance with specified performance requirements.
1. Standard Systems: Submit certified copies of previous test reports substantiating performance of system in lieu of retesting

B. Warranty: Sample of special warranty.

1.7 CLOSEOUT SUBMITTALS

A. Maintenance Data: For sound-absorbing wall units to include in maintenance manuals. Include fabric manufacturers' written cleaning and stain-removal recommendations.

1.8 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials from same production run that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Fabric: For each fabric, color, and pattern installed, provide length equal to 10 percent of amount installed, but no fewer than 10 yards (9 m) quantity.
2. Mounting Devices: Full-size units equal to 5 percent of amount installed, but no fewer than five devices, including unopened adhesives.

1.9 QUALITY ASSURANCE

A. Source Limitations: Obtain sound-absorbing wall and ceiling units from single source from single manufacturer.

B. Fire-Test-Response Characteristics: Provide sound-absorbing wall units meeting the following as determined by testing identical products by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:

1. Surface-Burning Characteristics: As determined by testing per ASTM E 84.

a. Flame-Spread Index: 25 or less.
b. Smoke-Developed Index: 250 Maximum..

2. Fire Growth Contribution: Meeting acceptance criteria of local code and authorities having jurisdiction when tested according to NFPA 265 or NFPA 286.

C. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials, fabrication, and installation.

1. Build mockup of typical wall area as directed by Architect. Include intersection of wall and ceiling, corners, and perimeters.
2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

D. Preinstallation Conference: Conduct conference at Project site.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Comply with fabric and sound-absorbing wall unit manufacturers' written instructions for minimum and maximum temperature and humidity requirements for shipment, storage, and handling.

B. Deliver materials and units in unopened bundles and store in a temperature-controlled dry place with adequate air circulation.

1.11 PROJECT CONDITIONS

A. Environmental Limitations: Do not install sound-absorbing wall units until spaces are enclosed and weathertight, wet work in spaces is complete and dry, work at and above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

B. Lighting: Do not install sound-absorbing wall units until a lighting level of not less than 80 fc (538 lux) minimum is provided on surfaces to receive the units.

C. Air-Quality Limitations: Protect sound-absorbing wall units from exposure to airborne odors, such as tobacco smoke, and install units under conditions free from odor contamination of ambient air.

D. Field Measurements: Verify locations of sound-absorbing wall units and actual dimensions of openings and penetrations by field measurements before fabrication.

E. Wall & Ceiling Conditions
1. The wall surface should be clean, dry, structurally sound, and free of mildew, grease, dust, or other stains.
2. Remove any existing wallcovering and adhesive.
3. Plaster and masonry wall surfaces should not exceed 5.5% moisture when measured by a BD-8 Delmhorst moisture meter. Gypsum board wall surfaces should not exceed 16% moisture.
4. Room humidity should not exceed 90%.
5. Wall surfaces should be primed with a quality wallcovering primer as approved by manufacturer. Wall surfaces with significant color variation should be primed with a good quality pigmented wallcovering primer.
6. New plaster should age 60-90 days before painting or installing wallcovering

1.12 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of sound-absorbing wall units that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to the following:

a. Acoustical performance.
b. Fabric sagging, distorting, or releasing from panel edge.
c. Warping of core.

2. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SOUND-ABSORBING WALL UNITS

A. General Requirements for Sound-Absorbing Wall Units: Units shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

B. Sound-Absorbing Wall Panel: Manufacturer's custom panel construction consisting of facing material laminated to front face, edges, and back edge border of core, stretched over front face of edge-framed core and bonded or attached to edges and back of frame.

1. Basis-of-Design Product: Acoufelt “Fracture”, or comparable product by one of the following:
   a. Acoustical Panel Systems (APS, Inc.).
   b. Acoustical Solutions, Inc.
   c. Armstrong World Industries.
   d. Kinetics Noise Control, Inc.
   e. Proudfoot Company, Inc. (The).
   f. Sound Concepts Canada, Inc.
   g. Sound Management Group LLC.
   h. Tectum Inc.
   i. Filzfelt
   j. Wall Technology, Inc.; an Owens Corning company.

2. Mounting Accessories: None, adhered to substrate.
3. Constructed: 100% Polyester
4. Thickness: 1/2 in
5. Size: SEE DRAWINGS
6. Edge Detail: Square
7. Sound Absorption (ASTM C423): Noise Reduction Coefficient as follows:
   a. 0.45, SAA – 0.21, minimum.
8. Colors: Provide color selection from manufacturer’s standard to architect. Specified 3 color selection.

2.2 MATERIALS

A. Core Materials: Manufacturer's standard.
1. Impact-Resistant, acoustically transparent, Copolymer Sheet for Face Layer: 1/16- to 1/8-inch- (1.6- to 3.2-mm-) thick layer of perforated, noncombustible, copolymer sheet laminated to face of core.

B. Facing Material Fabric from same dye lot; color and pattern as indicated on Drawings.

1. Manufacturer:
2. Product Line/Pattern:
3. Pattern Repeat
4. Style Number
5. Color

6. Fiber Content
7. Width
8. Source:
9. Applied Treatments: Stain resistance.

C. Mounting Devices: Concealed on back of unit, recommended by manufacturer to support weight of unit, and as follows:

1. Splines: Manufacturer's standard concealed metal or plastic splines that engage the kerfed edges of the unit, with other moldings and trim for interior corners, exterior corners, and exposed edges, with factory-applied finish on exposed items.
2. Adhesives: As recommended by sound-absorbing wall unit manufacturer and with a VOC content of 70 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
3. Adhesives: As recommended by sound-absorbing wall unit manufacturer and that comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers." A heavy-duty clay-based adhesive is required
4. Metal Clips or Bar Hangers: Manufacturer's standard two-part metal "Z" clips, with one part of each clip mechanically attached to back of unit and the other part to substrate, designed to permit unit removal.

2.3 FABRICATION

A. General: Use manufacturer's standard construction except as otherwise indicated; with facing material applied to face, edges, and back border of dimensionally stable core; and with rigid edges to reinforce panel perimeter against warpage and damage.

B. Core-Face Layer: Evenly stretched over core face and edges and securely attached to core; free from puckers, ripples, wrinkles, or sags.

C. Facing Material: Apply fabric facing fully covering visible surfaces of unit; with material stretched straight, on the grain, tight, square, and free from puckers, ripples, wrinkles, sags, blisters, seams, adhesive, or other visible distortions or foreign matter.

D. Dimensional Tolerances of Finished Units: Plus or minus 1/16 inch (1.6 mm) for the following:

1. Thickness.
2. Edge straightness.
3. Overall length and width.
4. Squareness from corner to corner.
5. Chords, radii, and diameters.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine fabric, fabricated units, substrates, areas, and conditions, for compliance with requirements, installation tolerances, and other conditions affecting performance of sound-absorbing wall units.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install sound-absorbing wall units in locations indicated with vertical surfaces and edges plumb, top edges level and in alignment with other units, faces flush, and scribed to fit adjoining work accurately at borders and at penetrations.

B. Comply with sound-absorbing wall unit manufacturer's written instructions for installation of units using type of mounting devices indicated. Mount units securely to supporting substrate.

C. Align and level fabric pattern and grain among adjacent units.

3.3 INSTALLATION TOLERANCES

A. Variation from Plumb and Level: Plus or minus 1/16 inch (1.6 mm).

B. Variation of Panel Joints from Hairline: Not more than 1/16 inch (1.6 mm) wide.

3.4 CLEANING

A. Clip loose threads; remove pills and extraneous materials.

B. Clean panels on completion of installation to remove dust and other foreign materials according to manufacturer's written instructions.

3.5 WASTE MANAGEMENT

A. Coordinate with Division 01.

1. Separate and recycle cut-offs and waste materials and material packaging in accordance with Waste Management Plan and to the maximum extent economically feasible and place in designated areas for recycling.
2. Set aside and protect materials suitable for reuse and/or remanufacturing.
3. Separate and fold up metal banding; flatten and place along with other metal scrap for recycling in designated area.

END OF SECTION 09 84 33

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SECTION 09 91 00 - PAINTING

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. This section includes the performance criteria, materials, production, and erection of surface preparation and the application of paint systems for the project. The work performed under this Section consists of the provision of all plant, materials, labor and equipment and the like necessary and/or required for the complete execution of all surface preparation and the application of paint systems as required by the this section, schedules, keynotes and drawings, including, but not limited to the following substrates:

1. Concrete.
2. Concrete masonry units (CMU).
3. Steel.
4. Cast iron.
5. Galvanized metal.
6. Aluminum (not anodized or otherwise coated).
7. Wood.
8. Gypsum board.
9. Plaster.
10. Spray-textured ceilings.
11. ASJ insulation covering.

B. Related Requirements:

1. Division 05 "Structural Steel Framing" for shop priming of metal substrates with primers specified in this Section.

1.3 DEFINITIONS

A. Gloss Level 1 G! Matte or Flat Finish: Not more than 5 units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.

B. Gloss Level G2 Velvet Finish: Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.

C. Gloss Level G3 Eggshell Finish: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.

D. Gloss Level G4 Satin Finish: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.

E. Gloss Level G5 Semi-Gloss Finish: 35 to 70 units at 60 degrees, according to ASTM D 523.

F. Gloss Level G6 Gloss Finish: 70 to 85 units at 60 degrees, according to ASTM D 523.

G. Gloss Level G7 High-Gloss Finish: More than 85 units at 60 degrees, according to ASTM D 523.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product. Include preparation requirements and application instructions.

B. Samples for Initial Selection: For each type of topcoat product.

C. Samples for Verification: For each type of paint system and in each color and gloss of topcoat.

1. Submit Samples on rigid backing, 8 inches square.
2. Step coats on Samples to show each coat required for system.
3. Label each coat of each Sample.
4. Label each Sample for location and application area.

D. Product List: For each 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 product category specified in Part 2, with the proposed product highlighted.
3. VOC content.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. No extra material to be purchased for purpose of attic stock. All left over material from construction to constitute attic stock – store, maintain and protect accordingly. Package with protective covering for storage and identified with labels describing contents.

1.6 QUALITY ASSURANCE

A. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Architect will select one surface to represent surfaces and conditions for application of each paint system specified in Part 3.

a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft. (9 sq. m).
b. Other Items: Architect will designate items or areas required.

2. Final approval of color selections will be based on mockups.

    a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.

3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 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 from storage areas daily.

1.8 FIELD CONDITIONS

A. 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).

B. Do not apply paints 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.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by the following:

1. Akzo Nobel
2. Benjamin Moore & Co.
3. ICI Paints.
4. Kelly-Moore Paints.
5. Mastercoating technologies – Zolatone
6. PPG Architectural Finishes, Inc.
7. Sherwin-Williams Company (The)
8. Insl-X

2.2 PAINT, GENERAL

A. MPI Standards: Provide products that comply with MPI standards indicated and that are listed in its "MPI Approved Products List."

B. 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.

C. VOC Content: Products shall comply with VOC limits of authorities having jurisdiction and, for interior paints and coatings applied at Project site, the following VOC limits, exclusive of colorants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

1. Flat Paints and Coatings: 50 g/L.
2. Nonflat Paints and Coatings: 150 g/L.
3. Dry-Fog Coatings: 400 g/L.
4. Primers, Sealers, and Undercoaters: 200 g/L.
5. Anticorrosive and Antirust Paints Applied to Ferrous Metals: 250 g/L.
6. Zinc-Rich Industrial Maintenance Primers: 340 g/L.
7. Pretreatment Wash Primers: 420 g/L.
8. Floor Coatings: 100 g/L.
9. Shellacs, Clear: 730 g/L.
10. Shellacs, Pigmented: 550 g/L.

D. Colors: As indicated in a finish schedule.

2.3 BLOCK FILLERS

A. Block Filler, Latex, Interior/Exterior: MPI #4.

1. Glidden Professional – Concrete Coatings Block Filler Interior / Exterior Primer.
2. Akzo Nobel.
3. Sherwin Williams – Preprite – Interior / Exterior Block filler.

2.4 PRIMERS/SEALERS

A. Primer Sealer, Latex, Interior: MPI #50.

1. Product by one of the approved manufacturers found in the MPI list.

B. Primer, Alkali Resistant, Water Based: MPI #3.

1. Product by one of the approved manufacturers found in the MPI list.

C. Primer Sealer, Interior, Institutional Low Odor/VOC: MPI #149.

1. Product by one of the approved manufacturers found in the MPI list.

D. Primer, Latex, for Interior Wood: MPI #39.

1. Product by one of the approved manufacturers found in the MPI list.

E. Primer Sealer, Alkyd, Interior: MPI #45.

1. Product by one of the approved manufacturers found in the MPI list.

F. Primer Sealer, Alkyd, Interior: MPI #69 (Gymnasium Ceiling).

1. Product by one of the approved manufacturers found in the MPI list.

G. Primer, Bonding, Water Based: MPI #17.

1. Product by one of the approved manufacturers found in the MPI list.

H. Primer, Bonding, Solvent Based: MPI #69.

1. Product by one of the approved manufacturers found in the MPI list.

I. Wood-Knot Sealer: Sealer recommended in writing by topcoat manufacturer for use in paint systems indicated.

2.5 METAL PRIMERS

A. Primer, Rust-Inhibitive, Water Based: MPI #107.

1. Product by one of the approved manufacturers found in the MPI list.

B. Primer, Alkyd, Anti-Corrosive, for Metal: MPI #79.

1. Product by one of the approved manufacturers found in the MPI list.

C. Primer, Alkyd, Quick Dry, for Metal: MPI #76.

1. Product by one of the approved manufacturers found in the MPI list.

D. Primer, Galvanized, Water Based: MPI #134.

1. Product by one of the approved manufacturers found in the MPI list.

E. Primer, Vinyl Wash: MPI #80.

1. Product by one of the approved manufacturers found in the MPI list.

F. Primer, Quick Dry, for Aluminum: MPI #95.

1. Product by one of the approved manufacturers found in the MPI list.

2.6 WATER-BASED PAINTS

A. Latex, Interior, Institutional Low Odor/VOC, Flat (Gloss Level 1): MPI #143.

1. Product by one of the approved manufacturers found in the MPI list.

B. Latex, Interior, Institutional Low Odor/VOC, (Gloss Level 2): MPI #144.

1. Product by one of the approved manufacturers found in the MPI list.

C. Latex, Interior, Institutional Low Odor/VOC, (Gloss Level 3): MPI #145.

1. Product by one of the approved manufacturers found in the MPI list.

D. Latex, Interior, Institutional Low Odor/VOC, Semi-Gloss (Gloss Level 5): MPI #147.

1. Product by one of the approved manufacturers found in the MPI list.

E. Acrylic, Interior, Institutional Low Odor/VOC, Multicolor MPI # 112.

1. Product by one of the approved manufacturers found in the MPI list.

F. Light Industrial Coating, Exterior, Water Based, Semi-Gloss (Gloss Level 5): MPI #163.

1. Product by one of the approved manufacturers found in the MPI list.

2.7 SOLVENT-BASED PAINTS

A. Alkyd, Interior, (Gloss Level 3): MPI #51.

1. Product by one of the approved manufacturers found in the MPI list.

B. Alkyd, Interior, (Flat) Spray Applied Dry Fall : MPI #118 (Gymnasium Ceiling)

C. Alkyd, Interior, Semi-Gloss (Gloss Level 5): MPI #47.

1. Product by one of the approved manufacturers found in the MPI list.

D. Alkyd, Quick Dry, Semi-Gloss (Gloss Level 5): MPI #81.

1. Product by one of the approved manufacturers found in the MPI list.

2.8 DRY FOG/FALL COATINGS

A. Interior Alkyd Dry Fog/Fall: MPI #118.

1. Basis-of-Design Product: Coronado Paint; Superkote 5000Alkyd Dryfall 105-1/131-1 or equal.

2. VOC Content: E Range of E2.

2.9 FLOOR COATINGS

A. Sealer, Water Based, for Concrete Floors: MPI #99.

1. Product by one of the approved manufacturers found in the MPI list.

2.10 SOURCE QUALITY CONTROL

A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure:

1. Owner will engage the services of a qualified testing agency to sample paint materials. Contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
2. Testing agency will perform tests for compliance with product requirements.
3. Owner may direct Contractor to stop applying coatings if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:

1. Concrete: 12 percent.
2. Masonry (Clay and CMU): 12 percent.
3. Wood: 15 percent.
4. Gypsum Board: 12 percent.
5. Plaster: 12 percent.

C. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.

D. Plaster Substrates: Verify that plaster is fully cured.

E. Proceed with coating application only after unsatisfactory conditions have been corrected.

1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Manual" applicable to substrates indicated.

B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.

C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.

D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.

E. Steel Substrates: Remove rust, loose mill scale, and shop primer, if any. Clean using methods recommended in writing by paint manufacturer but not less than the following:

1. SSPC-SP 2, "Hand Tool Cleaning."
2. SSPC-SP 3, "Power Tool Cleaning."
3. SSPC-SP 7/NACE No. 4, "Brush-off Blast Cleaning."
4. SSPC-SP 11, "Power Tool Cleaning to Bare Metal."

F. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

G. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

H. Aluminum Substrates: Remove loose surface oxidation.

I. Wood Substrates:

1. Scrape and clean knots, and apply coat of knot sealer before applying primer.
2. Sand surfaces that will be exposed to view, and dust off.
3. Prime edges, ends, faces, undersides, and backsides of wood.
4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.

J. Cotton or Canvas Insulation Covering Substrates: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates.

3.3 APPLICATION

A. Apply paints according to manufacturer's written instructions and to recommendations in "MPI Manual."

1. Use applicators and techniques suited for paint and substrate indicated.
2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.

B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.

C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

E. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:

1. Paint the following work where exposed in equipment rooms:

a. Equipment, including panelboards and switch gear.
b. Uninsulated metal piping.
c. Uninsulated plastic piping.
d. Pipe hangers and supports.
e. Metal conduit.
f. Plastic conduit.
g. Tanks that do not have factory-applied final finishes.
h. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.

2. Paint the following work where exposed in occupied spaces:

a. Equipment, including panelboards.
b. Uninsulated metal piping.
c. Uninsulated plastic piping.
d. Pipe hangers and supports.
e. Metal conduit.
f. Plastic conduit.
g. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.

h. Other items as directed by Architect.

3. Paint portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets that are visible from occupied spaces.

4. Do not paint in mechanical rooms except as noted in 3.3.E.1.

3.4 FIELD QUALITY CONTROL

A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.

1. Contractor shall touch up and restore painted surfaces damaged by testing.
2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.5 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.

3.6 PAINTING SCHEDULE

A. Concrete Substrates, Nontraffic Surfaces:

1. Institutional Low-Odor/VOC Latex System:

a. Prime Coat: Primer sealer, interior, institutional low odor/VOC**,** MPI #149.
b. Intermediate Coat: Latex, interior, institutional low odor/VOC, matching topcoat.
c. Topcoat: Latex, interior, institutional low odor/VOC, (Gloss Level 2), MPI #144.

B. Concrete Substrates, Traffic Surfaces:

1. Water-Based Clear Sealer System:

a. First coat: Sealer, solvent based, for concrete floors, MPI #99.
b. Topcoat: Sealer, solvent based, for concrete floors, MPI #104.

C. CMU Substrates:

1. Institutional Low-Odor/VOC Latex System:

a. Block Filler: Block filler, latex, interior/exterior, MPI #4.
b. Intermediate Coat: Latex, interior, institutional low odor/VOC, matching topcoat.
c. Topcoat: Latex, interior, institutional low odor/VOC, (Gloss Level 2), MPI #144.

D. Steel Substrates:

1. Quick-Drying Enamel System:

a. Prime Coat: Primer, alkyd, quick dry, for metal, MPI #76.
b. Intermediate Coat: Alkyd, quick dry, matching topcoat.
c. Topcoat: Alkyd, quick dry, semi-gloss (Gloss Level 5), MPI #81.

E. Galvanized-Metal Substrates:

1. Institutional Low-Odor/VOC Latex System:

a. Prime Coat: Primer, galvanized, water based, MPI #134.
b. Intermediate Coat: Latex, interior, institutional low odor/VOC, matching topcoat.
c. Topcoat: Latex, interior, institutional low odor/VOC, (Gloss Level 2), MPI #144.

F. Aluminum (Not Anodized or Otherwise Coated) Substrates:

1. Institutional Low-Odor/VOC Latex System:

a. Prime Coat: Primer, quick dry, for aluminum, MPI #95.
b. Intermediate Coat: Latex, interior, institutional low odor/VOC, matching topcoat.
c. Topcoat: Latex, interior, institutional low odor/VOC, (Gloss Level 2), MPI #144.

G. Wood Substrates: Including wood trim, architectural woodwork, doors, wood-based panel products.

1. Institutional Low-Odor/VOC Latex System:

a. Prime Coat: Primer, latex, for interior wood, MPI #39.
b. Intermediate Coat: Latex, interior, institutional low odor/VOC, matching topcoat.
c. Topcoat: Latex, interior, institutional low odor/VOC, (Gloss Level 2), MPI #144.

H. Fiberglass and Plastic Substrates:

1. Institutional Low-Odor/VOC Latex System:

a. Prime Coat: Primer, bonding, water based, MPI #17.
b. Prime Coat: Primer, bonding, solvent based, MPI #69.
c. Intermediate Coat: Latex, interior, institutional low odor/VOC, matching topcoat.
d. Topcoat: Latex, interior, institutional low odor/VOC, (Gloss Level 2), MPI #144.

I. Gypsum Board and Plaster Substrates:

1. Institutional Low-Odor/VOC Latex System:

    a. Prime Coat: Primer sealer, interior, institutional low odor/VOC, MPI #149.
    b. Intermediate Coat: Latex, interior, institutional low odor/VOC, matching topcoat.
    c. Topcoat: Latex, interior, institutional low odor/VOC, (Gloss Level 2), MPI #144.

2. Institutional Low-Odor/VOC Acrylic System:

    a. Prime Coat: SP203Stain Acrylic Drywall Primer, Master Coating Technologies.
    b. Intermediate Coat: Acrylic Interior, Institutional Low Odor/VOC, Multi-color, Master Coating Technologies., #MPI #112.
    c. Finish Coat: Acrylic Interior, Institutional Low Odor/VOC, Multi-color, Master Coating Technologies., #MPI #112.

J. Cotton or Canvas and ASJ Insulation-Covering Substrates: Including pipe and duct coverings.

1. Institutional Low-Odor/VOC Latex System:

    a. Prime Coat: Primer sealer, latex, interior, MPI #50.
    b. Intermediate Coat: Latex, interior, institutional low odor/VOC, matching topcoat.
    c. Topcoat: Latex, interior, institutional low odor/VOC, (Gloss Level 2), MPI #144.

3.7 WASTE MANAGEMENT

A. Coordinate with Section 01 74 19.

1. Separate and recycle cut-offs and waste materials and material packaging in accordance with Waste Management Plan and to the maximum extent economically feasible and place in designated areas for recycling.
2. Set aside and protect materials suitable for reuse and/or remanufacturing.
3. Separate and fold up metal banding; flatten and place along with other metal scrap for recycling in designated area.

END OF SECTION 09 50 00

SECTION 10 11 00 - VISUAL DISPLAY SURFACES *(PROVIDED BY OWNER INSTALLED BY CONTRACTOR)*

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. The work performed under this Section includes the performance criteria, materials, production, and erection of visual display units for the project and consists of the provision of all plant, materials, labor and equipment and the like necessary and/or required for the complete execution of all visual display units as required by schedules, keynotes and drawings, as specified herein, and as may be required by conditions and authorities having jurisdiction including, but not limited to the following:

1. Tackboards.
2. Visual display wall panels.

1.3 DEFINITIONS

A. Tackboard: Framed or unframed, tackable, visual display board assembly.

B. Visual Display Board Assembly: Visual display surface that is factory fabricated into composite panel form, either with or without a perimeter frame; includes visual display wall panels and tackboards.

C. Visual Display Surface: Surfaces that are used to convey information visually, including surfaces of magnetic markerboards, tackboards, and surfacing materials that are not fabricated into composite panel form but are applied directly to walls.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for visual display surfaces.

B. Shop Drawings: For visual display surfaces. Include plans, elevations, sections, details, and attachments to other work.

1. Show locations of panel joints.
2. Show locations of special-purpose graphics for visual display surfaces.
3. Include sections of typical trim members.

C. Samples for Initial Selection: For each type of visual display surface indicated, for units with factory-applied color finishes, and as follows:

1. Actual sections of porcelain-enamel face sheet, tackboard assembly, visual display wall covering.
2. Include accessory Samples to verify color selected.

D. Samples for Verification: For each type of visual display surface indicated.

1. One visual display board assembly, mock-up complete with porcelain – enamel face sheet, tackboard and trim mounted on substrate. Board may be incorporated into project upon acceptance of mock-up.

E. Product Schedule: For visual display surfaces. Use same designations indicated on Drawings.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer.

B. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for surface-burning characteristics of fabrics.

C. Warranties: Sample of special warranties.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For visual display surfaces to include in maintenance manuals.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of visual display board.

B. Source Limitations: Obtain visual display surfaces from single source from single manufacturer.

C. Surface-Burning Characteristics: Class B as determined by testing identical products according to ASTM E 84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Flame-Spread Index: 75 or less.
2. Smoke-Developed Index: 450 or less.

D. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate appearance and aesthetic effects and set quality standards for installation.

1. Build mockup of typical visual display boards as shown on Drawings. Include accessories.
2. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver factory-built visual display surfaces**,** including factory-applied trim where indicated, completely assembled in one piece without joints, where possible. If dimensions exceed maximum manufactured panel size, provide two or more pieces of equal length as acceptable to Architect. When overall dimensions require delivery in separate units, prefit components at the factory, disassemble for delivery, and make final joints at the site.

B. Store visual display surfaces vertically with packing materials between each unit.

1.9 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install visual display surfaces until spaces are enclosed and weathertight, wet work in spaces is complete and dry, work above ceilings is complete, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

B. Field Measurements: Verify actual dimensions of construction contiguous with visual display surfaces by field measurements before fabrication.

1. Allow for trimming and fitting where taking field measurements before fabrication might delay the Work.

1.10 WARRANTY

A. Special Warranty for Porcelain-Enamel Face Sheets: Manufacturer's standard form in which manufacturer agrees to repair or replace porcelain-enamel face sheets that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Surfaces lose original writing and erasing qualities.
b. Surfaces exhibit crazing, cracking, or flaking.

2. Warranty Period: 50 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Porcelain-Enamel Face Sheet: Manufacturer's standard steel sheet with porcelain-enamel coating fused to steel; uncoated thickness indicated.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following]:

a. Claridge Products and Equipment, Inc.
b. PolyVision Corporation; a Steelcase company.

c. A-1 visual system.

2. Gloss Finish: Gloss as indicated; dry-erase markers wipe clean with dry cloth or standard eraser.

B. Natural Cork Sheet: Seamless, single-layer, compressed fine-grain cork sheet; bulletin board quality; face sanded for natural finish with surface-burning characteristics indicated.

C. Hardboard: ANSI A135.4, tempered.

D. Fiberboard: ASTM C 208.

E. Extruded Aluminum: ASTM B 221 (ASTM B 221M), Alloy 6063.

2.2 TACKBOARD ASSEMBLIES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Clarus
2. A-1 Visual Systems.
3. Claridge Products and Equipment, Inc.
4. PolyVision Corporation; a Steelcase company.

B. Natural-Cork Tackboard: 1/4-inch- (6-mm-) thick, natural cork sheet factory laminated to 1/4-inch- (6-mm-) thick hardboard backing.

2.3 VISUAL DISPLAY WALL PANEL ASSEMBLIES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. A-1 Visual Systems.
2. Clarus EmpowerED
3. Claridge Products and Equipment, Inc.
4. PolyVision Corporation; a Steelcase company.
5. Tri-Best Visual Display Products.

B. Marker Wall Sheets: Fabricated from 0.021-inch (0.53-mm) uncoated thickness, porcelain-enamel face sheets fused to steel; for direct application to wall surface.

C. Marker Wall Panels: Fabricated from markerboard assembly indicated.

D. Joint Accessories: Manufacturer's standard, exposed trim at butt joints.

E. Adhesive: Mildew-resistant, nonstaining adhesive, for use with specific tack wall panels and substrate application, as recommended in writing by visual display surface manufacturer.

1. Adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

F. Primer/Sealer: Mildew-resistant primer/sealer complying with requirements in Division 09 "Painting" and recommended in writing by visual display surface manufacturer for intended substrate.

G. Face Trim: 5/8 clear anodized aluminum with mitered corners.

H. Mounting Clip: Manufacturers standard.

2.4 FABRICATION

A. Porcelain-Enamel Visual Display Assemblies: Laminate porcelain-enamel face sheet and backing sheet to core material under heat and pressure with manufacturer's standard flexible, waterproof adhesive.

B. Visual Display Boards: Factory assemble visual display boards unless otherwise indicated.

1. Where factory-applied trim is indicated, trim shall be assembled and attached to visual display boards at manufacturer's factory before shipment.

C. Factory-Assembled Visual Display Units: Coordinate factory-assembled units with trim and accessories indicated. Join parts with a neat, precision fit.
1. Provide manufacturer's standard mullion trim at joints between markerboards and tackboards of combination units.

D. Modular Visual Display Boards: Fabricated with integral panel clips attached to core material.

E. Aluminum Frames and Trim: Fabricate units straight and of single lengths, keeping joints to a minimum. Miter corners to a neat, hairline closure.

1. Where factory-applied trim is indicated, trim shall be assembled and attached to visual display units at manufacturer's factory before shipment.

2.5 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.6 ALUMINUM FINISHES

A. Clear Anodic Finish: AAMA 611, AA-M12C22A31, Class II, 0.010 mm or thicker.

B. Color Anodic Finish: AAMA 611, AA-M12C22A32/A34, Class II, 0.010 mm or thicker.

C. Baked-Enamel or Powder-Coat Finish: AAMA 2603 except with a minimum dry film thickness of 1.5 mils (0.04 mm). Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.

2.7 VISUAL DISPLAY SURFACE SCHEDULE

A. Visual Display Board, Markerboard or Tackboard: Factory assembled.

1. Visual Display: Sliding Magnetic Glass writing board- Ultra Thin Glass assembly

    a. Color: Glass
    b. Corners: Square.
    c. Width: Refer to finish schedule on drawings
    d. Height: Refer to finish schedule on drawings
    e. Mounting: Wall.
    f. Mounting Height: As indicated on Drawings.
    g. Factory-Applied Aluminum Trim and Marker Rail: Manufacturer's standard with clear anodic finish.

2. Tackboard: Factory assembled

    a. Tack Surface: Natural-cork tackboard assembly.
    b. Color: TBD
    c. Corners: Square.
    d. Width: Refer to finish schedule on drawings
    e. Height: Refer to finish schedule on drawings
    f. Mounting: Wall.
    g. Mounting Height: As indicated on Drawings.
    h. Edges: Concealed by trim.
    i. Factory-Applied Aluminum Trim & Marker Rail: Manufacturer's standard style, with clear anodic finish.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances, surface conditions of wall, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Comply with manufacturer's written instructions for surface preparation.

B. Clean substrates of substances that could impair the performance of and affect the smooth, finished surfaces of visual display boards, including dirt, mold, and mildew.

3.3 INSTALLATION, GENERAL

A. General: Install visual display surfaces in locations and at mounting heights indicated on Drawings. Keep perimeter lines straight, level, and plumb. Provide grounds, clips, backing materials, adhesives, brackets, anchors, trim, and accessories necessary for complete installation.

3.4 INSTALLATION OF FACTORY-FABRICATED VISUAL DISPLAY BOARDS AND ASSEMBLIES

A. Visual Display Boards: Attach concealed clips, hangers, and grounds to wall surfaces and to visual display boards with fasteners at not more than 8 inches (200 mm) o.c. Secure both top and bottom of boards to walls.

3.5 CLEANING AND PROTECTION

A. Clean visual display surfaces according to manufacturer's written instructions. Attach one cleaning label to visual display surface in each room.

B. Touch up factory-applied finishes to restore damaged or soiled areas.

C. Cover and protect visual display surfaces after installation and cleaning.

3.6 WASTE MANAGEMENT

A. Coordinate with Section 01 74 19.

1. Separate and recycle cut-offs and waste materials and material packaging in accordance with Waste Management Plan and to the maximum extent economically feasible and place in designated areas for recycling.
2. Set aside and protect materials suitable for reuse and/or remanufacturing.
3. Separate and fold up metal banding; flatten and place along with other metal scrap for recycling in designated area.

END OF SECTION 10 11 00

SECTION 10 14 00 - SIGNAGE

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes identifying devices.

1.2 SUBMITTALS

A. See Division 1 – General Requirements for submittal procedures.

B. Product Data: Manufacturer's printed literature for each type of sign, indicating sign styles, font, foreground and background colors, locations, overall dimensions.

C. Signage Schedule: Provide information sufficient to completely define each sign for fabrication, including room number, room name, other text to be applied, sign and letter sizes, fonts and colors.
   1. When room numbers to appear on signs differ from those on the drawings, include drawing room number on schedule.
   2. When content of signs is indicated to be determined later, request such information from Owner through Architect at least 2 months prior to start of fabrication; upon request, submit preliminary schedule.
   3. Submit for approval by Owner through Architect prior to fabrication.

D. Samples: Submit three samples of each type of sign, of size similar to that required for project, illustrating sign style, font and method of attachment.
   1. Selection Samples: Where colors are not specified, submit three sets of color selection charts or chips.
   2. Verification Samples: Submit samples showing colors selected

E Manufacturer's Installation Instructions: Submit installation template and attachment devices.

1.3 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum three years documented experience.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Package signs as required to prevent damage before installation.

B. Package room and door signs in sequential order of installation, labeled by floor and building.

C. Store adhesive attachment tape at ambient room temperatures.

1.5 ENVIRONMENTAL REQUIREMENTS

A. Do not install signs when ambient temperature is lower than recommended by manufacturer.

B. Maintain this minimum temperature during and after installation of signs.

PART 2 PRODUCTS

2.1 CAST ALUMINUM LETTERS

A. Provide cast aluminum letters with text and locations as indicated on Drawings.
1. Material: 214 or 514 aluminum alloy.
2. Finish: Sand-blasted edges. Paint as per finish schedule.
4. Letter Style: Century Gothic Upper Case, Bold
5. Mounting: Concealed Studs, with stainless steel spacers.

B. Manufacturers
1. The Southwell Co., San Antonio, TX 78291
2. Andco Industries Corp., Greensboro, NC 27410
3. Matthews International Corp., Pittsburgh, PA 15212
4. Signs and Decal Corp., Brooklyn, NY 11211

2.2 EXTERIOR WALL SIGNS (At Handicapped Entrances)- NOT USED

A. Access entrance symbol sign, Black duranodic aluminum frame. Insert size 9" x 9". Insert shall have a raised 4" accessibility symbol with the verbal description, “Entrance” using 1" Gill Sans upper case letters directly below and followed by Grade 2 braille.

2.3 INTERIOR SIGNS

A. Manufacturers:
1. Ark Ramos
2. Mohawk Sign Systems, Inc.
3. Seton Identification Products.
4. Substitutions: See Division 1 - General Requirements for submittal procedures.

2.4 SIGNAGE APPLICATIONS

A. Accessibility Compliance: All signs are required to comply with ADAAG and ANSI/CC A117.1 and applicable building codes,

B. Room and Door Signs: Provide a sign for every doorway, whether it has a door or not, excluding corridors, lobbies and similar open areas.

2.5 GRAPHIC PROCESS

A. Tactile characters shall be raised the required 1/32" inches from sign face. Glue-on letters or etched backgrounds are not acceptable.

B. All text shall be accompanied by Grade 2 braille. Braille shall be separated ½" from the corresponding raised characters or symbols. Grade 2 braille translation to be provided by signage manufacturer.

C. All letters, numbers and/or symbols shall contrast with their background, either light characters on a dark background or dark characters on a light background. Characters and background shall have a non-glare finish.

D. Plaque material shall be Special Purpose SP125 decorative thermosetting high pressure laminate. Material to be 1/8” thick laminate with a melamine resin surface and a phenolic resin core which provides resistance to abrasion, stains, alcohol, solvents, boiling water, and heat. The material shall be NEMA rated and have flammability and smoke values that meet the standards for flammability of interior materials.

E. Background color as selected by architect from manufacturer’s actual color samples.

2.6 ACCESSIBILITY GUIDELINES FOR SIGNAGE

A. Room Identification Signs: Signs which designate permanent rooms or spaces shall comply with the following guidelines:
1. Raised Copy - Letters and numerals shall be raised 1/32" upper case, sans serif or simple serif typestyle.
2. Character Height - Raised characters shall be at least 5/8" high, but no higher than 2".
3. Symbols - Symbols shall be accompanied by the equivalent verbal description placed directly below the symbol. The border dimension of the symbol shall be 6" minimum in height.
4. Braille Tags - Grade 2 Braille shall be on all signs, as required.
5. Colors - The characters and backgrounds of all signs shall be of matte or other non-glare finish. Characters and symbols shall contrast with light characters on a dark background or dark characters on a light background. Colors to be as selected by the Architect from the manufacturer's standard colors.
6. Mounting - Signs shall be installed on the wall adjacent to the latch side of the door. If there is no space on the latch side of the door, including double leaf doors, signs shall be placed on the nearest adjacent wall. Mounting height shall be so that the baseline of the tactile copy is located between 48” at the lowest point to 60” at the highest point. . Mounting location for such signage shall be so that a person may approach within three inches of signage without encountering protruding objects or standing within the swing of a door.

B. Directional and Information Signs: Signs which provide direction to, or information about functional spaces of the building shall comply with the same guidelines as those set for Room Identification Signs with the following additions and exceptions.
1. Character Proportion - Letters and numerals on sign shall have a width to height ratio between 3:5 and 1:1 and a stroke width to height ratio between 1:5 and 1:10.
2. Character Height - Characters and numbers on signs shall be sized according to the viewing distance from which they are to be read. The minimum height is measured using an upper case X. Lower case characters are permitted. Any signs that are suspended

or projected overhead shall have characters at least three inches high and shall maintain a minimum clearance of 80 inches from finished floor.
3. Raised Copy - Directional and Informational signs are NOT required to use raised copy or braille tags.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify existing conditions before starting Work.

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install neatly, with horizontal edges level.

C. Sign Locations:
1. Room and Door Signs: Locate on wall at latch side of door. The sign shall be mounted so that the baseline of the tactile copy shall be between 48" at the lowest point to 60" at the highest point above finished floor.
2. If no location is indicated, obtain Owner/s instructions.
3. Maximum Occupancy Signs posted in Assembly spaces in a conspicuous place near the main or exit access doorway.

D. Protect from damage until Substantial Completion; repair or replace damaged items.

3.3 WASTE MANAGEMENT

A. Coordinate with Division 01

1. Separate and recycle cut-offs and waste materials and material packaging in accordance with Waste Management Plan and to the maximum extent economically feasible and place in designated areas for recycling.

2. Set aside and protect materials suitable for reuse and/or remanufacturing.

3. Separate and fold up metal banding; flatten and place along with other metal scrap for recycling in designated area.

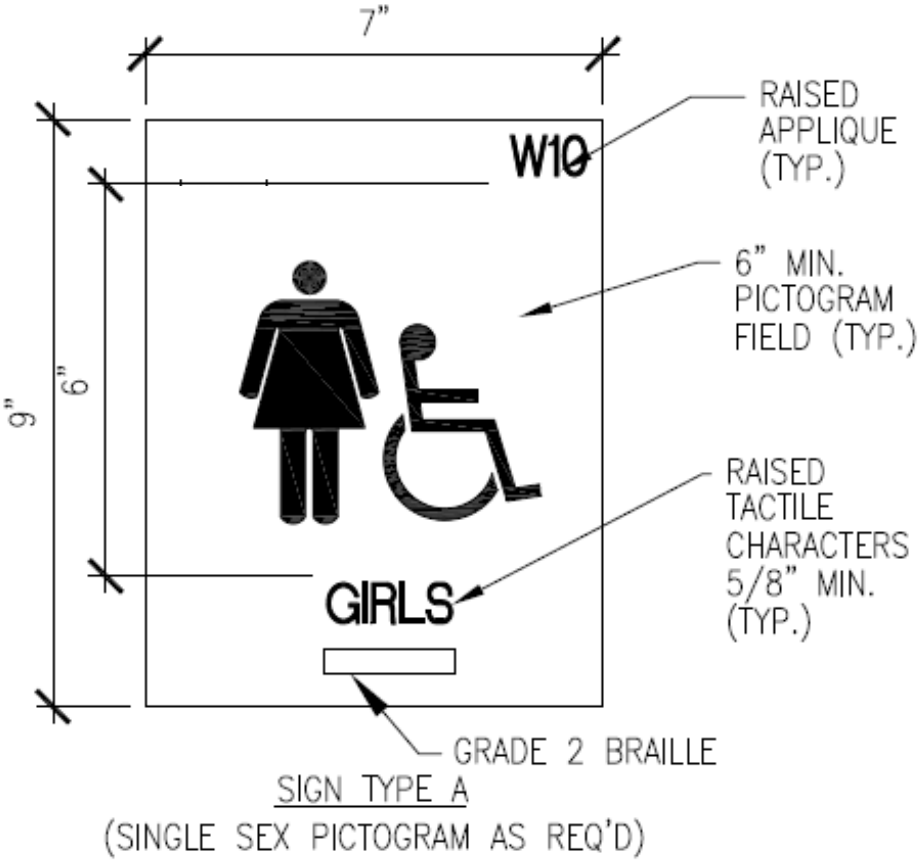
ROOM NUMBER.
RAISED TACTILE
CHARACTERS
5/8” MIN (TYP.)

GRADE 2 BRAILLE

ROOM NAME.
RAISED TACTILE
CHARACTERS
5/8” MIN (TYP.)

HIGH SCHOOL CLASSROMS 6”X12”

NTS



TOILET ROOMS
NTS

END OF SECTION 10 14 00

SECTION 10 21 00 - TOILET PARTITIONS

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 toilet compartments and screens as follows:
   1. Type: Solid-plastic.
   2. Compartment Style: Overhead braced and floor anchored.

B. Related Sections include the following:
   1. Division 5 Section "Metal Fabrications" for supports that attach units to overhead structural system.
   2. Division 10 "Toilet and Bath Accessories" for toilet paper holders, grab bars, purse shelves, and similar accessories.

1.3 SUBMITTALS

A. Product Data: For each type and style of toilet compartment and screen specified. Include details of construction relative to materials, fabrication, and installation. Include details of anchors, hardware, and fastenings.

B. Shop Drawings: For fabrication and installation of toilet compartment and screen assemblies. Include plans, elevations, sections, details, and attachments to other work.
   1. Show locations of reinforcement and cutouts for compartment-mounted toilet accessories.

C. Samples for Initial Selection: Manufacturer's color charts consisting of sections of actual units showing the full range of colors, textures, and patterns available for each type of compartment or screen indicated.

D. Samples for Verification: Of each compartment or screen color and finish required, prepared on 6-inch-square Samples of same thickness and material indicated for Work.

1.4 PROJECT CONDITIONS

A. Field Measurements: Verify dimensions in areas of installation by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
   1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating units without field measurements. Coordinate supports, adjacent construction, and fixture locations to ensure actual dimensions correspond to established dimensions.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Scranton Products
   2. General Partitions Mfg. Corp.
   3. Bradley Corp.

2.2 MATERIALS

A. General: Provide materials that have been selected for surface flatness and smoothness. Exposed surfaces that exhibit pitting, seam marks, roller marks, stains, discolorations, telegraphing of core material, or other imperfections on finished units are unacceptable.

B. Solid-Plastic, Provide units with eased edges and with minimum 1-inch-thick doors and panels, and 1-1/4 inch pilasters. Provide units with Class B flame spread rating under ASTM E84, with smoke developed less than 450. Provide color as follows:
   1. Color: One color in each room as selected by Architect from manufacturer's full range of colors.

C. Pilaster Shoes and Sleeves (Caps): ASTM A 666, Type 302 or 304 stainless steel, not less than 0.0312 inch thick and 3 inches high, finished to match hardware.

D. Full-Height (Continuous) Brackets: Manufacturer's standard design for attaching panels and screens to walls and pilasters of the following material:
   1. Material: Stainless steel.

E. Hardware and Accessories: Manufacturer's standard design, heavy-duty operating hardware and accessories of the following material:
   1. Material: Chrome-plated, nonferrous, cast zinc alloy (zamac) or clear-anodized aluminum.

F. Overhead Bracing: Manufacturer's standard continuous, extruded-aluminum head rail with antigrip profile in manufacturer's standard finish.

G. Anchorages and Fasteners: Manufacturer's standard exposed fasteners of stainless steel or chrome-plated steel or brass, finished to match hardware, with theft-resistant-type heads. Provide sex-type bolts for through-bolt applications. For concealed anchors, use hot-dip galvanized or other rust-resistant, protective-coated steel.

2.3 FABRICATION

A. General: Provide standard doors, panels, screens, and pilasters fabricated for compartment system. Provide units with cutouts and drilled holes to receive compartment-mounted hardware, accessories, and grab bars, as indicated.

B. Overhead-Braced-and-Floor-Anchored Compartments: Provide manufacturer's standard corrosion-resistant supports, leveling mechanism, fasteners, and anchors at pilasters to suit floor conditions. Make provisions for setting and securing continuous head rail at top of each pilaster. Provide shoes at pilasters to conceal supports and leveling mechanism.

C. Doors: Unless otherwise indicated, provide 24-inch-wide in-swinging doors for standard toilet compartments and 36-inch-wide out-swinging doors with a minimum 32-inch-wide clear opening for compartments indicated to be handicapped accessible.
   1. Hinges: Manufacturer's standard self-closing type that can be adjusted to hold door open at any angle up to 90 degrees.
   2. Latch and Keeper: Manufacturer's standard surface-mounted latch unit with combination rubber-faced door strike and keeper designed for emergency access. Provide units that comply with accessibility requirements of authorities having jurisdiction at compartments indicated to be handicapped accessible.
   3. Coat Hook: Manufacturer's standard combination hook and rubber-tipped bumper, sized to prevent door from hitting compartment-mounted accessories.
   4. Door Bumper: Manufacturer's standard rubber-tipped bumpers at out-swinging doors or entrance screen doors.
   5. Door Pull: Manufacturer's standard unit that complies with accessibility requirements of authorities having jurisdiction at out-swinging doors. Provide units on both sides of doors at compartments indicated to be handicapped accessible.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Comply with manufacturer's written installation instructions. Install units rigid, straight, plumb, and level. Provide clearances of not more than 1/2 inch between pilasters and panels and not more than 1 inch between panels and walls. Secure units in position with manufacturer's recommended anchoring devices.

B. Overhead-Braced-and-Floor-Anchored Compartments: Secure pilasters to floor and level, plumb, and tighten. Secure continuous head rail to each pilaster with not less than 2 fasteners. Hang doors and adjust so tops of doors are parallel with overhead brace when doors are in closed position.

3.2 ADJUSTING AND CLEANING

A. Hardware Adjustment: Adjust and lubricate hardware according to manufacturer's written instructions for proper operation. Set hinges on in-swinging doors to hold open approximately 30 degrees from closed position when unlatched. Set hinges on out-swinging doors and swing doors in entrance screens to return to fully closed position.

B. Provide final protection and maintain conditions that ensure toilet compartments and screens are without damage or deterioration at the time of Substantial Completion.

3.3 WASTE MANAGEMENT

A. Coordinate with Section 01 74 19.

1. Separate and recycle cut-offs and waste materials and material packaging in accordance with Waste Management Plan and to the maximum extent economically feasible and place in designated areas for recycling.
2. Set aside and protect materials suitable for reuse and/or remanufacturing.
3. Separate and fold up metal banding; flatten and place along with other scrap for recycling.

END OF SECTION 10 21 00

SECTION 10 28 00 – TOILET AND BATH 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. The work performed under this Section includes the performance criteria, materials, production, and erection of toilet, bath and laundry accessories for the project and consists of the provision of all plant, materials, labor and equipment and the like necessary and/or required for the complete execution of all toilet, bath and laundry accessories as required by schedules, keynotes and drawings, as specified herein, and as may be required by conditions and authorities having jurisdiction including, but not limited to the following:

1. Toilet room accessories.
2. Underlavatory guards.
3. Custodial accessories.

B. Related Sections:
1. Division 09 "Ceramic Tile"

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include the following:

1. Construction details and dimensions.
2. Anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.
3. Material and finish descriptions.
4. Features that will be included for Project.
5. Manufacturer's warranty.

B. Samples: Full size, for each accessory item to verify design, operation, and finish requirements.

1. Approved full-size Samples will be returned and may be used in the Work.

C. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.

1. Identify locations using room designations indicated.
2. Identify products using designations indicated.

1.4 INFORMATIONAL SUBMITTALS

A. Warranty: Sample of special warranty.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For toilet and bath accessories to include in maintenance manuals.

1.6 QUALITY ASSURANCE

A. Source Limitations: For products listed together in the same Part 2 articles, obtain products from single source from single manufacturer.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

1.7 COORDINATION

A. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.

B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

1.8 WARRANTY

A. Special Mirror Warranty: Manufacturer's standard form in which manufacturer agrees to replace mirrors that develop visible silver spoilage defects and that fail in materials or workmanship within specified warranty period.

1. Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Stainless Steel: ASTM A 666, Type 304, 0.031-inch (0.8-mm) minimum nominal thickness unless otherwise indicated.

B. Brass: ASTM B 19, flat products; ASTM B 16/B 16M, rods, shapes, forgings, and flat products with finished edges; or ASTM B 30, castings.

C. Steel Sheet: ASTM A 1008/A 1008M, Designation CS (cold rolled, commercial steel), 0.036-inch (0.9-mm) minimum nominal thickness.

D. Galvanized-Steel Sheet: ASTM A 653/A 653M, with G60 (Z180) hot-dip zinc coating.

E. Galvanized-Steel Mounting Devices: ASTM A 153/A 153M, hot-dip galvanized after fabrication.

F. Fasteners: Screws, bolts, and other devices of same material as accessory unit and tamper-and-theft resistant where exposed, and of galvanized steel where concealed.

G. Chrome Plating: ASTM B 456, Service Condition Number SC 2 (moderate service).

H. Mirrors: ASTM C 1503, Mirror Glazing Quality, clear-glass mirrors, nominal 6.0 mm thick.

I. ABS Plastic: Acrylonitrile-butadiene-styrene resin formulation.

2.2 TOILET/ SHOWER ROOM ACCESSORIES – See Accessory Schedule on drawings

A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
1. American Specialties, Inc.
2. A&J Washroom Accessories, Inc.
3. Bobrick Washroom Equipment, Inc.
4. Bradley Corporation.
5. GAMCO Specialty Accessories; a division of Bobrick Washroom Equipment, Inc.
6. Tubular Specialties Manufacturing, Inc.

2.3 UNDERLAVATORY GUARDS

A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

1. Plumberex Specialty Products, Inc.
2. Truebro by IPS Corporation.

B. Underlavatory Guard:

1. Basis-of-Design Product: ISP Corp Truebro Lav Guard 2.
2. Description: Insulating pipe covering for supply and drain piping assemblies that prevent direct contact with and burns from piping; allow service access without removing coverings.
3. Material and Finish: Antimicrobial, molded plastic, white.

2.4 FABRICATION

A. General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.

B. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner's representative.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.

B. Grab Bars: Install to withstand a downward load of at least 250 lbf (1112 N), when tested according to ASTM F 446.

3.2 ADJUSTING AND CLEANING

A. Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.

B. Remove temporary labels and protective coatings.

C. Clean and polish exposed surfaces according to manufacturer's written recommendations.

3.3 WASTE MANAGEMENT

A. Coordinate with Division 01.

1. Separate and recycle cut-offs and waste materials and material packaging in accordance with Waste Management Plan and to the maximum extent economically feasible and place in designated areas for recycling.
2. Set aside and protect materials suitable for reuse and/or remanufacturing.
3. Separate and fold up metal banding; flatten and place along with other metal scrap for recycling in designated area.

END OF SECTION 10 28 00

SECTION 10 44 13 - FIRE EXTINGUISHER CABINETS

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. The work performed under this Section includes the performance criteria, materials, production, and erection of Fire Extinguisher Cabinets for the project and consists of the provision of all plant, materials, labor and equipment and the like necessary and/or required for the complete execution of all Fire Extinguisher Cabinets as required by schedules, keynotes and drawings, as specified herein, and as may be required by conditions and authorities having jurisdiction.

B. Related Sections:

1. Division 10: "Fire Extinguishers."

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: For fire protection cabinets. Include plans, elevations, sections, details, and attachments to other work.

C. Samples: For each exposed product and for each color and texture specified.

D. Product Schedule: For fire protection cabinets. Coordinate final fire protection cabinet schedule with fire extinguisher schedule to ensure proper fit and function.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance data: For fire protection cabinets to include in maintenance manuals.

1.5 QUALITY ASSURANCE

A. Fire-Rated, Fire Protection Cabinets: Listed and labeled to comply with requirements in ASTM E 814 for fire-resistance rating of walls where they are installed.

B. Coordinate size of fire protection cabinets to ensure that type and capacity of fire extinguishers indicated are accommodated.

C. Coordinate sizes and locations of fire protection cabinets with wall depths.

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

1. Review methods and procedures related to fire protection cabinets including, but not limited to, the following:
   a. Schedules and coordination requirements.

1.6 COORDINATION

A. Coordinate size of fire protection cabinets to ensure that type and capacity of fire extinguishers indicated are accommodated.

B. Coordinate size of fire protection cabinets to ensure that type and capacity of fire hoses, hose valves, and hose racks indicated are accommodated.

C. Coordinate sizes and locations of fire protection cabinets with wall depths.

1.7 SEQUENCING

A. Apply decals or vinyl lettering on field painted, fire protection cabinets after painting is complete.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B.

B. Aluminum: Alloy and temper recommended by aluminum producer and manufacturer for type of use and finish indicated, and as follows:

1. Sheet: ASTM B 209 (ASTM B 209M).

2. Extruded Shapes: ASTM B 221 (ASTM B 221M).

C. Stainless-Steel Sheet: ASTM A 666, Type 304.

D. Tempered Break Glass: ASTM C 1048, Kind FT, Condition A, Type I, Quality q3, 1.5 mm thick.

2.2 FIRE PROTECTION CABINET

A. Cabinet Type: Suitable for fire extinguisher, FEC and hose, rack, valve, and extinguisher, FAC.

1. Products: Subject to compliance with requirements, provide one of the following:
   a. Fire End & Croker Corporation.
   b. J. L. Industries, Inc., a division of Activar Construction Products Group.
   c. Kidde Residential and Commercial Division, Subsidiary of Kidde plc.
   d. Larsen's Manufacturing Company.
   e. Modern Metal Products, Division of Technico Inc.
   f. Moon-American.
   g. Potter Roemer LLC.
   h. Watrous Division, American Specialties, Inc.

B. Cabinet Construction: Where cabinets are located if fire rated walls, provide “Fire-FX” option for cabinet construction.

1. Fire-Rated Cabinets: Construct fire-rated cabinets with double walls fabricated from 0.0428-inch- (1.1-mm-) thick, cold-rolled steel sheet lined with minimum 5/8-inch- (16-mm-) thick, fire-barrier material. Provide factory-drilled mounting holes.

C. Cabinet Material: Steel sheet.

D. Recessed Cabinet: Cabinet box recessed in walls of sufficient depth to suit style of trim indicated. **(NOT USED)**

1. Exposed Flat Trim: One-piece combination trim and perimeter door frame overlapping surrounding wall surface with exposed trim face and wall return at outer edge (backbend).

E. Semirecessed Cabinet: One-piece combination trim and perimeter door frame overlapping surrounding wall surface with exposed trim face and wall return at outer edge (backbend).

1. Rolled-Edge Trim: 2-1/2-inch (64-mm) and 4-inch (102-mm).backbend depth. Coordinate with wall thicknesses.

F. Surface Mounted Cabinet: Cabinet box surface mounted on walls. **(NOT USED)**

1. Exposed Trim: One-piece combination trim and perimeter door frame overlapping surrounding wall surface with exposed trim face and wall return at outer edge (backbend).

G. Cabinet Trim Material: Same material and finish as door.

H. Door Material: Steel sheet.

I. Door Style: Fully glazed vertical panel with frame.

J. Door Glazing: Tempered break glass.

K. Door Hardware: Manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated.

L. Accessories:

1. Mounting Bracket: Manufacturer's standard steel, designed to secure fire extinguisher to fire protection cabinet, of sizes required for types and capacities of fire extinguishers indicated, with plated or baked-enamel finish.

2. Break-Glass Strike: Manufacturer's standard metal strike, complete with chain and mounting clip, secured to cabinet.

3. Door Lock: Cam lock that allows door to be opened during emergency by pulling sharply on door handle.

4. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as directed by Architect.
   a. Identify fire extinguisher in fire protection cabinet with the words "FIRE EXTINGUISHER."
      1) Location: Applied to cabinet glazing.
      2) Application Process: Silk-screened.
      3) Lettering Color: White.
      4) Orientation: Vertical and Horizontal per location.

M. Finishes:

1. Manufacturer's standard baked-enamel paint or powder coat for the following:
   a. Exterior of cabinet door, and trim, except for those surfaces indicated to receive another finish.
   b. Interior of cabinet and door.

2.3 FABRICATION

A. Fire Protection Cabinets: Provide manufacturer's standard box (tub), with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated. Miter and weld joints and grind smooth.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Examine walls and partitions for suitable framing depth and blocking where recessed and semirecessed cabinets will be installed and prepare recesses as required by type and size of cabinet and trim style.

B. Install fire protection cabinets in locations and at mounting heights indicated or, if not indicated, at heights acceptable to authorities having jurisdiction.

C. Fire Protection Cabinets: Fasten cabinets to structure, square and plumb.

D. Identification: Apply decals at locations indicated.

E. Adjust fire protection cabinet doors to operate easily without binding. Verify that integral locking devices operate properly.

F. Replace fire protection cabinets that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

3.2 WASTE MANAGEMENT

A. Coordinate with Section 01 74 19.

1. Separate and recycle cut-offs and waste materials and material packaging in accordance with Waste Management Plan and to the maximum extent economically feasible and place in designated areas for recycling.
2. Set aside and protect materials suitable for reuse and/or remanufacturing.
3. Separate and fold up metal banding; flatten and place along with other scrap for recycling.

END OF SECTION 10 44 13

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SECTION 10 44 16 - FIRE EXTINGUISHERS

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 portable, hand-carried fire extinguishers and mounting brackets for fire extinguishers.

B. Related Requirements:

1. Division 10 "Fire Extinguisher Cabinets."

1.3 PREINSTALLATION MEETINGS

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

1. Review methods and procedures related to fire extinguishers including, but not limited to, the following:

a. Schedules and coordination requirements.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product. Include rating and classification, material descriptions, dimensions of individual components and profiles, and finishes for fire extinguisher and mounting brackets.

B. Product Schedule: For fire extinguishers. Coordinate final fire-extinguisher schedule with fire-protection cabinet schedule to ensure proper fit and function.

1.5 INFORMATIONAL SUBMITTALS

A. Warranty: Sample of special warranty.

1.6 CLOSEOUT SUBMITTALS

A. Operation and maintenance data.

1.7 COORDINATION

A. Coordinate type and capacity of fire extinguishers with fire-protection cabinets to ensure fit and function.

1.8 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace fire extinguishers that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Failure of hydrostatic test according to NFPA 10.
b. Faulty operation of valves or release levers.

2. Warranty Period: Six years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."

B. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.

1. Provide fire extinguishers approved, listed, and labeled by FM Global.

2.2 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS

A. Fire Extinguishers: Type, size, and capacity for each fire-protection cabinet and mounting bracket indicated.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Guardian Fire Equipment, Inc.
b. JL Industries, Inc.; a division of the Activar Construction Products Group.
c. Larsens Manufacturing Company.

2. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B, and bar coding for documenting fire-extinguisher location, inspections, maintenance, and recharging.

C. Multi-Purpose Dry Chemical Type: UL-rated 4-A:60-B:C, 10 lb. nominal capacity, in enameled steel container, for Class A, Class B and Class C fires.

a. Provide multi-purpose dry chemical type ABC extinguishers except where otherwise noted.

2.3 MOUNTING BRACKETS

A. Mounting Brackets: Manufacturer's standard galvanized steel, designed to secure fire extinguisher to wall or structure, of sizes required for types and capacities of fire extinguishers indicated, with plated or red black baked-enamel finish.

1. Manufacturers: Subject to compliance with requirements, provide products by the following provide products by one of the following available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Guardian Fire Equipment, Inc.
b. JL Industries, Inc.; a division of the Activar Construction Products Group.
c. Larsens Manufacturing Company.

B. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated by Architect.

1. Identify bracket-mounted fire extinguishers with the words "FIRE EXTINGUISHER" in red letter decals applied to mounting surface.

a. Orientation: Vertical.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine fire extinguishers for proper charging and tagging.

1. Remove and replace damaged, defective, or undercharged fire extinguishers.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Examine fire extinguishers for proper charging and tagging.

1. Remove and replace damaged, defective, or undercharged fire extinguishers.

B. Install fire extinguishers and mounting brackets in locations indicated and in compliance with requirements of authorities having jurisdiction.

1. Mounting Brackets: 54 inches above finished floor to top of fire extinguisher.

C. Mounting Brackets: Fasten mounting brackets to surfaces, square and plumb, at locations indicated.

3.3 WASTE MANAGEMENT

A. Coordinate with Section 01 74 19.

1. Separate and recycle cut-offs and waste materials and material packaging in accordance with Waste Management Plan and to the maximum extent economically feasible and place in designated areas for recycling.
2. Set aside and protect materials suitable for reuse and/or remanufacturing.
3. Separate and fold up metal banding; flatten and place along with other scrap for recycling.

END OF SECTION 10 44 16

SECTION 11 16 00 - BULLET RESISTANT FIBERGLASS PANELS

PART 1 GENERAL

1.1 REFERENCE

The publication below forms a part of this specification.
UNDERWRITERS LABORATORY UL 752 9th Edition
Standard for Bullet Resisting Equipment dated Jan. 27,1995

1.2 SUBMITTALS

The following shall be submitted in accordance with Sections 01340 and the SPECIAL CONTRACT REQUIREMENTS: Submit for approval prior to fabrication catalog cuts, brochures, specifications, UL LISTING VERIFICATION, proof of possession of PRODUCT LIABILITY INSURANCE in an amount not less than five million U.S. dollars, and printed data in sufficient detail to indicate compliance with the contract documents and the manufacturer's instructions for the installation of Bullet Resistant Fiberglass.

1.3 DESIGN

Through the design, manufacturing technique and material application the Bullet Resistant Fiberglass shall be of the "non-ricochet type". This design is intended to permit the encapture and retention of an attacking projectile lessening the potential of a random injury or lateral penetration.

1.4 DELIVERY, STORAGE AND HANDLING

Deliver the materials to the project with the manufacturer’s UL Labels intact and legible. Handle the material with care to prevent damage. Store the materials inside under cover, stack flat and off the floor.

1.5 WARRANTY

All materials and workmanship shall be warranted against defects for a period of one (1) year from the date of receipt at the project site.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Basis of Design: ArmorCore 13070 Level 3 = 3/4” Ballistic Fiberglass Panels – multiple layer woven ballistic grade fiberglass panels by Waco Composites. www.armorcore.com

D. Substitutions: See Section 01 60 00 - Product Requirements.

2.1 BULLET RESISTANT FIBERGLASS MATERIAL

The panels shall be made of multiple layers of starch-oil woven roving ballistic grade fiberglass cloth impregnated with a thermoset polyester resin and compressed into flat rigid sheets. The production technique and materials used shall provide the controlled internal delamination to permit the encapture of a penetrating projectile. Panels shall be UL Listed (BRF100/BRF200/BRF300).

Bullet Resistant Fiberglass panels shall be UL Listed (BRF300).

2.2 SECURITY LEVEL

The Bullet Resistant Fiberglass must be UL Listed Rated for Level 3.

2.3 SUBSTITUTIONS

Other UL Listed bullet resistant fiberglass products are acceptable if in compliance with all requirements of this specification. Alternate products must be submitted to the architect for approval.

PART 3 EXECUTION

3.1 SUPPORTING MEMBERS

Prior to installing the bullet resistive material, the contractor shall verify that all supports have been installed as required by the contract documents and the architectural drawings.

3.2 JOINTS

All joints shall be reinforced by a back-up layer of bullet resistive material. The bullet resistance of the joint, as reinforced, shall be at least equal to that of the panel. Minimum width of reinforcing layer at joint shall be 4". (2" on each panel side or a 2" minimum overlap per side)

3.3 INSTALLATION

Panels shall be installed in accordance with the manufacturer's printed recommendations. Panels shall be adhered using an industrial adhesive, mastic, screws or bolts. Method of application shall maintain the bullet resistive rating at junctures with the concrete floor slab, the concrete roof slab, the bullet resistive door frames, the bullet resistive window frames, and all required penetrations.

END OF SECTION

SECTION 11 31 00 - RESIDENTIAL APPLIANCES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Refrigeration appliances.
2. Cleaning appliances

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples: For each exposed product and for each color and texture.

1.3 INFORMATIONAL SUBMITTALS

A. Product certificates.

B. Field quality-control reports.

C. Warranties: Sample of special warranties.

1.4 CLOSEOUT SUBMITTALS

A. Operation and maintenance data.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An employer of workers trained and approved by manufacturer for installation and maintenance of units required for this Project.

B. Provide electric-operated appliances with manufacturer's conversion kit installed by a qualified service agency according to manufacturer's written instructions for Project location and type of fuel.

C. Pre-installation Conference: at project site.

1.6 WARRANTY

A. Special Warranties: Manufacturer's standard form in which manufacturer agrees to repair or replace residential appliances or components that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, acceptable manufacturers, but not limited to, the following:

B. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated or comparable product by one of the following:
1. Asko.
2. KitchenAid
3. General Electric
4. Lab Rep Co.
5. Summit Appliances
6. Frigidaire

2.2 REFRIGERATOR/FREEZERS

A. Compact Refrigerator:

1. Basis-of-Design Product: Summit Appliance – All Refrigerator -ADA Complaint (Model # AL54CSSTB)
2. Type: Free Standing
3. Energy Performance, ENERGY STAR: Provide appliances that qualify for the EPA/DOE ENERGY STAR product labeling program.
4. Front Panel: Stainless Steel.

2.3 ICEMAKERS

A. Icemaker:

1. Basis-of-Design Product: Summit Appliance BIM 44ADA.
2. Type: Built-In.
3. Ice Capacity:

a. Production: 40 lbs per day.
b. Storage: 25 lb.

4. Features:

   a. Automatic defrost.
   b. Automatic shutoff.

5. Front Panel: Stainless Steel.

2.4 DISHWASHERS

A. Dishwasher: Complying with AHAM DW-1 and ASSE 1006.

1. Basis-of-Design Product: GE (Model #GDT665SSN).
2. Type: Built-in undercounter.
3. Energy Performance, ENERGY STAR: Provide appliances that qualify for the EPA/DOE ENERGY STAR product labeling program.
4. Front Panel: Stainless Steel.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Built-in Equipment: Securely anchor units to supporting cabinets or countertops with concealed fasteners. Verify that clearances are adequate for proper functioning and that rough openings are completely concealed.

B. Freestanding Equipment: Place units in final locations after finishes have been completed in each area. Verify that clearances are adequate to properly operate equipment.

C. Range Anti-Tip Device: Install at each range according to manufacturer's written instructions.

D. Utilities: Comply with plumbing and electrical requirements.

3.2 FIELD QUALITY CONTROL

A. Perform tests and inspections.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

B. Tests and Inspections:

1. Perform visual, mechanical, and electrical inspection and testing for each appliance according to manufacturers' written recommendations. Certify compliance with each manufacturer's appliance-performance parameters.
2. Leak Test: After installation, test for leaks. Repair leaks and retest until no leaks exist.
3. Operational Test: After installation, start units to confirm proper operation.

4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and components.

C. Prepare test and inspection reports.

3.3 WASTE MANAGEMENT

A. Coordinate with Section 01 74 19
1. Separate and recycle cut-offs and waste materials and material packaging in accordance with Waste Management Plan and to the maximum extent economically feasible and place in designated areas for recycling.
2. Set aside and protect materials suitable for reuse and/or remanufacturing.
3. Separate and fold up metal banding; flatten and place along with other metal scrap for recycling in designated area.

END OF SECTION 11 31 00

SECTION 11 60 00 – HIGH PERFORMANCE FUME HOODS

PART 1- GENERAL

1.01 SUMMARY

A. Section Includes:
   1. High Performance Laboratory fume hoods.

B. Related Sections Includes:
   1. 12 34 50 “Wood Laboratory Furniture”
   2. Division 23 “Mechanical”

1.02 FUME HOOD GENERAL DESIGN REQUIREMENTS

A. Fume hoods shall function as ventilated, enclosed workspaces, designed to capture, confine and exhaust fumes, vapors and particulate matter produced or generated within the enclosure.

B. Design fume hoods for consistent and safe air flow through the hood face. Negative variations of face velocity shall not exceed 20% of the average face velocity at any designated measuring point as defined in this section.

C. Average illumination of work area with white liner: Minimum 80 foot-candles. Work area shall be defined as the area inside the superstructure from side to side and from face of baffle to the inside face of the sash, and from the working surface to a height of 28 inches.

D. Fume hood shall be designed to minimize static pressure loss with adequate slot area. Maximum average static pressure loss readings taken three diameters above the hood outlet from four points, 90 degrees apart, shall not exceed the following maximums with sash in full open position:

Face Velocity	Measured S.P.L. (W.G.)
52 F.P.M.	.19 inches

E. Fume hoods shall be available in standard widths of 4, 5, 6 & 8-feet. Each size will have this depth available: 35.25”.

F. Noise Criteria: Test data of octave band analysis verifying hood is capable of a 50 NC value when connected to a 50 NC HVAC source. Reading taken 3' in front of an open sash at the 18” operational height at 100 fpm face velocity.

1.03 LINER SURFACE FINISH PERFORMANCE REQUIREMENTS

A. Test procedure:
   1. Test No. 1 – Spills and Splashes:
      1.1 Suspend in a vertical plane a 42” (horizontal) by 12” (vertical) panel divided

into 3/4" wide vertical columns, each column numbered 1 through 49.
1.2 Apply five drops of each reagent listed with an eye dropper.
1.3 Apply liquid reagents at top of panel and allow to flow down full panel height. (CAUTION! Flush away any reagent drops.)

2. Test No. 2 – Fumes and Gases:
2.1 Divide 24" x 12" panel into 2" squares, each square numbered 1 through 49.
2.2 Place 25 milliliters of reagent into 100 milliliters beakers and position panel over beaker tops in the proper sequence. Note: Beaker pouring lip permits atmospheric oxygen to enter and participate in the reaction of the reagent fumes.
3. After 24 hours remove panel, flush with water, clean with naphtha and detergent, rinse, wipe dry and evaluate.

B. Evaluation ratings: Change in surface finish and function shall be described by the following ratings:
1. No Effect: No detectable change in surface material.
2. Excellent: Slight detectable change in color or gloss, but no change to the function or life of the work surface material.
3. Good: Clearly discernible change in color or gloss, but no significant impairment of work surface function or life.
4. Fair: Objectionable change in appearance due to surface discoloration or etch, possibly resulting in deterioration of function over an extended period.
5. Failure: Pitting, cratering or erosion of work surface material; obvious and significant deterioration.

C. Test Results: Fume Hood Liner

REAGENT LIST Concentrations by Weight	Test No. 1 Rating Spills	Test No. 2 Fumes
1. Sodium Hydroxide Flake	---	No Effect
2. Sodium Hydroxide, 40%	Excellent	No Effect
3. Sodium Hydroxide, 20%	Excellent	No Effect
4. Sodium Hydroxide, 10%	Excellent	No Effect
5. Ammonium Hydroxide, 28%	No Effect	No Effect
6. Eldorado - Plus (Solution)	No Effect	No Effect
7. Chloroform	Excellent	No Effect
8. LpH SE (Solution)	No Effect	No Effect
9. Trichloroethylene	Excellent	No Effect
10. Monochlorobenzene	Excellent	No Effect
11. Tincture of Iodine	Excellent	Excellent
12. Methyl Alcohol	No Effect	No Effect
13. Ethyl Alcohol	No Effect	No Effect
14. Butyl Alcohol	No Effect	No Effect
15. Phenol, 85%	Excellent	No Effect
16. Cresol	Excellent	No Effect
17. Sodium Sulfide, Saturated	Good	No Effect
18. Furfural	Fair	No Effect
19. Dioxane	No Effect	No Effect
20. Zinc Chloride, Saturated	No Effect	No Effect
21. Benzene	Excellent	No Effect
22. Toluene	Excellent	No Effect
23. Xylene	Excellent	No Effect

24.	Gasoline	Excellent	No Effect
25.	Naphthalene	Excellent	No Effect
26.	Methyl Ethyl Ketone	Excellent	No Effect
27.	Acetone	Excellent	No Effect
28.	Ethyl Acetate	Excellent	No Effect
29.	Amyl Acetate	Excellent	No Effect
30.	Ethyl Ether	Excellent	No Effect
31.	Silver Nitrate, 10%	Good	No Effect
32.	Di Methyl Formamide	No Effect	Excellent
33.	Formaldehyde, 37%	No Effect	No Effect
34.	Formic Acid, 88%	No Effect	No Effect
35.	Acetic Acid, Glacial	No Effect	No Effect
36.	Dichloro Acetic Acid, 93%	Excellent	Excellent
37.	Chromic Acid, Saturated	Good	No Effect
38.	Phosphoric Acid, 85%	No Effect	No Effect
39.	Sulfuric Acid, 33%	No Effect	No Effect
40.	Sulfuric Acid, 77%	Excellent	No Effect
41.	Sulfuric Acid, 93%	Good	No Effect
42.	Hydrogen Peroxide, 30%	No Effect	No Effect
43.	Acid Dichromate	Excellent	No Effect
44.	Nitric Acid, 20%	Excellent	No Effect
45.	Nitric Acid, 30%	Excellent	No Effect
46.	40 & 47 Equal Parts	Excellent	Good
47.	Nitric Acid, 70%	Excellent	Good
48.	Hydrochloric Acid, 37%	No Effect	Excellent
49.	Hydrofluoric Acid, 48%	No Effect	Failure

1.04 SUBMITTALS

A. Shop Drawings: Indicate equipment locations, large scale plans, elevations, cross sections, rough-in and anchor placement dimensions and tolerances and all required clearances.

B. Product Data: Submit manufacturer's data for each component and item of laboratory equipment specified. Include component dimensions, configurations, construction details, joint details, and attachments, utility and service requirements and locations. Include liner and exterior finish tests by independent third party.

1.05 QUALITY ASSURANCE

A. Single source responsibility: Fume hood casework, work surfaces, and other laboratory equipment and accessories shall be manufactured or furnished by a single laboratory furniture company.

B. Manufacturer's qualifications: Modern plant with proper tools, dies, fixtures and skilled workmen to produce high quality laboratory casework and equipment, and shall meet the following minimum requirements:
   1. Five years or more experience in manufacture of laboratory casework and equipment of type specified.
   2. Ten installations of equal or larger size and requirements.
   3. UL 1805 Specification:
      Fume Hood must be Underwriters Laboratories subject 1805 classified. The 1805 standard covers electrical and mechanical hazards, investigate the

flammability of materials and measures the effectiveness of airflow characteristics. Proper labeling must be affixed to the face of each fume hood indicating classification to the UL 1805 standard for Laboratory Fume Hoods. UL listing covering electrical components only or other listings that do not encompass all issues covered in UL 1805 is insufficient. All factory testing shall be performed in a U.L. certified test facility.

1.06 DELIVERY, STORAGE AND HANDLING

A. Schedule delivery of equipment so that spaces are sufficiently complete that equipment can be installed immediately following delivery.

B. Protect finished surfaces from soiling or damage during handling and installation. Keep covered with polyethylene film or other protective coating.

1.07 PROJECT CONDITIONS

A. Do not deliver or install equipment until the following conditions have been met:
1. Windows and doors are installed and the building is secure and weather tight.
2. Ceiling, overhead ductwork and lighting are installed.
3. All painting is completed and floor tile located below casework is installed.

PART 2- PRODUCTS

2.01 MANUFACTURER

A. Casework, fume hood and equipment manufacturer: BMC, P.O. Box 4089, Muskegon, MI 49444, 231-733-1206.
B. Basis of Design- Airfoil ADA Assemblies hoods 60” model with Allen Bradley, model number 600TQX216 motor starter switch.

2.02 FUME HOOD MATERIALS

A. Steel: High quality, cold rolled, mild steel meeting requirements of ASTM A366; gauges U.S. Standard.

B. Stainless steel: Type 304; gauges U.S. Standard.

C. Ceiling closure panels: Minimum 18 gauge; finish to match hood exterior.

D. Safety glass: 7/32" thick laminated safety glass.

E. Sash cables: Stainless steel, uncoated, 1/8" diameter military spec. quality. (MIL-W-83420D-3)

F. Sash guides: Corrosion resistant poly-vinyl chloride.

G. Pulley assembly for sash cable: 2" diameter, nylon race, ball bearing type, with cable retaining device and sash leveling mechanism.

H. Sash pull: Full width extruded aluminum with chemical resistant powder coating.

I. Gaskets: Ridged black PVC for interior access panels. Gasket shall retain access panels with integral clips for easy removal and replacement of panel.

J. Fastenings:
1. Exterior structural members attachments: 1/4-20 machine screws and lock nuts, zinc plated.
2. Interior fastening devices concealed. All fasteners exposed to the hood interior shall be non-metallic.
3. Exterior side access panel member fastening devices to be concealed. Mechanical latch, exposed screws or velcro type fasteners – not acceptable.

K. Instruction plate: Corrosion resistant or plastic plate attached to the fume hood exterior with condensed information covering recommended locations for apparatus and accessories, baffle settings and use of sash.

2.03 FUME HOOD CONSTRUCTION

A. Superstructure: Rigid, self supporting assembly of double wall construction, maximum 5" thick.
1. Wall consists of a sheet steel outer shell and a corrosion resistant inner liner, and houses and conceals steel framing members, attaching brackets and remote operating service fixture mechanisms and services. Panels must be attached to a full frame construction, minimum 16 gauge painted members.
2. Access to fixture valves concealed in wall provided by exterior removable access panels and gasketed access panels on the inside liner walls.

B. Exhaust outlet: Round, 18 gauge stainless steel.

C. Access opening perimeter: Air foil or streamlined shape with all right angle corners radiused. Bottom horizontal foil shall be double tiered and provide nominal one inch bypass when sash is in the closed position. Bottom foil shall not be removable without use of special tools. Bottom foil shall provide access area sufficient in size to pass thru electrical plugs. Bottom foil: Steel with powder coated finish.

D. Fume hood sash: (Combination) Vertical and horizontal sash access with a 35” high sight line. Sash shall be top hung on nylon tired ball bearing wheels. Sash side frame must be inset into sash guides providing a full width unobstructed view of the interior. Exposed side frames - not acceptable. Upper and lower sash frame components to be extruded aluminum. Lower frame radiused to minimize turbulence and have integral guides for horizontal sliding panels. Area above the 27 1/2” vertical sash opening shall be glazed with laminated safety glass. All glass to have finished edge treatment. Horizontal panels provided with finger pulls.

E. Counter balance system: Single weight, pulley, cable, counter balance system which prevents sash tilting and permits one finger operation at any point along full width pull. Maximum 7 pounds pull required to raise or lower sash throughout its full length of travel. Design system to hold sash at any position without creep and to prevent sash drop in the event of cable failure.

F. Sash lock: Keyed sash lock to prevent the sash from opening above 18” without being unlocked. Sash shall be able to be locked at any position, even above 18”, and reset when lowered below 18”.

F. Airfoil: The airfoil will be flush to the worksurface with ample room for electrical cords to fit between the airfoil and sash handle. Sill to be aerodynamically radiused on front edge and have a secondary containment trough.

G. Fume hood liner: Resin-chem: Reinforced polyester panel; smooth finish and white color in final appearance. Flexural strength: 19,500 psi. Flame spread: 19 or less per ASTM E84. Baffle must be same material as liner. Metallic baffles, brackets or supports on hood interior – not acceptable. Liner and baffle material must meet 1.03 performance test.

H. Baffles: Baffles providing controlled air vectors into and through the fume hood must be fabricated of the same material as the liner. High performance baffles must be mathematically calculated to provide proper energy distribution of exhaust currents providing stable performance regardless of sash position. Baffle to be non-adjustable. Baffles with manual or automatic adjustment are not acceptable. All baffles, supports, and brackets to be non-metallic.

I. Sash Position: Sash shall be designed to promote usage as an upper body and face shield. Face velocities and volumes shall be based on an 18” operating opening. Sash shall have the capability to be raised to full 27.5” vertical opening for loading or unloading of large apparatus. A keyed lock shall be provided limiting the sash operation to 18”.

J. Service fixtures and fittings: Color coded hose nozzle outlets and valves mounted inside the fume hood and controlled from the exterior with color coded index buttons.
1. Valves: Needlepoint type with self-centering cone tip and seat of hardened stainless steel. Tip and seat shall be removable and replaceable.
2. Provide piping for all service fixtures from valve to outlet and from valve to a point 3” above or below the superstructure as indicated by project conditions: Copper for water, air and vacuum and black iron for gas services.
3. Fixtures exposed to hood interior: Color coded chemically resistant nylon.
4. Remote control handles: Black nylon four-arm handle with nylon color-coded index buttons.
5. Services: As shown or specified.

K. Hood light fixture: Two lamp, instant start, UL listed, T8 fluorescent light fixture with sound rated “A” ballast installed on exterior of roof. Provide safety glass panel cemented and sealed to the hood roof.
1. Interior of fixture: White, high reflecting plastic enamel.
2. Size of fixture: Largest possible up to 48" for hoods with superstructures up to six feet. Provide two 24" fixtures for hoods with eight foot superstructures.
3. Include lamps with fixtures. Hoods without lamps – not acceptable.
4. Illumination: Per performance values, Part 1 of this Section.
5. Access to light from top front of hood.

L. Electrical services: Three wire grounding type receptacles rated at 120 V.A.C. at 20 amperes. Flush plates: Stainless steel.

M. Wiring: Pre-wire electrical fixtures to junction box located on top of hood.

N. Work surfaces: 1-1/4" thick surface, dished a nominal 3/8” to contain spills.
1. Molded resin work surfaces for hoods with Resin-Chem liners.

O. Safety Monitor/Alarm System: [Specified's Option]

Where shown or specified provide Safety Monitor/Alarm System which monitors face velocity and provides audible and visual alarm if face velocity drops below safe levels. The technology used in the alarm will be based on thermally compensated thermistor based in the alarm module.

1. Safety monitor: UL listed, tamper proof, with all alarm circuits, electric components, external tubing, and manifolds furnished complete and factory installed. The monitor shall have a visual display which provides clear indication of airflow conditions.
2. Calibration is the responsibility of the owner and is required once the hood is stationed and the hood exhaust and room supply systems are balanced. A secondary calibration has been factory set into the alarm's memory only to determine that the alarm is functional and ready for shipment. The primary calibration must be completed in the field.
3. Airflow sensor: Thermally compensated glass-beaded thermistor, factory connected to a side-wall port on the interior of the fume hood.
4. Alarm Signal: Audible and visual signal:
   4.1 Silence pushbutton, which disables the audible alarm, shall be accessible on the front of the safety monitor.
   4.2 When alarm condition is corrected and face velocity and volume return to specified levels, the Safety Monitor will automatically reset and begin routine monitoring.
5. Provide test circuit to verify proper Safety Monitor operation.
6. Electrical rating: Maximum 12 VDC.

2.04 METAL FINISH

A. Metal finish:
   1. Preparation: Spray clean metal with a heated cleaner/phosphate solution, pre-treat with iron phosphate spray, water rinse, and neutral final seal. Immediately dry in heated ovens, gradually cooled, prior to application of finish.
   2. Application: Electrostatic application of epoxy powder coat of selected color and bake in controlled high temperature oven to assure a smooth, hard satin finish. Surfaces shall have a chemical resistant, high-grade laboratory furniture quality finish with a 1.5 mil average thickness.

B. Surface Finish Tests:
   Independent, third party performance testing must be submitted validating compliance and adheres to the finish specifications.
   1. Chemical Spot Test:
      1.1 Purpose of Test
      The purpose of the chemical spot test is to evaluate the resistance a finish has to chemical spills.

      Note: Many organic solvents are suspected carcinogens, toxic and/or flammable. Great care should be exercised to protect personnel and the environment from exposure to harmful levels of these materials.

      1.2 Test Procedure
      Obtain one sample panel measuring 14" x 24" (355.6mm x 609.6mm). The received sample to be tested for chemical resistance as described herein.

      Place panel on a flat surface, clean with soap and water and blot dry. Condition the panel for 48-hours at 73+ 3F (23(+ 2(C) and 50+ 5% relative humidity. Test

the panel for chemical resistance using forty-nine different chemical reagents by one of the following methods:

Method A – Test volatile chemicals by placing a cotton ball saturated with reagent in the mouth of a one-ounce (29.574cc) bottle and inverting the bottle on the surface of the panel.

Method B – Test volatile chemicals by placing five drops of the reagent on the surface of the panel and covering with a 24mm watch glass, convex side down.

For both of the above methods, leave the reagents on the panel for a period of one hour. Wash off the panel with water, clean with detergent and naphtha, and rinse with deionized water. Dry with a towel and evaluate after 24-hours at 73±3°F (23°±2°C) and 50±5% relative humidity using the following rating system:

Level 0 – No detectable change.
Level 1 – Slight change in color or gloss.
Level 2 – Slight surface etching or severe staining.
Level 3 – Pitting, cratering, swelling, or erosion of coating. Obvious and significant deterioration.

Test No.	Chemical Reagent	Test Method
1.	Acetate, Amyl	A
2.	Acetate, Ethyl	A
3.	Acetic Acid, 98%	B
4.	Acetone	A
5.	Acid Dichromate, 5%	B
6.	Alcohol, Butyl	A
7.	Alcohol, Ethyl	A
8.	Alcohol, Methyl	A
9.	Ammonium Hydroxide, 28%	B
10.	Benzene	A
11.	Carbon Tetrachloride	A
12.	Chloroform	A
13.	Chromic Acid, 60%	B
14.	Cresol	A
15.	Dichlor Acetic Acid	A
16.	Dimethylformanide	A
17.	Dioxane	A
18.	Ethyl Ether	A
19.	Formaldehyde, 37%	A
20.	Formic Acid, 90%	B
21.	Furfural	A
22.	Gasoline	A
23.	Hydrochloric Acid, 37%	B
24.	Hydrochloric Acid, 48%	B
25.	Hydrogen Peroxide, 3%	B
26.	Iodine, Tincture of	B
27.	Methyl Ethyl Ketone	A
28.	Methylene Chloride	A
29.	Mono Chlorobenzene	A
30.	Naphthalene	A
31.	Nitric Acid, 20%	B

32.	Nitric Acid, 30%	B
33.	Nitric Acid, 70%	B
34.	Phenol, 90%	A
35.	Phosphoric Acid, 85%	B
36.	Silver Nitrate, Saturated	B
37.	Sodium Hydroxide, 10%	B
38.	Sodium Hydroxide, 20%	B
39.	Sodium Hydroxide, 40%	B
40.	Sodium Hydroxide, Flake	B
41.	Sodium Hydroxide, Saturated	B
42.	Sulfuric Acid, 33%	B
43.	Sulfuric Acid, 77%	B
44.	Sulfuric Acid, 96%	B
45.	Sulfuric Acid, 77% and Nitric Acid, 70%, equal parts	B
46.	Toluene	A
47.	Trichloroethylene	A
48.	Xylene	A
49.	Zinc Chloride, Saturated	B

1.3 Acceptance Level
Results will vary from manufacturer to manufacturer. Laboratory grade finishes should result in no more than four Level 3 conditions. Suitability for a given application is dependent upon the chemicals used in a given laboratory.

2. Hot Water Test
   2.1 Purpose of Test
   The purpose of this test is to insure the coating is resistant to hot water.
   2.2 Test Procedure
   Hot water, 190°F to 205°F (88°C to 96°C), shall be allowed to trickle (with a steady stream and at a rate of not less than 6 ounces (177.44cc) per minute on the surface, which shall be set at an angle of 45-degrees, for a period of five minutes.
   2.3 Acceptance Level
   After cooling and wiping dry, the finish shall show no visible effect from the hot water.
3. Impact Test
   3.1 Purpose of Test
   The purpose of this test is to evaluate the ductility of the coating.
   3.2 Test Procedure
   A one-pound ball approximately 2" (50.8mm) in diameter shall be dropped form a distance of 12" (304.8mm) onto a flat horizontal surface, coated to manufacturer’s standard manufacturing method.
   3.3 Acceptance Level
   There shall be no visible evidence to the naked eye of cracks or checks in the finish due to impact.
4. Paint Adhesion on Steel Test
   4.1 Purpose of Test
   The paint adhesion test is used to determine the bond of the coating to steel. This does not apply to non-steel products.
   4.2 Test Procedure
   This test is based on ASTM D2197-86 “Standard Method of Test for Adhesion of Organic Coating”. Two sets of eleven parallel lines 1/16" (1.587mm) apart shall

be cut with a razor blade to intersect at right angles thus forming a grid of 100 squares. The cuts shall be made just deep enough to go through the coating, but not into the substrate. They shall then be brushed lightly with a soft brush for one minute. Examine under 100-foot candles of illumination.

4.3 Acceptance Level

Ninety or more of the squares shall show finish intact.

5. Paint Hardness on Steel Test

5.1 Purpose of Test

The paint hardness test is used to determine the resistance of the coatings to scratches.

5.2 Test Procedure

Pencils, regardless of their brand, are valued in this way: 8-H is the hardest, and next 11 order of diminishing hardness are 7-H, 6-H, 5-H, 4-H, 3-H, 2-H, H, F, HB, B (soft), 2-B, 3-B, 4-B, 5-B (which are softest). The pencils shall be sharpened on emery paper to a wide sharp edge. Pencils of increasing hardness shall be pushed across the paint film in a chisel-like manner until one is found that will cut or scratch the film. The pencil used before that one, that is the hardest pencil that will not rupture the film, is then used to express or designate the hardness.

5.3 Acceptance Level

The paint shall have a hardness of 4-H minimum.

2.05 SOURCE QUALITY CONTROL TESTING OF FUME HOODS

A. Evaluation of manufacturer's standard product shall take place in manufacturer's own test facility, with testing personnel, samples, apparatus, instruments, and test materials supplied by the manufacturer at no cost to the Owner.

B. Submit test report consisting of the following test parameters and equipment for each hood width and configuration specified.

C. Hood shall achieve a rating of 4.0 AM 0.05 PPM or better. Tested to ASHRAE-110-1995. Test shall be done with sash open 27.5” vertically at 52 fpm face velocity.

D. Test facility: Sufficient size to provide unobstructed clearance of five feet each side and ten feet in front of fume hood. Provide make-up air to replace room air exhausted through fume hood and to obtain a negative 0.2" w.g. room pressure. Introduce make-up air in a manner that minimizes drafts in front of hood to less than 20% of the face velocity.

1. Examine facility to verify conformance to the requirements of this Section.
2. Test room shall be isolated from all personnel during test procedure.

E. Testing equipment:

1. Properly calibrated hot wire thermal anemometer probes equal to Alnor AVT-55; correlate with computer data acquisition format to provide simultaneous readings at all points.
2. Pitot tube manometer with graduations no greater than 0.2 inch of water.
3. Tracer gas: Sulfur hexa-fluoride supplied from a cylinder at a test flow rate of four liters per minute.
4. Ejector system: Tracer gas ejector equal to ASHRAE-110-1995 specification.
5. Critical orifice: Sized to provide tracer gas at four liters per minute at an upstream pressure of 30 PSIG.
6. Detection instruments: Qualitek Model Q200 Leak Meter sulfur hexa-fluoride detector instrument or equal.

7. Recorder with an accuracy better than plus or minus 0.5% of full scale.
8. Three dimensional manikin, overall height 67", clothed in a smock.
9. Titanium tetrachloride glass modules.
10. One dozen 30-second smoke bombs.

F. Preliminary Test and Data:
1. Provide sketch of room indicating room layout, location of significant equipment, including test hood and other hoods. Provide sketch of air supply system indicating type of supply fixtures.
2. Reverse air flows and dead space:
2.1 Swab strip of titanium tetrachloride along both walls and floor of hood in a line 6" behind and parallel to the hood face, and along the top of the face opening. Swab an 8" diameter circle on the back of the hood. All smoke should be carried to the back of the hood and exhausted.
2.2 Test the operation of the bottom air bypass air foil by running the cotton swab under the air foil.
2.3 If visible fumes flow out of the front of the hood, the hood fails the test and receives no rating.
3. Face velocity measurements: Face velocity shall be determined by averaging minimum of four and maximum of eight readings at the hood face. Take readings at center of a grid made up of sections of equal area across the top half of the face and sections of equal area across the bottom half of the face. Take simultaneous readings at each point with a series of calibrated hot wire anemometers over a one minute period of time. Probes shall be correlated to a computer data acquisition package, which will provide an average of each reading over that one minute period and also an overall average. During the one minute monitoring period, all velocities must automatically update average at a maximum of four second intervals.

G. Test Procedure:
1. Check sash operation by moving sash through its full travel. Verify that sash operation is smooth and easy, and that vertical rising sash shall hold at any height without creeping up or down. Position sash in the full open position.
2. Take a static pressure reading, using methods assuring an accurate reading, in an area of the ductwork no more than three feet nor less than one foot above the exhaust collar. Static pressure loss shall not exceed values given under Design Requirements in Part 1 of this Section.
3. Install ejector in test positions. For a typical bench-type hood, three positions are required: left, center and right as seen looking into the hood. In the left position the ejector center line is 12" from the left inside wall of the hood; center position is equal distance from the inside sidewalls; and the right position is 12" from the right inside wall. The ejector body is 6" in from the hood face in all positions. Location of ejector may require modification for hoods of unusual dimensions.
4. Install manikin positioned in front of the hood, centered on the ejector.
5. Fix detector probe in the region of the nose and mouth of the manikin. Take care that method of attachment of the probe does not interfere with the flow patterns around the manikin. Locate nose of manikin 9" in front of ejector (3" in front of sash).
6. Open tracer gas block valve. Correlate readings with a computer data acquisition package, which is capable of monitoring and visually recording a minimum of one reading per second for a minimal three minute time period at each of the three positions.
7. The control level rating of the hood shall be the maximum of the three average

values for the three test positions.

8. Record performance rating of the fume hood as XXAMyyy, where XX equals the release rate in liters per minute (4.0) and AM represents the as manufactured test sequence and yyy equals the control level in parts per million.
9. All data on the above test conditions including instrumentation and equipment, test conditions, preliminary test and data information shall be provided on a report, including a printout of the average face velocities, and a separate graph-type performance curve on all three tracer gas positions.

PART 3- EXECUTION

3.01 INSTALLATION

A. Installation:
   1. Install fume hoods and equipment in accordance with manufacturer's instructions.
   2. Install equipment plumb, square, and straight with no distortion and securely anchored as required.
   3. Secure work surfaces to casework and equipment components with material and procedures recommended by the manufacturer.

B. Accessory installation: Install accessories and fittings in accordance with manufacturer's recommendations.

3.02 ADJUSTING

A. Adjust sash, fixtures, accessories and other moving or operating parts to function smoothly.

3.03 CLEANING

A. Clean equipment, touch up as required.

3.04 PROTECTION OF FINISHED WORK

A. Provide all necessary protective measures to prevent exposure of equipment from exposure to other construction activity.

B. Advise contractor of procedures and precautions for protection of material and installed fume hoods from damage by work of other trades.

END OF SECTION 11 60 00

SECTION 11 68 13 – PLAYGROUND EQUIPMENT, N.I.C

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 this Section.

1.2 SUMMARY

A. Provide playground equipment specifically designed for the ages of 2-5 years.

1.3 SUBMITTALS

A. Product Data: Submit manufacturer's technical data, installation instructions, and general recommendations for each resinous flooring material required. Include certification indicating compliance of materials with requirements.

B. Shop Drawings: Indicate location, size, of each equipment and construction details not covered in Product Data

1.4 QUALITY ASSURANCE

A. Single Source Responsibility: Obtain equipment from a single manufacturer with not less than ten years of successful experience in manufacturing and installing principal materials described in this section. Contractor shall have completed at least five projects of similar size and complexity. Provide secondary materials only of type and from source recommended by manufacturer of primary materials.
   1. Record Submittal: Manufacture shall verify in writing acceptance of all substrates prior to installation.

B. Pre-Installation Conference
   1. General contractor shall arrange a meeting not less than thirty days prior to starting work.
   2. Attendance
      a. General Contractor
      b. Architect/Owner's Representative
      c. Manufacturer/Installer's Representative

1.5 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of referenced standard and manufacturer's written instructions.

1.6 WARRANTY

A. Manufacturer shall furnish a single, written warranty covering both material and workmanship for a period of one (1) full year from date of installation.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Basis of Design BCI Burke Company. American Recreation Products When warranties are required, verify with Owner's counsel that warranties stated in this article are not less than remedies available to Owner under prevailing local laws.
   1. Series: Basics, Intensity, Nucleus,
   2. Age group 5-12 years
   3. Complaint with ASTM F1487 and CPSC playground safety standards.
   4. Accessible safety surfacing material required beneath and around all equipment

B. Or Approved Equal

SECTION 12 24 13 - ROLLER WINDOW SHADES

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 RELATED SECTIONS

A. Division 06 – Rough Carpentry: Wood blocking and grounds for mounting roller shades.

B. Division 09 – Gypsum Board

C. Division 09 – Acoustic Tile Ceilings

D. Division 26 – Electrical

1.3 REFERENCES

A. ASTM G 21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.

B. NFPA 70 - National Electrical Code.

C. NFPA 701 - Fire Tests for Flame-Resistant Textiles and Films.

1.4 SUMMARY

A. The work performed under this Section includes the performance criteria, materials, production, and erection of roller window shades for the project and consists of the provision of all plant, materials, labor and equipment and the like necessary and/or required for the complete execution of all window shades as required by schedules, keynotes and drawings, as specified herein, and as may be required by conditions and authorities having jurisdiction including, but not limited to the following:
   1. Manually operated roller shades with single rollers at all exterior windows of instructional spaces, including but not limited to, classrooms, conference rooms and offices and all interior door glazing and sidelites.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include styles, material descriptions, construction details, dimensions of individual components and profiles, features, finishes, and operating instructions for roller shades.

B. Shop Drawings: Show fabrication and installation details for roller shades, including shadeband materials, their orientation to rollers, and their seam and batten locations.

1. Manual Roller Shades with chain pull.

C. Samples: For each exposed product and for each color and texture specified, 10 inches (250 mm) long.

D. Samples for Initial Selection: For each type and color of shadeband material.

1. Include Samples of accessories involving color selection.

E. Samples for Verification: For each type of roller shade.

1. Shadeband Material: Not less than 10 inches (250 mm) square. Mark inside face of material if applicable.
2. Roller Shade: Full-size operating unit, not less than 16 inches (400 mm) wide by 36 inches (900 mm) long for each type of roller shade indicated.
3. Installation Accessories: Full-size unit, not less than 10 inches (250 mm) long.

F. Roller-Shade Schedule: Use same designations indicated on Drawings.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Product Certificates: For each type of shadeband material, signed by product manufacturer.

C. Product Test Reports: For each type of shadeband material, for tests performed by manufacturer and witnessed by a qualified testing agency.

1.7 CLOSEOUT SUBMITTALS

A. Maintenance Data: For roller shades to include in maintenance manuals.

1.8 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Roller Shades: Full-size units equal to 5 percent of quantity installed for each size, color, and shadeband material indicated, but no fewer than ten units.

1.9 QUALITY ASSURANCE

A. Manufacturer Qualifications: Obtain roller shades system through one source from a single manufacturer with a minimum of ten years experience and minimum of five projects of similar scope and size in manufacturing products comparable to those specified in this section.

B. Installer for Roller Shade System - Qualifications: Installer trained and certified by the manufacturer with a minimum of ten years experience in installing products comparable to those specified in this section.

C. Fire-Test-Response Characteristics: Passes NFPA 701 small and large-scale vertical burn. Materials tested shall be identical to products proposed for use.

D. ShadeCloth Anti-Microbial Characteristics: 'No Growth' per ASTM G 21 results for fungi ATCC9642, ATCC 9644, ATCC9645.

E. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.

1. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Deliver roller shades in factory packages, marked with manufacturer, product name, and location of installation using same designations indicated on Drawings.

1.11 FIELD CONDITIONS

A. Environmental Limitations: Do not install roller shades until construction and finish work in spaces, including painting, is complete and dry and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

B. Field Measurements: Where roller shades are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Allow clearances for operating hardware of operable glazed units through entire operating range. Notify Architect of installation conditions that vary from Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Product: Subject to compliance with requirements, provide:

- Mechoshade Systems, Inc. – Mecho/5 Regular Roll Shade in 4133 Pocket manually operated single roller with Thermoveil screens - 1500 Series 3 % density at all interior classrooms doors with lites and/or sidelites, support space doors with lites and/or sidelites and, and all corridors windows. Shades are not required at exterior operable doors.
- Mechoshade System, Inc. – Mecho/5 Regular Roll in 5113 Pocket manually operated double roller shade with Thermoveil 1500 Series 3% density and 0100 Series Blackout at all science labs and prep rooms exterior windows.
-

Or comparable product by one of the following:

1. BTX Window Automation, Inc.
2. DFB Sales.
3. Draper Inc.
4. Hunter Douglas Contract.
5. Lutron Electronics Co., Inc.

B. Source Limitations: Obtain roller shades from single source from single manufacturer.

2.2 MANUALLY OPERATED SHADES WITH SINGLE ROLLERS

A. Chain-and-Clutch Operating Mechanisms: With continuous-loop bead chain and clutch that stops shade movement when bead chain is released; permanently adjusted and lubricated.

1. Bead Chains: Stainless steel.

a. Loop Length: Full length of roller shade.
b. Limit Stops: Provide upper and lower ball stops.
c. Chain-Retainer Type: Chain tensioner, jamb mounted.

2. Spring Lift-Assist Mechanisms: Manufacturer's standard for balancing roller-shade weight and lifting heavy roller shades.

B. Rollers: Corrosion-resistant steel or extruded-aluminum tubes of diameters and wall thicknesses required to accommodate operating mechanisms and weights and widths of shadebands indicated without deflection. Provide with permanently lubricated drive-end assemblies and idle-end assemblies designed to facilitate removal of shadebands for service.

1. Roller Drive-End Location: As directed during shop drawing review.
2. Direction of Shadeband Roll: Reverse, from front of roller.

C. Mounting Hardware: Brackets or endcaps, corrosion resistant and compatible with roller assembly, operating mechanism, installation accessories, and mounting location and conditions indicated.

D. Roller-Coupling Assemblies: Coordinated with operating mechanism and designed to join up to three inline rollers into a multiband shade that is operated by one roller drive-end assembly.

E. Shadebands:

1. Shadeband Material: Translucent.
2. Shadeband Bottom (Hem) Bar: Steel or extruded aluminum.

    a. Type: Exposed with endcaps.
    b. Color and Finish: As selected by Architect from manufacturer's full range.

F. Shade Pocket: For mounting as indicated on the drawings.

1. Extruded aluminum shade pocket, sized to accommodate roller shades, with exposed extruded aluminum closure mount, tile support and removable closure panel to provide access to shades.
2. Basis of Design: 4133 surface mounted with endcaps, as per details.

G. Installation Accessories:

1. Side Channels: With light seals and designed to eliminate light gaps at sides of shades as shades are drawn down. Provide side channels with shadeband guides or other means of aligning shadebands with channels at tops.
2. Bottom (Sill) Channel or Angle: With light seals and designed to eliminate light gaps at bottoms of shades when shades are closed.
3. Installation Accessories Color and Finish: As selected from manufacturer's full range.

2.3 MANUALLY OPERATED SHADES WITH DOUBLE ROLLERS

A. Chain-and-Clutch Operating Mechanisms: With continuous-loop bead chain and clutch that stops shade movement when bead chain is released; permanently adjusted and lubricated.

1. Bead Chains: Stainless steel.

    a. Loop Length: Full length of roller shade.
    b. Limit Stops: Provide upper and lower ball stops.
    c. Chain-Retainer Type: Chain tensioner, jamb mounted.

2. Spring Lift-Assist Mechanisms: Manufacturer's standard for balancing roller-shade weight and lifting heavy roller shades.

B. Rollers: Corrosion-resistant steel or extruded-aluminum tubes of diameters and wall thicknesses required to accommodate operating mechanisms and weights and widths of shadebands indicated without deflection. Provide with permanently lubricated drive-end assemblies and idle-end assemblies designed to facilitate removal of shadebands for service.

1. Double-Roller Mounting Configuration: Offset, outside roller over and inside roller under.
2. Inside Roller:

    a. Drive-End Location: As indicated on Drawings.
    b. Direction of Shadeband Roll: Regular, from back of roller.

3. Outside Roller:

a. Drive-End Location: As indicated on Drawings.
b. Direction of Shadeband Roll: Regular, from back of roller.

4. Shadeband-to-Roller Attachment: Manufacturer's standard method.

C. Mounting Hardware: Brackets or endcaps, corrosion resistant and compatible with roller mounting configuration, roller assemblies, operating mechanisms, installation accessories, and installation locations and conditions indicated.

D. Roller-Coupling Assemblies: Coordinated with operating mechanism and designed to join up to three inline rollers into a multiband shade that is operated by one roller drive-end assembly.

E. Inside Shadebands:

1. Shadeband Material: Light-filtering fabric.
2. Shadeband Bottom (Hem) Bar: Steel or extruded aluminum.

a. Type: Enclosed in sealed pocket of shadeband material.
b. Color and Finish: As selected by Architect from manufacturer's full range.

F. Outside Shadebands:

1. Shadeband Material: Light-blocking fabric.
2. Shadeband Bottom (Hem) Bar: Steel or extruded aluminum.

a. Type: Enclosed in sealed pocket of shadeband material.
b. Color and Finish: As selected by Architect from manufacturer's full range.

G. Shade Pocket: For mounting as indicated on the drawings.

1. Extruded aluminum shade pocket, sized to accommodate roller shades, with exposed extruded aluminum closure mount, tile support and removable closure panel to provide access to shades.
2. Basis of Design: 4133 surface mounted with endcaps, as per details.
3. Retain "Recessed Shade Pocket" Subparagraph below for roller enclosure installed above the ceiling.

H. Installation Accessories:

1. Side Channels: With light seals and designed to eliminate light gaps at sides of shades as shades are drawn down. Provide side channels with shadeband guides or other means of aligning shadebands with channels at tops.
2. Bottom (Sill) Channel or Angle: With light seals and designed to eliminate light gaps at bottoms of shades when shades are closed.
3. Installation Accessories Color and Finish: As selected from manufacturer's full range.

2.4 SHADEBAND

A. Shadeband Material Flame-Resistance Rating: Comply with NFPA 701. Testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

B. Shade Bands: Construction of shade band includes the fabric, the enclosed hem weight, shade roller tube, and the attachment of the shade band to the roller tube. Sewn hems and open hem pockets shall not be acceptable.
   1. Concealed Hembar: Shall be continuous extruded aluminum for entire width of shade band and with the following characteristics:
      a. Hembar shall be heat sealed on all sides.
      b. Open ends shall not be accepted.
   2. Shade band and Shade Roller Attachment:
      a. Use extruded aluminum shade roller tube of a diameter and wall thickness required to support shade fabric without excessive deflection.
      b. Provide for positive mechanical attachment of shade band to roller tube; shade band shall be made removable / replaceable with a "snap-on" snap-off" Spline mounting, without having to remove shade roller from shade brackets.
      c. Mounting Spline shall not require use of adhesives, adhesive tapes, staples, and/or rivets.
      d. Any method of attaching shade band to roller tube that requires the use of: adhesive, adhesive tapes, staples, and/or rivets, does not meet the performance requirements of this specification and shall not be accepted.

C. Light-Filtering Fabric: Woven fabric, stain and fade resistant.

   1. Source: Roller-shade manufacturer.
   2. Type: PVC-coated polyester.
   3. Weave: Dense Vertical Weave.
   4. Roll Width: 96 inches (244 mm).
   5. Orientation on Shadeband: Up the bolt.
   6. Openness Factor: 3 percent.
   7. Color: As selected by Architect from manufacturer's full range.

D. Light-Blocking Fabric: Opaque fabric, stain and fade resistant.

   1. Source: Roller-shade manufacturer.
   2. Type: Acrylic-coated fiberglass.
   3. Roll Width: 98 inches (249 mm).
   4. Orientation on Shadeband: Up the bolt.
   5. Features: Flame retardant and flame resistant.
   6. Color: As selected by Architect from manufacturer's full range.

2.5 ROLLER-SHADE FABRICATION

A. Product Safety Standard: Fabricate roller shades to comply with WCMA A 100.1, including requirements for flexible, chain-loop devices; lead content of components; and warning labels.

B. Unit Sizes: Fabricate units in sizes to fill window and other openings as follows, measured at 74 deg F (23 deg C):

1. Between (Inside) Jamb Installation: Width equal to jamb-to-jamb dimension of opening in which shade is installed less 1/4 inch (6 mm) per side or 1/2-inch (13-mm) total, plus or minus 1/8 inch (3.1 mm). Length equal to head-to-sill or -floor dimension of opening in which shade is installed less 1/4 inch (6 mm), plus or minus 1/8 inch (3.1 mm).
2. Outside of Jamb Installation: Width and length as indicated, with terminations between shades of end-to-end installations at centerlines of mullion or other defined vertical separations between openings.

C. Shadeband Fabrication: Fabricate shadebands without battens or seams to extent possible except as follows:

1. Vertical Shades: Where width-to-length ratio of shadeband is equal to or greater than 1:4 provide battens and seams at uniform spacing along shadeband length to ensure shadeband tracking and alignment through its full range of movement without distortion of the material.
2. Railroaded Materials: Railroad material where material roll width is less than the required width of shadeband and where indicated. Provide battens and seams as required by railroaded material to produce shadebands with full roll-width panel(s) plus, if required, one partial roll-width panel located at top of shadeband.
3. Blackout shadebands, when used in side channels, shall have horizontally mounted, roll-formed stainless steel or tempered-steel battens not more than 3 feet (115 mm) on center extending fully into the side channels. Battens shall be concealed in an integrally-colored fabric to match the inside and outside colors of the shadeband, in accordance with manufacturer's published standards for spacing and requirements.
    a. Battens shall be roll formed of stainless steel or tempered steel and concave to match the contour of the roller tube.
    b. Batten pockets shall be self-colored fabric front and back RF welded into the shadecloth. A self-color opaque liner shall be provided front and back to eliminate any see through of the batten pocket that shall not exceed 1-1/2 inches (38.1 mm) high and be totally opaque. A see-through moire effect, which occurs with multiple layers of transparent fabrics, shall not be acceptable.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, operational clearances, accurate locations of connections to building electrical system, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 ROLLER-SHADE INSTALLATION

A. Install roller shades level, plumb, and aligned with adjacent units according to manufacturer's written instructions.

1. Opaque Shadebands: Located so shadeband is not closer than 2 inches (51 mm) to interior face of glass. Allow clearances for window operation hardware.

B. Electrical Connections: Connect motor-operated roller shades to building electrical system.

3.3 ADJUSTING

A. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.

3.4 CLEANING AND PROTECTION

A. Clean roller-shade surfaces after installation, according to manufacturer's written instructions.

B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer that ensure that roller shades are without damage or deterioration at time of Substantial Completion.

C. Replace damaged roller shades that cannot be repaired, in a manner approved by Architect, before time of Substantial Completion.

3.5 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain motor-operated roller shades.

3.6 WASTE MANAGEMENT

A. Coordinate with Section 01 74 19.

1. Separate and recycle cut-offs and waste materials and material packaging in accordance with Waste Management Plan and to the maximum extent economically feasible and place in designated areas for recycling.
2. Set aside and protect materials suitable for reuse and/or remanufacturing.
3. Separate and fold up metal banding; flatten and place along with other metal scrap for recycling in designated area.

END OF SECTION 12 24 13

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SECTION 12 34 50 - WOOD LABORATORY FURNITURE- NANUET HIGH SCHOOL

1.00 MANUFACTURERS

A. The basis of this specification is wood casework manufactured and constructed according to the standards used by Leonard Peterson & Co., Inc., 400 Webster Road, Auburn, Alabama. The specified design is **Vanguard – REVEAL OVERLAY.** All laboratory equipment covered by the specification shall be the product of one manufacturer and be fabricated at one geographic location to assure shipping continuity and single-source responsibility. All quotations from a manufacturer other than Leonard Peterson & Co., Inc. shall contain a review of the following capabilities:

1. List of shop facilities
2. List of engineering and manufacturing personnel
3. Proof of financial ability to fulfill the contract
4. List of a minimum of ten (10) installations over the last five (5) years of comparable scope
5. Proof of project management and installation capabilities
6. AWI Premium Grade Certification Number.

B. The selected manufacturer must warrant for a period of three (3) years, starting on the date of acceptance or occupancy, whichever comes first, that all products sold under the contract referenced above shall be free from defects in material and workmanship. Purchaser shall notify the manufacturer's representative immediately of any defective product. The manufacturer shall have a reasonable opportunity to inspect the goods. The purchaser shall return no product until receipt by purchaser of written shipping instructions from the manufacturer.

C. Samples:
Samples from non-specified manufacturers will be required and reviewed per specification. Samples shall be delivered, at no cost to the architect or owner to a destination set forth by the architect or owner. This must be done seven (7) days before quotation deadline as a condition of approval of each bidder. Samples shall be full size, production type samples. Miniature, or "Show Room" type samples are not acceptable. Furnish the following:

1. One combination drawer and cupboard base unit showing complete construction details, including one shelf.
2. One leg corner sample showing table construction.
3. One sample of all top materials shown or called for, of sufficient size to perform finish requirements test.
4. Sample of mechanical service fittings, locks, door pulls, hinges, and interior hardware and other material deemed necessary for review.

D. The above samples of the successful manufacturer may be impounded by the architect or owner to insure that material delivered to the jobsite conforms in every respect to the samples submitted.

2.00 MATERIALS

A. General:

1. Casework shall be reveal overlay and constructed in accordance with the best woodworking practices. All cabinetry shall be produced in manufacturers own facility and operated under his control and supervision. First class quality of casework shall be established and maintained by use of proper machinery, finishing products, tools, fixtures and skilled workmanship.

2. Casework units to be dowel pin construction with all joints properly glued making each unit rigid and self-supporting.

3. Material shall be selected so that the finished installation shall provide an attractive and harmonious appearance. All exterior casework surfaces exposed to view after installation shall be Northern Red Oak. Solid woods and veneers behind closed doors or drawers shall be of color and graining in conformance with the normally accepted standard required of the scientific laboratory equipment industry.

B. Solid Woods:

All solid woods shall be hardwood carefully and thoroughly air-dried, then kiln dried in humidity controlled kilns to a moisture content of 4-1/2%. All kiln dried lumber shall then be tempered to a moisture content of 6% before use. This moisture content shall be maintained throughout production.

C. Plywoods:

All plywood shall be hardwood. Soft woods such as Fir or Pine are not permitted.

1. Veneer Core Plywood:

Veneer core plywood shall be either 7-ply (3/4”) or 9-ply (1”) and shall be compliant with ANSI/HPVA HP-1 2009.

2. Composition Core Plywood:

Composition core plywood shall be 3-ply and shall be compliant with ANSI A208.1-2009, and/or ANSI A208.2-2009.

3. Face Veneers:

Plywood face veneers shall be Grade A, plain sliced, book matched, red oak on face, and Grade 1, red oak on back.

D. Banding:

Plywood panels to shall be edge banded as specified with a multiple ply hardwood edge-banding or 1/8” (3mm) solid lumber to match exposed cabinet veneer.

E. Tempered Hardboard:

Tempered Hardboard shall be a wood fiber/resinous combination formed with heat and pressure into sheets providing a hard, smooth surface and shall be compliant with ANSI A135.4-2004.

F. Dowels:

Assembly dowels, used to joint rails to panels, shall be fluted hardwood 8mm in diameter x 36mm in length. All dowels glued into components.

G. Glass:

Glass for framed sliding and swinging doors shall be 1/8" float glass (tempered glass provided when specified). Glass for unframed sliding doors shall be ¼" float glass.

H. Glues:

All glues used in the manufacture of plywood, assembly of component parts and cabinetry to be water resistant with no added urea formaldehyde.

I. Finishes:

Conversion varnish with no added urea formaldehyde and shall comply with HUD 24 CFR 3280.308.

Custom Gray Finish as selected by Architect will be required on all Base Cabinets.

Custom White Finish as selected by Architect will be required on all Wall Cases.

J. Hardware:

1. Drawer and door pulls: Bar Type made of extruded aluminum 4-1/2" long and ½" wide having dull brushed finish. Pull attached with two (2) No. 10 flat head machine screws countersunk on 4"centers. Pulls provided for all hinged doors and drawers. (Plastic pulls or a design not compatible for use by the handicapped is not acceptable.) **Pulls to be Black**.

2. Hinges: Butt style, 5-knuckle, institutional type of dull finished stainless steel, 2-1/2" by 3-1/8", unequal winged, tight pinned and with wing thickness of .081". Each hinge is secured by seven plated No. 7 flat head screws. (Surface mounted hinges shall not be acceptable.) **Hinges to be Black**.

   Doors hung with paired hinges are capable of supporting 175 pounds at 12" from pivot point of hinges with no distortion of hinges or degradation of casework. Hinged doors up to 48" high furnished with 1 pair of hinges. Hinged doors over 48" high furnished with 1-1/2 pair of hinges.

3. Drawer Slides: 100 lb. rated capacity, full extension, zinc plated, linear ball bearing made of cold rolled steel. Drawers removable without the use of tools.

4. Shelf support clips: double pin type made of vinyl having anti-tipping seismic feature. Each clip capable of supporting 200 pounds. Clips engage into holes drilled into cabinet end panels or partitions.

5. Catches: spring loaded, nylon roller type, designed for quiet operation provided for hinged doors. Cabinets with locked paired doors have elbow catches inside left-hand doors. Cabinet and case doors provided with 2 catches, one at top and one at bottom, where elbow catches are not furnished.

6. Base molding (when call for or specified): pliable black vinyl, 1/8" thick by 4" high with top edge rounded. Molding secured with self-stick or applied waterproof adhesives. Formed stainless steel caps are fastened to exposed corners. Exposed cabinet work provided with base molding unless otherwise specified.

7. Drawer and hinged door locks: dead bolt style, heavy-duty, five-tumbler, of non-ferrous metal and master-keyed having 3/8" bolt throw and single bitted style keyway. Barrel and back plate of locks are riveted together; lock bolts are non-removal. Locks with cams held in place with machine screws or nuts are not acceptable. Locks are secured to rear of drawer and door fronts with flat head screws. Each lock furnished with one non-ferrous key when keyed alike and two non-ferrous keys when keyed differently. Locks shall be keyed to same master key as locks provided for other drawer and hinged door cabinets. **Locks to be Black and furnished on all doors and drawers**.

2.01 CONSTRUCTION

A. General:

The prime intent of this specification is to define the essential minimum cabinet case and table requirements of the materials, and construction, finish and workmanship to be supplied. Cabinetry to be of convention reveal overlay style design having drawer and doors provided with edges overlapping openings on all edges. Each cabinet unit shall be completely factory assembled and finished. Cabinets constructed with flush interiors having no offsets maximizing drawer and cupboard space and ease of cleanability. All exposed joints shall be closely fitted and tight showing no open joints when finished. All exposed corners eased. Individual cabinet, case and table units shall meet or exceed the Recommended Standards and Practices outlined in SEFA 8.

B. Base Cabinets:

1. End panels, partitions, bottoms and shelves:

Exposed end panels, partitions, bottoms and shelves to be ¾" thick red oak veneer core plywood. Unexposed end panels, partitions, bottoms and shelves to be ¾" thick birch or maple veneer core plywood providing light cabinet interiors behind closed doors. Exposed edges of end panels, partitions and bottoms to be banded in red oak. Edges of shelves behind solid doors to be red oak wood or red oak PVC depending on finish.

Interiors of end panels and partitions to be drilled to receive dowel inserted edges of rails, bottoms and toe boards and bored for shelf clips where required. Bottoms machined for and provided with dowels (on maximum of 96mm centers) for insertion into end panels or partitions and grooved to receive cupboard backs.

Cupboard base cabinet shelves to be ¾" thick veneer core plywood, adjustable on 1-1/4" (32mm) centers.

2. Top Frame:

Cabinet top frame to be comprised of a front rail and a back rail. Front rail to be 4" x 1" hardwood having exposed edge red oak banded and end edges drilled and provided with three (3) dowels for horizontal glued insertion into cabinet end panels at front. Back rail shall be ¾" hardwood varying in height from 9" high for

35" high cabinets to 7-3/4" high for 29" high cabinets and inserted vertically at rear into cabinet end panels. End edges of back rails each drilled and provided with four (4) dowels for glued insertion into ends panels.

3. Intermediate Rails:

Intermediate Rails to be 4" x ¾" hardwood having exposed edge red oak banded and end edges each drilled and provided with 3 dowels for insertion into end panels. Intermediate rails placed horizontally at face of panels between all drawers or drawers and cupboards. Intermediate rails machined to receive engagement of lock bolts and security panels when specified.

4. Backs:

Interior cupboard backs to be ¼" thick tempered hardboard and provided removable. Backs set into grooved cabinet bottom and attached at top to rear vertical rail with minimum of two (2) screws. Exposed interior cupboard backs to be ¼" veneer core red oak plywood provided removable unless specified as fixed.

Exposed exterior finished oak backs for free standing cabinets or mobile units to be of ¾" thick red oak veneer core plywood with exposed edges banded. Free standing units up to 8'0" long shall be provided with one piece back and shipped assembled to cabinets.

5. Drawers:

Drawer heads shall be ¾" thick, red oak, composite core plywood. Drawer sides, back and sub-front to be 15/32" thick, 11 ply birch plywood. Drawer fronts secured to four-sided drawer body with the use of screws. Drawer bodies secured with interlocking lap joints and back fully rabbeted into sides. Joints glued and pinned. Bottoms to be ¼" tempered hardboard fully grooved into drawer sub-fronts, sides and back.

Drawers provided with 100 lb. full extension slides and pulls as described under Hardware. Drawers over 26" wide to have two (2) pulls.

Base Cabinet Drawers to be furnished with Plastic Laminate Fronts with color as selected by the Architect.

6. Security Panels:

Security panels shall be ¼" thick tempered hardboard attached to back of front intermediate rails and fastened into security clips or rails at rear of cabinet. Security panels provided only when locks are keyed differently between drawers or drawers and cupboards.

7. Hinged Paneled Doors:

Doors shall be ¾" thick, red oak, composite core plywood edge banded on all four edges. Paired cabinet doors to have matched grain pattern. Doors provided with two (2) hinges, one (1) pull and one (1) catch as described under Hardware.

Base Cabinet Doors to be furnished with Plastic Laminate Fronts with color as selected by the Architect.

8. Toe Spaces:

Base Cabinets to have recessed toe space 4" high x 2-1/2" deep. Toe board made of ¾" thick water resistant hardwood. End edges machined for and provided with three (3) dowels for glued insertion into cabinet end panels. Toe boards further secured to underside of bottom with glue block(s) for rigidity.

C. Wall Cases and Tall Storage Cases:

1. End Panels, Partitions, Bottoms and Shelves:

Exposed end panels, partitions, bottoms and shelves to be red oak veneer core plywood. Unexposed components to be birch or maple veneer core plywood providing light cabinet interiors behind closed doors. Exposed edges of end panels, partitions and bottoms to be banded in red oak. Edges of shelves behind solid doors to be red oak wood or red oak PVC depending on finish. End panels machined to receive doweled bottoms, tops and toe boards. Dowels to be spaced on maximum 96mm centers. End panels bored to receive adjustable shelf clips on 1-1/4" (36 mm) centers.

End panels, partitions and bottoms of tall cases to be ¾" thick.

Tops, of wall cases, counter mounted cases and tall cases to be 1" thick. Bottoms of wall cases and counter mounted cases to be 1" thick. All exposed front edges to be hardwood edge banded.

Wall and counter mounted cases to be provided with ¾" thick veneer core plywood shelves. Shelves for tall case to be 1" thick veneer core plywood. Exposed front edge of shelves to be red oak banded. All shelves to be full depth and adjustable except for center shelf provided in tall cases which shall be fixed.

2. Backs:

Unexposed interior backs shall be ¼" tempered hardboard grooved into tops, ends and bottoms. Exposed interior backs shall be ¼" veneer core red oak plywood attached to tops, ends and bottoms. Backs are further supplied and secured with ¾" x 3" wide batton strips behind back of backs for reinforcement and through which hardware shall be attached for securement to walls. Exposed exterior back shall be ¾" thick veneer core red oak plywood having red oak edge bands.

3. Toe Boards:

4" high toe boards provided at base of tall storage cases shall be ¾" thick water resistant hardwood. End edges to each machined for and provided with 3 dowels for insertion into case ends. Toe boards set flush with face of ends and further secured to underside of bottom with glue block(s) for rigidity.

4. Hinged Panel Doors:

Doors shall be ¾" thick, red oak, composite core plywood edge banded on all four edges. Door provided with similar hardware to base cabinets except doors over 36" high to have 1-1/2 pair of hinges and 2 catches.

Wall Case Doors to be furnished with White Markerboard Surface.

D. Apron and Table Frame Construction:

1. Apron and table frames made of hardwood. Exposed rails minimum ¾" thick x 4-3/4" high red oak grooved for acceptance of cross rails and corner blocks.

2. Reinforcing cross rails made of hardwood, grooved, glued and screwed into front and back rails.

3. Apron and table rail corner blocks, for attachment of legs shall be 13 gauge formed plated steel grooved and screwed into aprons.

4. **Student Table Legs to be 2" square 14 gauge black power coated steel telescoping for height adjustment. Legs attach to apron corners with a 3/8" diameter chrome plated bolt having head conforming to leg edge rounding, passing diagonally through leg. Legs furnished with 3" diameter casters**.

5. Panel legs, for attachment of aprons, to be 1-1/4" thick constructed of hardwood plywood having top and bottom concealed solid hardwood bands. Exposed edges faced with solid oak bands.

E. Cabinet Finish:

1. After assembly of cabinets but prior to the application of wood stain and sealing cabinet and case parts to be sanded smooth and loose fibers and dust removed.

2. Exposed cabinet and case parts and backs of doors then receive an application of stain. Excess stain to be removed by wiping with wood wool and/or cloth, and parts allowed to thoroughly dry. Unexposed interiors behind solid doors and drawers left natural providing light interiors for ease of viewing.

3. After drying, exposed parts, cabinet and case interiors, shelves, drawers and doors to receive a double coat of clear resinous wood sealer. Exposed cabinet parts, drawers, doors, and cupboard and case interiors then receive a double coat of clear, chemical resistant synthetic varnish. Between all applications of sealer and varnish, cabinet parts to be lightly sanded and wiped. The resulting exterior finish shall be semi-gloss and provide an acid, alkali, solvent, water and abrasive-resistant surface.

4. Applied finish to meet Finish Test Requirements of SEFA 8.

5. **Custom Gray Finish as selected by Architect will be required on all Base Cabinets**.

6. **Custom White Finish as selected by Architect will be required on all Wall Cases**.

2.02 COUNTERTOPS:

1. General:

   A. Countertops constructed per specification covering particular type.
   B. Tops having sinks provided with drip grooves cut into underside of exposed edges.
   C. Adhesives or fasteners to be provided for securing of tops to cabinet work. Such materials to allow for contraction or expansion of tops where necessary.
   D. Tops shall be 1" thick unless otherwise specified and provided with 4" high curbs where tops abut walls, columns, case ends, etc.

2. Type:

   A. **Phenolic Resin** is fabricated from composite panels comprised of multiple layers of selected papers impregnated with special phenolic resins, manufactured under heat and pressure to form a solid black chemical resistant composite throughout the entire thickness of the panel. Tops shall be furnished black in color having black exposed edges honed smooth and exposed corners and edges chamfered back approximately 1/8". Tops shall have a non-glaring surface.

2.03 SINKS:

1. Epoxy resin sinks are cast of black modified epoxy resin having high resistance to chemicals, heat and shock as normally encountered in laboratories. Castings are done in permanent molds producing sinks with all inside corners coved and bottoms dished. Sinks to be drop-in style.
   Epoxy resin sinks provided with 1-1/2" epoxy resin outlets.
   Tail pieces, traps and drain lines to be furnished by Others unless otherwise noted on details or in equipment schedule.

2. Sinks shall be installed by Casework Contractor.
   Outlets to be installed by Others.

2.04 PLUMBING FIXTURES:

1. Plumbing and Gas fixtures to be **Water Saver ColorTech Gray Powder Coated.** Water fixtures to be **Lead Free** and furnished with vacuum breakers.
   Fixtures provided with brass tank nipples complete with locknuts and washers for attachment to countertops.

2. Safety shower and eyewash units shall be furnished in make and model numbers listed on the drawings or outlined in equipment schedule as manufactured by Water Saver Faucet Co.

3. Pedestal electric boxes, cast aluminum finished in black textured coating furnished with tank nipples and locknuts for attachment to countertops.
   Electrical boxes mounted in table or cabinet aprons shall be steel.
   Electric receptacles, switches, etc., shall be specification grade 20 amp and UL approved. Receptacles located within 6'0" of sinks to be G.F.I. type.
   Cover plates for receptacles shall be stainless steel.
   Mounting of electric boxes in table aprons or cabinet units to be by Casework Manufacturer.

3.00 EXECUTION

1. For approval by owner or architect, within 30 days after receipt of order submit shop details showing floor plans, rough-ins and elevations of casework and equipment being supplied. Floor plans with rough-in details to be in 3/16" scale. Elevation drawings to be in 3/8" scale.

2. Prior to fabrication of casework field check project site to assure proper fit of materials being provided. Adjust drawings as necessary to insure proper fit of all casework and equipment to building conditions.

3. Deliver casework only after wet operations are complete and building is closed in, dry and has proper climate control for installation of casework.
(Area in which laboratory casework is installed to be maintained between 65 and 75 degrees F. with relative humidity maintained between 45% - 55%.)
If these conditions are not met and maintained, product warranty is void.

4. Install casework in accordance to manufacturers recommended practice by qualified casework installer having a minimum of 3 years' experience in the installation of institutional casework.

5. Adjust casework and hardware so that doors and drawers operate smoothly. Lubricate operating hardware as recommended by manufacturer.

6. Advise owner or contractor on procedures and precautions to be taken to protect casework and other materials installed from damage by work performed by other trades.

7. During installation keep job site clean and remove debris on a daily basis. Floors are to be broom cleaned upon completion.

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SECTION 22 05 01 - BASIC PLUMBING MATERIALS AND METHODS

PART 1 GENERAL

1.1 SUMMARY

A. This section includes the following basic mechanical materials and methods to complement other Division 22 Sections.
   1. Field-fabricated metal and wood equipment supports.
   2. Water soluble flux.
   3. Plumbing solder.
   4. Installation requirements common to equipment specifications.
   5. Firestopping (refer to specification section 078413).
   6. Cutting and patching.
   7. Touchup painting and finishing.
   8. Demolition.
   9. Plumbing Equipment Instruction

B. Pipe and pipe fitting materials are specified in piping system Sections.

1.2 DEFINITIONS

A. Pipe, pipe fittings, and piping include tube, tube fittings, and tubing.

B. Finished Spaces: Spaces other than mechanical and electrical equipment rooms furred spaces, pipe and duct shafts, unheated spaces immediately below the roof, spaces above ceilings, unexcavated spaces, crawl spaces and tunnels.

C. Exposed Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.

D. Exposed Exterior Installations: Exposed to view outdoors, or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.

E. Concealed Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in duct shafts.

F. Concealed Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants, but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.

1.3 REFERENCES

A. ASTM E 119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 1997.

B. ASTM E 814 - Standard Test Method for Fire Tests of Through-Penetration Fire Stops; 1994b.

C. FM P7825 - Approval Guide; Factory Mutual Research Corporation; current edition.

D. UL (FRD) - Fire Resistance Directory; Underwriters Laboratories Inc.; current edition.

1.4 SUBMITTALS

A. Product Data: Provide product data for piping specialties.

B. Shop Drawings: Detailing fabrication and installation for metal and wood supports, and anchorage for plumbing materials and equipment.

C. Identification materials and devices.

D. Certificates: Welder certificates signed by the Contractor certifying that welders meet or exceed the requirements specified under the "Quality Assurance" Article.

E. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Nanuet Union Free School District's name and registered with manufacturer.

1.5 QUALITY ASSURANCE

A. Perform work in accordance with the Building Code of New York State.

B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

C. Installer Qualifications: Company specializing in performing the work of this section with minimum three years of experience.

D. Equipment Selection: Equipment of greater or larger power, dimensions, capacities, and ratings may be furnished provided such proposed equipment is approved in writing and connecting mechanical and electrical services, circuit breakers, conduit, motors, bases and equipment spaces are increased. No additional costs will be approved for these increases, if larger equipment is approved. If minimum energy ratings or efficiencies of the equipment are specified, the equipment must meet the design requirements and commissioning requirements.

1.6 PIPING DELIVERY, STORAGE, AND HANDLING

A. Deliver pipes and tubes with factory-applied end-caps. Maintain end-caps through shipping, storage, and handling to prevent pipe-end damage and prevent entrance of dirt, debris, and moisture.

B. Protect stored pipes and tubes from moisture and dirt. Elevate above grade. When stored inside, do not exceed structural capacity of the floor.

C. Protect flanges, fittings, and piping specialties from moisture and dirt.

D. Protect stored plastic pipes from direct sunlight. Support to prevent sagging and bending.

1.7 SEQUENCING AND SCHEDULING

A. Coordinate equipment installation with other building components.

B. Arrange for chases, slots, and openings in building structure during progress of construction to allow for plumbing installations.

C. Coordinate the installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.

D. Sequence, coordinate, and integrate installations of plumbing materials and equipment for efficient flow of the Work.

E. Coordinate connection of electrical services.

F. Coordinate connection of plumbing systems with utilities and services. Comply with requirements of governing regulations, landlord, franchised service companies, and controlling agencies.

G. Coordinate requirements for access panels and doors where plumbing items requiring access are concealed behind finished surfaces.

H. Coordinate installation of identifying devices after completing covering and painting where devices are applied to surfaces. Install identifying devices prior to installing acoustical ceilings and similar concealment.

PART 2 PRODUCTS

2.1 WATER SOLUBLE FLUX

A. Water Soluble Flux: Taramet Sterling(R) lead-free water soluble flux, conforming to ASTM B 813.

2.2 PLUMBING SOLDER

A. Plumbing Solder: Sterling® solder, ASTM B 32, Alloy Grade TC; 95 percent tin, 4.85 percent copper, 0.15 percent selenium.
   1. Certified to comply with NSF 61.
   2. Melting Temperature: 410 degrees F..
   3. Tensile Strength: 7,130 psi.
   4. Shear Strength: 5,979 psi.
   5. Elongation Percent: 19.1.
   6. Brinell Hardness: 15.1.
   7. Burst Strength: 5,800 psi.
   8. Pressure/Temperature Test Data on Copper Tube Assemblies comprised of 3 inch, 2 inch, 1 inch, 3/4 inch, and 1/2 inch Tubing with a Reducing Tee:
      a. No leaks at 180 degrees F., 200 psi, held for 2 minutes.

2.3 PIPE, PIPE FITTINGS, AND JOINING MATERIALS

A. Refer to individual piping system specification sections for pipe fitting materials and joining methods.

B. Pipe Threads: ASME B1.20.1 for factory threaded pipe and fittings.

C. Pipe Flange Gasket Materials: Suitable for thermal and chemical conditions of the contents of the piping system.
   1. ASME B16.21, non-metallic, flat, asbestos-free, 1/8 inch maximum thickness, except where thickness or specific material is indicated
      a. Full-Face Type: For flat-face, Class 125 cast-iron and cast-bronze flanges.
      b. Narrow-Face Type: For raised-face, Class 250 cast-iron and steel flanges.
   2. AWWA C110, rubber, flat-face, 1/8 inch thick, except where other thickness is indicated; and full-face or ring-type, except where type is indicated.

D. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, except where other material is specified.

E. Welding Filler Metals: Comply with AWS D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

2.4 PIPING SPECIALTIES

A. Escutcheons: Manufactured wall, ceiling, and floor plates; deep-pattern type where required to conceal protruding fittings and sleeves.
   1. Inside Diameter: Closely fit around pipe, tube and insulation.
   2. Outside Diameter: Completely cover opening.
   3. Stamped Steel: One-piece, with set-screw and chrome-plated finish.
   4. Cast-Iron Floor Plate: One-piece casting.

B. Dielectric Fittings: Assembly or fitting having insulating material isolating joined dissimilar metals to prevent galvanic action and stop corrosion.
   1. Description: Combination of copper alloy and ferrous; threaded, solder, plain, and weld neck end types and matching piping system materials.
   2. Insulating Material: Suitable for system fluid, pressure and temperature.

3. Dielectric Unions: Factory-fabricated, union assembly for 250-psig minimum working pressure at a 180 deg. F temperature.

PART 3 EXECUTION

3.1 PREPARATION

A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.

B. Remove scale and dirt on inside and outside before assembly.

C. Prepare piping connections to equipment with flanges or unions.

D. Keep open ends of pipe free from scale and dirt. Whenever work is suspended during construction protect open ends with temporary plugs or caps.

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Route piping in orderly manner, plumb and parallel to building structure, and maintain gradient.

C. Install piping to conserve building space and avoid interference with use of space.

D. Sleeve pipe passing through partitions, walls, and floors.

E. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.

F. Inserts:
1. Provide inserts for placement in concrete formwork.
2. Provide inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.
3. Provide hooked rod to concrete reinforcement section for inserts carrying pipe over 4 inches.
4. Where concrete slabs form finished ceiling, locate inserts flush with slab surface.
5. Where inserts are omitted, drill through concrete slab from below and provide through-bolt with recessed square steel plate and nut above slab.

G. Pipe Hangers and Supports:
1. Install in accordance with ASME B31.9.
2. Support horizontal piping as scheduled.
3. Place hangers within 12 inches of each horizontal elbow.
4. Use hangers with 1-1/2 inch minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.
5. Support vertical piping at every floor. Support riser piping independently of connected horizontal piping.
6. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.
7. Provide copper plated hangers and supports for copper piping.
8. Prime coat exposed steel hangers and supports. Hangers and supports located in crawl spaces, pipe shafts, and suspended ceiling spaces are not considered exposed.

H. Provide clearance for installation of insulation and access to valves and fittings.

I. Provide access where valves and fittings are not exposed.

J. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welds.

K. Install valves with stems upright or horizontal, not inverted.

3.3 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

A. Install equipment to provide the maximum possible headroom where mounting heights are not indicated.

B. Install equipment according to approved submittal data. Portions of the Work are shown only in diagrammatic form. Refer conflicts to the Architect.

C. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, except where otherwise indicated.

D. Install plumbing equipment to facilitate servicing, maintenance, and repair or replacement of equipment components. Connect equipment for ease of disconnecting, with minimum of interference with other installations. Extend grease fittings to an accessible location

E. Install equipment giving right-of-way to piping systems installed at a required slope.

3.4 PAINTING AND FINISHING

A. Damage and Touch Up: Repair marred and damaged factory-painted finishes with materials and procedures to match original factory finish

3.5 ERECTION OF METAL SUPPORTS AND ANCHORAGE

A. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor plumbing materials and equipment.

B. Field Welding: Comply with AWS D1.1 "Structural Welding Code--Steel."

3.6 CUTTING AND PATCHING

A. Cut, channel, chase, and drill floors, walls, partitions, ceilings, and other surfaces necessary for plumbing installations. Perform cutting by skilled mechanics of the trades involved.

B. Repair cut surfaces to match adjacent surfaces.

3.7 PLUMBING EQUIPMENT INSTRUCTION

A. Provide instruction of the Owner's representatives for the duration specified below in operation and maintenance of the following equipment:
   1. Emergency Eye and Face Wash Units (minimum 2 hours).
   2. Emergency Mixing Valves (minimum 2 hours).

3.8 DEMOLITION

A. Disconnect, demolish, and remove work specified under Division 22 and as indicated.

B. Where pipe, breeching, insulation, or equipment to remain is damaged or disturbed, remove damaged portions and install new products of equal capacity and quality.

C. Accessible Work: Remove indicated exposed pipe and breeching in its entirety.

D. Removal: Remove indicated equipment from the project site.

E. Temporary Disconnection: Remove, store, clean, reinstall, reconnect, and make operational, equipment indicated for relocation.

END OF SECTION 22 05 01

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SECTION 22 05 17 - SLEEVES AND SLEEVE SEALS FOR PLUMBING PIPING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Pipe sleeves.

1.2 SUBMITTALS

A. Shop Drawings: Indicate pipe materials used, jointing methods, supports, floor and wall penetration seals. Indicate installation, layout, weights, mounting and support details, and piping connections.

1.3 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

B. Clean equipment, pipes, valves, and fittings of grease, metal cuttings, and sludge that may have accumulated from the installation and testing of the system.

PART 2 PRODUCTS

2.1 PIPE SLEEVES

A. Vertical Piping:
   1. Sleeve Length: 1 inch above finished floor.
   2. Provide sealant for watertight joint.
   3. Drilled Penetrations: Provide 1-1/2 inch angle ring or square set in silicone adhesive around penetration.

B. Plastic or Sheet Metal: Pipe passing through interior walls, partitions, and floors, unless steel or brass sleeves are specified below.

C. Pipe Passing Through Mechanical, Laundry, and Electrical Rooms above Basement/Tunnels/Crawlspaces:
   1. Galvanized steel pipe or black iron pipe with asphalt coating.
   2. Connect sleeve with floor plate.

D. Clearances:
   1. Provide allowance for insulated piping.
   2. Wall, Floor, Partitions, and Beam Flanges: 1 inch greater than external pipe diameter.
   3. All Rated Openings: Caulked tight with fire stopping material complying with ASTM E814 in accordance with Section 078413 to prevent the spread of fire, smoke, and gases.

PART 3 EXECUTION

3.1 INSTALLATION

A. Route piping in orderly manner, plumb and parallel to building structure. Maintain gradient.

B. Install piping to conserve building space, to not interfere with use of space and other work.

C. Install piping and pipe sleeves to allow for expansion and contraction without stressing pipe, joints, or connected equipment.

D. Provide sleeves when penetrating footings, floors, walls, and partitions. Seal pipe including sleeve penetrations to achieve fire resistance equivalent to fire separation required.
   1. Aboveground Piping:
      a. Pack solid using mineral fiber complying with ASTM C592.
      b. Fill space with an elastomer caulk to a depth of 0.50 inch where penetrations occur between conditioned and unconditioned spaces.
   2. All Rated Openings: Caulk tight with fire stopping material complying with ASTM E814 in accordance with Section 078413 to prevent the spread of fire, smoke, and gases.

E. When installing more than one piping system material, ensure system components are compatible and joined to ensure the integrity of the system. Provide necessary joining fittings. Ensure flanges, union, and couplings for servicing are consistently provided.

END OF SECTION 22 05 17

SECTION 22 05 53 - IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Tags.

B. Pipe markers.

1.2 REFERENCE STANDARDS

A. ASME A13.1 - Scheme for the Identification of Piping Systems; 2007.

B. ASTM D709 - Standard Specification for Laminated Thermosetting Materials; 2013.

1.3 SUBMITTALS

A. List: Submit list of wording, symbols, letter size, and color coding for plumbing identification.

B. Chart and Schedule: Submit valve chart and schedule, including valve tag number, location, function, and valve manufacturer's name and model number.

C. Product Data: Provide manufacturers catalog literature for each product required.

PART 2 PRODUCTS

2.1 IDENTIFICATION APPLICATIONS

A. Emergency Eye and Face Wash: Nameplates.

B. Piping: Tags and Pipe Markers.

C. Emergency Mixing Valve: Nameplate.

D. Valves: Tags.

2.2 NAMEPLATES

A. Description: Laminated three-layer plastic with engraved letters.
   1. Letter Color: White.
   2. Letter Height: 1/4 inch.
   3. Background Color: Black.
   4. Plastic: Comply with ASTM D709.

2.3 TAGS

A. Metal Tags: Brass with stamped letters; tag size minimum 1-1/2 inch diameter with smooth edges.

B. Valve Tag Chart: Typewritten letter size list in anodized aluminum frame.

2.4 PIPE MARKERS

A. Comply with ASME A13.1.

B. Plastic Tape Pipe Markers: Flexible, vinyl film tape with pressure sensitive adhesive backing and printed markings.

C. Identification Scheme, ASME A13.1:
   1. Primary: External Pipe Diameter, Uninsulated or Insulated.

D. Color code as follows:

1. Potable, Cooling, Boiler, Feed, Other Water: Green with white letters.

PART 3 EXECUTION

3.1 PREPARATION

A. Degrease and clean surfaces to receive adhesive for identification materials.

3.2 INSTALLATION

A. Install plastic nameplates with corrosive-resistant mechanical fasteners, or adhesive. Apply with sufficient adhesive to ensure permanent adhesion and seal with clear lacquer.

B. Install tags with corrosion resistant chain.

C. Install plastic tape pipe markers complete around pipe in accordance with manufacturer's instructions.

D. Use tags on piping 3/4 inch diameter and smaller.
   1. Identify service, flow direction, and pressure.
   2. Install in clear view and align with axis of piping.
   3. Locate identification not to exceed 20 feet on straight runs including risers and drops, adjacent to each valve and Tee, at each side of penetration of structure or enclosure, and at each obstruction.

END OF SECTION 22 05 53

SECTION 22 07 19 - PLUMBING PIPING INSULATION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Flexible elastomeric cellular insulation.

B. Piping insulation.

C. Jackets and accessories.

1.2 REFERENCE STANDARDS

A. ANSI/ICC A117.1 - American National Standard for Accessible and Usable Buildings and Facilities; International Code Council; 1998.

B. ASTM C177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus; 2013.

C. ASTM C195 - Standard Specification for Mineral Fiber Thermal Insulating Cement; 2007 (Reapproved 2013).

D. ASTM C449 - Standard Specification for Mineral Fiber Hydraulic-Setting Thermal Insulating and Finishing Cement; 2007 (Reapproved 2013).

E. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus; 2010.

F. ASTM C547 - Standard Specification for Mineral Fiber Pipe Insulation; 2015.

G. ASTM C585 - Standard Practice for Inner and Outer Diameters of Thermal Insulation for Nominal Sizes of Pipe and Tubing; 2010.

H. ASTM C795 - Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel; 2008 (Reapproved 2013).

I. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.

J. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2014.

K. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

1.3 SUBMITTALS

A. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.

B. Manufacturer's Instructions: Indicate installation procedures that ensure acceptable workmanship and installation standards will be achieved.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with not less than three years of documented experience.

B. Applicator Qualifications: Company specializing in performing the type of work specified in this section with minimum 3 years of experience.

C. Code Compliance: All insulation products provided on the contract shall be fully in compliance with all material and installation requirements of the New York State Energy Conservation

Construction Code, latest addition with all amendments. Insulation products shall meet all "k" values and thicknesses as described in the Code.

1.5 REGULATORY REQUIREMENTS

A. Conform to maximum flame spread/smoke developed rating of 25/50 in accordance with ASTM E 84.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Accept materials on site, labeled with manufacturer's identification, product density, and thickness.

1.7 FIELD CONDITIONS

A. Maintain ambient conditions required by manufacturers of each product.

B. Maintain temperature before, during, and after installation for minimum of 24 hours.

PART 2 PRODUCTS

2.1 REGULATORY REQUIREMENTS

A. Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84 or UL 723.

2.2 PLUMBING FIXTURE SAFETY COVERS

A. Provide products that comply with the following:
   1. Americans With Disabilities Act (ADA), Article 4.19.4.
   2. ANSI/ICC A117.1, American National Standard for Accessible Buildings and Facilities.
   3. Requirements of applicable building code.

B. Piping Safety Covers: Truebro Lav-Guard.
   1. Characteristics: Three-piece molded assembly, minimum 1/8 inch wall thickness, with internal ribs to provide air space between piping and piping insulation jacket, molded to receive manufacturer's snap-clip fasteners.
   2. Vinyl Material: Impact-resistant and stain-resistant molded closed-cell anti-microbial vinyl compound, UV-stable, non-fading, non yellowing; having the following performance characteristics:
      a. Burning Characteristics: 0 seconds Average Time of Burning (ATB), 0 mm Area of Burning (AEB), when tested in accordance with ASTM D 635.
      b. Thermal Conductivity: K-value 1.17, when tested in accordance with ASTM C 177.
      c. Indentation Hardness: 60, minimum, when tested in accordance with ASTM D 2240, using Type A durometer.
   3. Trap Assembly Cover: Three-piece assembly, with removable clean-out nut enclosure.
   4. Angle Stop Covers: Formed with hinged cap for access to valve without requiring cover removal.
   5. Configurations: In accordance with manufacturer's product data for project piping configurations indicated on drawings.
   6. Color: China White, gloss finish; paintable.
   7. Fasteners: Manufacturer's standard re-usable snap-clip fasteners; wire-tie fasteners not permitted.

C. Lavatory Piping Enclosure: Truebro Lav-Shield.

1. Characteristics: One-piece rigid molded vinyl enclosure, minimum 1/8 inch wall thickness, factory-punched for manufacturer's wall fasteners.
2. Vinyl Material: Impact-resistant and stain-resistant molded closed-cell vinyl, having the following performance characteristics:
   a. Burning Characteristics: 0 seconds Average Time of Burning (ATB), 0 mm Area of Burning (AEB), when tested in accordance with ASTM D 635.
   b. Indentation Hardness: 69, minimum, when tested in accordance with ASTM D 2240, using Type A durometer.
3. Vinyl Color: China White, fine-textured finish; paintable.
4. Fasteners: Manufacturer's standard stainless steel wall fasteners with tamper-resistant heads.

2.3 GLASS FIBER

A. Insulation: ASTM C547 and ASTM C795; semi-rigid, noncombustible, end grain adhered to jacket.
   1. K Value: ASTM C177, 0.24 at 75 degrees F.
   2. Maximum Service Temperature: 650 degrees F.
   3. Maximum Moisture Absorption: 0.2 percent by volume.

B. Vapor Barrier Jacket: White Kraft paper with glass fiber yarn, bonded to aluminized film; moisture vapor transmission when tested in accordance with ASTM E96/E96M of 0.02 perm-inches.

C. Tie Wire: 0.048 inch stainless steel with twisted ends on maximum 12 inch centers.

D. Vapor Barrier Lap Adhesive: Compatible with insulation.

E. Insulating Cement/Mastic: ASTM C195; hydraulic setting on mineral wool.

F. Fibrous Glass Fabric:
   1. Cloth: Untreated; 9 oz/sq yd weight.
   2. Blanket: 1.0 lb/cu ft density.
   3. Weave: 5 by 5.

G. Indoor Vapor Barrier Finish:
   1. Cloth: Untreated; 9 oz/sq yd weight.
   2. Vinyl emulsion type acrylic, compatible with insulation, black color.

H. Insulating Cement: ASTM C449.

2.4 FLEXIBLE ELASTOMERIC CELLULAR INSULATION

A. Insulation: Preformed flexible elastomeric cellular rubber insulation complying with ASTM C534/C534M Grade 1; use molded tubular material wherever possible.
   1. 'K' value: ASTM C 177; 0.27 at 75 degrees F.
   2. Minimum Service Temperature: Minus 40 degrees F.
   3. Maximum Service Temperature: 220 degrees F.
   4. Maximum Moisture Absorption - Pipe Insulation: 3.5 percent, by weight, when tested in accordance with ASTM D 1056.
   5. Water Vapor Permeability: 0.20 perm-inches, when tested in accordance with ASTM E 96.
   6. Connection: Waterproof vapor barrier adhesive.

B. Elastomeric Foam Adhesive: Air dried, contact adhesive, compatible with insulation.
   1. Air dried, contact adhesive, compatible with insulation.

2.5 JACKETS

A. PVC Plastic.
   1. Jacket: One piece molded type fitting covers and sheet material, off-white color.
      a. Minimum Service Temperature: 0 degrees F.
      b. Maximum Service Temperature: 150 degrees F.
      c. Moisture Vapor Permeability: 0.002 perm inch, maximum, when tested in accordance with ASTM E96/E96M.
      d. Thickness: 10 mil.
      e. Connections: Brush on welding adhesive.
   2. Covering Adhesive Mastic: Compatible with insulation.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that piping has been tested before applying insulation materials.

B. Verify that surfaces are clean and dry, with foreign material removed.

C. Verify that piping configurations are correct type for piping cover component configurations specified

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install in accordance with North American Insulation Manufacturers Association (NAIMA) National Insulation Standards.

C. Exposed Piping: Locate insulation and cover seams in least visible locations.

D. Insulated pipes conveying fluids below ambient temperature: Insulate entire system including fittings, valves, unions, flanges, strainers, flexible connections, and expansion joints.

E. Glass fiber insulated pipes conveying fluids below ambient temperature:
   1. Provide vapor barrier jackets, factory-applied or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure sensitive adhesive. Secure with outward clinch expanding staples and vapor barrier mastic.
   2. Insulate fittings, joints, and valves with molded insulation of like material and thickness as adjacent pipe. Finish with PVC fitting covers.

F. For hot piping conveying fluids 140 degrees F or less, do not insulate flanges and unions at equipment, but bevel and seal ends of insulation.

G. Glass fiber insulated pipes conveying fluids above ambient temperature:
   1. Provide standard jackets, with or without vapor barrier, factory-applied or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure sensitive adhesive. Secure with outward clinch expanding staples.
   2. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe. Finish with PVC fitting covers.

H. Inserts and Shields:
   1. Application: Piping 1-1/2 inches diameter or larger.
   2. Shields: Galvanized steel between pipe hangers or pipe hanger rolls and inserts.
   3. Insert Location: Between support shield and piping and under the finish jacket.
   4. Insert Configuration: Minimum 6 inches long, of same thickness and contour as adjoining insulation; may be factory fabricated.

5. Insert Material: Hydrous calcium silicate insulation or other heavy density insulating material suitable for the planned temperature range.

I. Continue insulation through walls, sleeves, pipe hangers, and other pipe penetrations. Finish at supports, protrusions, and interruptions. At fire separations, refer to Section 078413.

J. Pipe Exposed in Mechanical Equipment Rooms, crawl spaces, tunnels, Electric Rooms and Finished Spaces, including spaces with no ceilings and spaces with cloud ceiling systems with the floor deck above visible: Finish with PVC jacket and fitting covers.

3.3 PROTECTION OF INSTALLED PRODUCTS

A. Do not allow damage to installed products by subsequent construction activities; protect products until Substantial Completion.

3.4 SCHEDULES

A. Plumbing Systems
   1. Domestic Hot Water Supply:
      a. Pipe Sizes 1-1/4 inches and less: 1 inch thick fiberglass.
      b. Pipe Sizes 1-1/2 inches and greater: 1-1/2 inch thick fiberglass.
   2. Domestic Hot Water Recirculation:
      a. Pipe Sizes 1-1/2 inches and less: 1 inch thick fiberglass.
      b. Pipe Sizes 2 inches and greater: 1-1/2 inch thick fiberglass.
   3. Tempered Domestic Hot Water Supply:
      a. Pipe Sizes 1-1/4 inches and less: 1 inch thick fiberglass.
      b. Pipe Sizes 1-1/2 inches and greater: 1-1/2 inch thick fiberglass.
   4. Domestic Cold Water:
      a. Pipe Sizes 1-1/4 inches and less: 1/2 inch thick fiberglass.
      b. Pipe Sizes 1-1/2 inches and greater: 1/2 inch thick fiberglass.
   5. Roof Drain Bodies:
      a. Pipe Size Range: All sizes.
         1) Thickness: 1 inch thick flexible elastomeric insulation.
   6. Plumbing Vents Within 10 feet of the Exterior: 1 inch thick fiberglass.
   7. Roof Drainage Piping: All horizontal piping; Thickness: 1 inch thick fiberglass.
   8. Lavatories/Sinks: Provide insulation per Part 2.2 of this section.

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SECTION 22 10 05 - PLUMBING PIPING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Chemical-resistant sanitary waste piping.

B. Pipe, pipe fittings, specialties, and connections for piping systems.
   1. Sanitary sewer.
   2. Storm piping.
   3. Domestic water.
   4. Natural gas piping, above grade.
   5. Flanges, unions, and couplings.
   6. Pipe hangers and supports.
   7. Ball valves.
   8. Valves.
   9. Flow-balancing valves.
   10. Check valves.

C. Backfill Materials.

1.2 REFERENCE STANDARDS

A. ASME B16.1 - Gray Iron Pipe Flanges and Flanged Fittings: Classes 25, 125, and 250; 2010.

B. ASME B16.3 - Malleable Iron Threaded Fittings: Classes 150 and 300; 2011.

C. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings; 2012.

D. ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings; 2013.

E. ASME B31.1 - Power Piping; 2014.

F. ASME B31.2 - Fuel Gas Piping; The American Society of Mechanical Engineers; 1968.

G. ASME B31.9 - Building Services Piping; 2014.

H. ASME BPVC-IX - Boiler and Pressure Vessel Code, Section IX - Welding, Brazing, and Fusing Qualifications; 2015.

I. ASSE 1003 - Performance Requirements for Water Pressure Reducing Valves for Domestic Water Distribution Systems; 2009.

J. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2012.

K. ASTM B32 - Standard Specification for Solder Metal; 2008 (Reapproved 2014).

L. ASTM B42 - Standard Specification for Seamless Copper Pipe, Standard Sizes; 2015a.

M. ASTM B68/B68M - Standard Specification for Seamless Copper Tube, Bright Annealed; 2011.

N. ASTM B75/B75M - Standard Specification for Seamless Copper Tube; 2011.

O. ASTM B88 - Standard Specification for Seamless Copper Water Tube; 2014.

P. ASTM B813 - Standard Specification for Liquid and Paste Fluxes for Soldering of Copper and Copper Alloy Tube; 2010.

Q. ASTM B828 - Standard Practice for Making Capillary Joints by Soldering of Copper and Copper Alloy Tube and Fittings; 2002 (Reapproved 2010).

R. ASTM C564 - Standard Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings; 2014.

S. ASTM D2241 - Standard Specification for Poly (Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series); 2015.

T. ASTM D2466 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40; 2013.

U. ASTM D2564 - Standard Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems; 2012.

V. ASTM D2665 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings; 2014.

W. ASTM D2729 - Standard Specification for Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings; 2011.

X. ASTM D2855 - Standard Practice for Making Solvent-Cemented Joints with Poly(Vinyl Chloride) (PVC) Pipe and Fittings; 1996 (Reapproved 2010).

Y. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.

Z. CISPI 301 - Standard Specification for Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste and Vent Piping Applications; 2009.

AA. CISPI 310 - Specification for Coupling for Use in Connection with Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications; 2011.

AB. ICC-ES AC01 - Acceptance Criteria for Expansion Anchors in Masonry Elements; 2012.

AC. ICC-ES AC106 - Acceptance Criteria for Predrilled Fasteners (Screw Anchors) in Masonry Elements; 2012.

AD. ICC-ES AC193 - Acceptance Criteria for Mechanical Anchors in Concrete Elements; 2013.

AE. ICC-ES AC308 - Acceptance Criteria for Post-Installed Adhesive Anchors in Concrete Elements; 2013.

AF. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation; 2009.

AG. MSS SP-67 - Butterfly Valves; 2011.

AH. MSS SP-110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends; 2010.

AI. NSF 61 - Drinking Water System Components - Health Effects; 2014 (Errata 2015).

AJ. NSF 372 - Drinking Water System Components - Lead Content; 2011.

AK. PPI TR-4 - PPI Listing of Hydrostatic Design Basis (HDB), Hydrostatic Design Stress (HDS), Strength Design Basis (SDB), Pressure Design Basis (PDB), and Minimum Required Strength (MRS) Ratings For Thermoplastic Piping Materials or Pipe; 2013.

AL. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

1.3 SUBMITTALS

A. Product Data: Provide data on pipe materials, pipe fittings, valves, and accessories. Provide manufacturers catalog information. Indicate valve data and ratings.

B. Sustainable Design Documentation: For soldered copper joints, submit installer's certification that the specified installation method and materials were used.

C. Piping Schedule: Provide schedule of piping applications and materials, indicating piping and fittings.

D. Piping Shop Drawings: Provide drawings of piping installation, indicating dimensioned locations, equipment, critical dimensions, elevations, sizes, systems, and valve locations.

1.4 QUALITY ASSURANCE

A. Perform work in accordance with New York State Building Code.

B. Perform work in accordance with New York State Plumbing Code.

C. Identify pipe with marking including size, ASTM material classification, ASTM specification, potable water certification, water pressure rating.

D. Perform Work in accordance with Plumbing Code of New York State.

E. Conform to New York State Department of Health Cross-Connection Control Public Water Supply Guide for installation of backflow prevention devices.

F. All materials used for installation related to the domestic water piping system shall be lead-free, including pipes, pipe fittings, plumbing fittings, and plumbing fixtures and conform to NSF/ANSI Standard 61, NSF/ANSI Standard 61 - Annex G, and NSF/ANSI Standard 372.

G. Acceptance product marking: NSF®-61 and NSF®-372 (or NSF®-61-G) or other accepted certifier marks demonstrating third party certification with these requirements.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Accept valves on site in shipping containers with labeling in place. Inspect for damage.

B. Provide temporary protective coating on cast iron and steel valves.

C. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.

D. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

1.6 FIELD CONDITIONS

A. Do not install underground piping when bedding is wet or frozen.

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS

A. Potable Water Supply Systems: Provide piping, pipe fittings, and solder and flux (if used), that comply with NSF 61 and NSF 372 for maximum lead content; label pipe and fittings.

B. Plenum-Installed Acid Waste Piping: Flame-spread index equal or below 25 and smoke-spread index equal or below 50 according to ASTM E84 or UL 723 tests.

2.2 SANITARY SEWER PIPING, ABOVE GRADE

A. Cast Iron Pipe: CISPI 301, hubless, service weight.
   1. All cast iron soil pipe and fittings shall be marked with the collective trademark of the Cast Iron Soil Pipe Institute (CISPI) and shall be listed by NSF International.
   2. Fittings: Cast iron.
   3. Joints: CISPI 310, neoprene gaskets and stainless steel clamp-and-shield assemblies.

B. PVC Pipe: ASTM D2665.
   1. Fittings: PVC.
   2. Joints: Solvent welded, with ASTM D2564 solvent cement.

2.3 PLUMBING VENT PIPING, ABOVE GRADE

A. Cast Iron Pipe: CISPI 301, hubless, service weight.
   1. All cast iron soil pipe and fittings shall be marked with the collective trademark of the Cast Iron Soil Pipe Institute (CISPI) and shall be listed by NSF International.
   2. Fittings: Cast iron.
   3. Joints: CISPI 310, neoprene gaskets and stainless steel clamp-and-shield assemblies.

B. PVC Pipe: ASTM D 2665.
   1. Fittings: PVC.
   2. Joints: Solvent welded, with ASTM D 2564 solvent cement.

2.4 CHEMICAL RESISTANT SEWER PIPING (TO BE USED AT WASTE PIPING LOCATIONS AS CALLED OUT ON THE PLUMBING DRAWINGS)

A. CPVC Pipe: Charlotte Pipe and Foundry Company ChemDrain, ASTM D 1784 and ASTM F 441.
   1. Fittings: CPVC conforming to ASTM F 2618.
   2. Joints: Solvent welded with ASTM F 493 solvent cement.

2.5 DOMESTIC WATER PIPING, ABOVE GRADE

A. Copper Tube for piping 3" and smaller: ASTM B88 (ASTM B88M), Type L (B), Drawn (H).
   1. Fittings: ASME B16.18, cast copper alloy or ASME B16.22, wrought copper and bronze.
   2. Joints: ASTM B32, alloy Sn95 solder.
   3. Hydraulic Press Fitting for Copper Tubing.
      a. Acceptable Fittings:
         1) ProPress by Viega, 301 N. Main, Wichita, KS 67202, (877) 843-4262, www.viega.com. NO SUBSTITUTIONS SHALL BE PERMITTED.
      b. Operating Conditions:
         1) Maximum Operating Pressure: 200 psi.
         2) Operating Temperature Range: 0-250 degrees F.
         3) Maximum Test Pressure: 600 psi.
         4) Maximum Vacuum: 29.2 inches hg @ 68 degrees F.
      c. Features:
         1) Fittings: Copper and copper alloy conforming to material requirements of ASME B16.18 or ASME B16.22.
            (a) Stainless Steel Grip Ring: Adds strength to the joint without collapsing the interior passageway.
         2) No flame for soldering required for installation of fittings and valves.
         3) Unpressed connections identified during pressure testing when water flows past sealing element.
         4) Sealing Elements: Factory installed, EPDM.
         5) Fittings that have been pressed can be rotated. If rotated more than 5 degrees, the fitting must be repressed to restore its resistance to rotational movement.
         6) Extended fitting end lead allows for twice the retention grip surface, and assists with proper tube alignment.
         7) Soldered adapter fittings are not allowed.

B. All materials used for installation related to the domestic water piping system shall be lead-free, including pipes, pipe fittings, plumbing fittings, and plumbing fixtures and conform to NSF/ANSI Standard 61, NSF/ANSI Standard 61 - Annex G, and NSF/ANSI Standard 372.

2.6 STORM WATER PIPING, ABOVE GRADE

A. Cast Iron Pipe: CISPI 301, hubless, service weight.

1. All cast iron soil pipe and fittings shall be marked with the collective trademark of the Cast Iron Soil Pipe Institute (CISPI) and shall be listed by NSF International.
2. Fittings: Cast iron.
3. Joints: Neoprene gaskets and stainless steel clamp-and-shield assemblies.

2.7 NATURAL GAS PIPING, ABOVE GRADE

A. Steel Pipe: ASTM A53/A53M Schedule 40 black.
   1. Fittings:
      a. ASME B16.3, malleable iron, or ASTM A234/A234M, wrought steel welding type OR
      b. Cold Press Mechanical Joint Fittings shall conform to material requirements of ASTM A420 or ASME B16.3 and performance criteria of IAPMO PS117. Sealing elements for press fittings shall be FKM. Sealing elements shall be factory installed or an alternative supplied by fitting manufacturer. Press ends shall have Smart Connect® technology design. MegaPress fittings with the Smart Connect technology assure leakage of liquids and/or gases from inside the system past the sealing element of an unpressed connection. The function of this technology is to provide the installer quick and easy identification of connections which have not been pressed prior to putting the system into operation.
   2. Joints: Threaded or welded to ASME B31.1.
      a. Joints located in inaccessible spaces such as vertical chases, behind milwork or ceilings with gypsum wall board ceilings shall only utilize welded joints. Joints located in accessible ceiling systems (ceilings with suspended drop ceiling systems) can utilize threaded joints.
      b. Pipe Thread: Pipe Threads shall conform to ASTM B16.3.

2.8 FLANGES, UNIONS, AND COUPLINGS

A. Unions for Pipe Sizes 3 Inches and Under:
   1. Copper Tube and Pipe: Class 150 bronze unions with soldered joints.
B. Flanges for Pipe Size Over 1 Inch:
   1. Copper Tube and Pipe: Class 150 slip-on bronze flanges; preformed neoprene gaskets.
C. No-Hub Couplings:
   1. Gasket Material: Neoprene complying with ASTM C564.
   2. Band Material: Stainless steel.
   3. Eyelet Material: Stainless steel.
D. All materials used for installation related to the domestic water piping system shall be lead-free, including pipes, pipe fittings, plumbing fittings, and plumbing fixtures and conform to NSF/ANSI Standard 61, NSF/ANSI Standard 61 - Annex G, and NSF/ANSI Standard 372.

2.9 PIPE HANGERS AND SUPPORTS

A. Provide hangers and supports that comply with MSS SP-58.
   1. If type of hanger or support for a particular situation is not indicated, select appropriate type using MSS SP-58 recommendations.
   2. Overhead Supports: Individual steel rod hangers attached to structure or to trapeze hangers.
   3. Trapeze Hangers: Welded steel channel frames attached to structure.
   4. Vertical Pipe Support: Steel riser clamp.
   5. Floor Supports: Concrete pier or steel pedestal with floor flange; fixture attachment.
B. Plumbing Piping - Drain, Waste, and Vent:
   1. Hangers for Pipe Sizes 1/2 Inch to 1-1/2 Inches: Malleable iron, adjustable swivel, split ring.

2. Hangers for all pipe sizes: Carbon steel, adjustable, clevis.
3. Hangers for Pipe Sizes 2 Inches and Over: Carbon steel, adjustable, clevis.
4. Wall Support for Pipe Sizes to 3 Inches: Cast iron hook.
5. Floor Support: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.

C. Plumbing Piping - Water:
1. Hangers for Pipe Sizes 1/2 Inch to 1-1/2 Inches: Malleable iron, adjustable swivel, split ring.
2. Hangers for Cold Pipe Sizes 2 Inches and Over: Carbon steel, adjustable, clevis.
3. Wall Support for Pipe Sizes to 3 Inches: Cast iron hook.
4. Floor Support for Cold Pipe: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
5. Floor Support for Hot Pipe Sizes to 4 Inches: Cast iron adjustable pipe saddle, locknut, nipple, floor flange, and concrete pier or steel support.
6. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.

D. Hanger Fasteners: Attach hangers to structure using appropriate fasteners, as follows:
1. Concrete Wedge Expansion Anchors: Complying with ICC-ES AC193.
2. Masonry Wedge Expansion Anchors: Complying with ICC-ES AC01.
3. Concrete Screw Type Anchors: Complying with ICC-ES AC193.
4. Masonry Screw Type Anchors: Complying with ICC-ES AC106.
5. Concrete Adhesive Type Anchors: Complying with ICC-ES AC308.
6. Other Types: As required.

2.10 BALL VALVES

A. 2-inch and smaller: 2-piece, full port, bronze:
1. Body: ASTM B-124 brass.
2. Body End Piece: ASTM B-124 brass.
3. Ball: Chrome plated ASTM B-584 cast red bronze.
4. Seat Ring: Reinforced TFE.
5. Packing: TFE.
6. Stem: ASTM B-371 silicon bronze.
7. Ends: Soldered or hydraulic press.

B. All materials used for installation related to the domestic water piping system shall be lead-free, including pipes, pipe fittings, plumbing fittings, and plumbing fixtures and conform to NSF/ANSI Standard 61, NSF/ANSI Standard 61 - Annex G, and NSF/ANSI Standard 372.

2.11 CHECK VALVES

A. Swing Check: 2-Inch and smaller:
1. Class: 125
2. Body: ASTM B-62 bronze.
3. Disc: ASTM B-62 bronze.
4. Hinge : ASTM B-62 bronze.
5. Hinge Pin: ASTM B-16 brass.
6. Cap: ASTM B-62 bronze.
7. Ends: Threaded or soldered.
8. Acceptable Manufacturers:
a. Stockham
b. Nibco
c. Milwaukee

2.12 GAS COCKS

A. Full port, brass ball valves with bottom-loaded blowout proof stem, virgin PTFE seats, thrust washer and adjustable stem packing gland, stem packing nut, chrome plated breass ball, brass adapter and steel handle.

B. 1/4" to 3/8": 1/2 psig, ASME B16.33.

C. 1/2" to 2": 1/2 psig, ASME B16.33.

2.13 NATURAL GAS CHECK VALVES

A. 316 Stainless Steel: Body, Shuttle, & Cap;

B. Seals: FKM (fluorocarbon)

C. Pressure Range: 0 to 400 psi

D. Temperature: 5 to 300 degrees F.

E. Basis of Design Manufacturer: Versa Valves (for natural gas)

2.14 BALANCE VALVES

A. Low-Lead Balancing Valve with Flow Meter

B. Provide a Caleffi Hydronic Solutions QuickSetter+ Code 132 series Manual Balancing Valve with Magnetic Movement Flow Indicator or equal. The valve shall provide direct reading of flow rate through graduated no-clouding sight gauge. Provide with low-lead brass valve body and flow meter, stainless steel ball, chrome-plated brass ball control stem, control stem guide, stainless steel flow meter bypass valve stem, stainless steel flow meter springs, flow meter float and indicator cover, PTFE ball seal seat, EPDM seals, and inlet flow check valve. Provide with adjustable ball valve for accurately regulating the medium flow rate. Provide with mixed outlet temperature gauge, 30 to 210 degrees F scale, 2 inch diameter.
   1. 3/4 inch union sweat with temperature gauge, flow rate 0.5 - 1.75 gallons per minute.

2.15 BACKFILL MATERIALS

A. Select Fill:
   1. Select fill shall be crushed stone, crushed gravel, or run of bank gravel that is free of clay, organics, snow, ice and friable or deleterious particles and meet the requirements of NYSDOT Standard Specifications, Select Fill, Item 203.06, having the following gradation requirements:
      a. Sieve Size:
         1) 4": 100 percent finer by weight.
         2) No. 40: 0-70 percent finer by weight.
         3) No; 200: 0-15 percent finer by weight.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that excavations are to required grade, dry, and not over-excavated.

3.2 PREPARATION

A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.

B. Remove scale and dirt, on inside and outside, before assembly.

C. Prepare piping connections to equipment with flanges or unions.

3.3 EARTH EXCAVATION

A. All excavation work shall be executed to the lines and grades shown on the Drawings or as required to install the services as indicated on the drawings, unless directed otherwise by the Owner's Representative. All excavation shall be performed in such a manner as to minimize disturbance and maintain stability of subgrade soils and slopes. Special care shall be taken not to disturb the bottom of excavations and proposed bearing elevations and surfaces. Excavation to the final subgrade levels must be done by methods that minimize traffic on or disturbance to the subgrade.

B. The excavation equipment must be of such size and capacity sufficient to excavate the materials encountered and to the specified depths as shown.

C. The Contractor shall be responsible at all times for safe and prudent excavation operations so as to protect the workmen, utilities, structures, and adjacent property. The Contractor shall perform all excavation in accordance with OSHA standards. The Contractor shall observe all applicable local, state and federal requirements and acquire all necessary permits.

D. The Contractor shall bench or cut back excavated slopes, dewater and sheet, as necessary for stability, safety and protection of adjacent utilities, structures, and properties.

E. Subgrades and slopes which have been damaged or degraded as a result of Contractor's activities, or failure of the Contractor to properly protect them shall be repaired at the Contractor's expense as directed by the Owner's Representative.

F. Subgrades in which soft or unsuitable materials are encountered which are not a result of Contractor's operations or failure to protect subgrades shall be undercut and backfilled with appropriate fill as directed by the Owner's Representative.

G. All subgrades will be monitored and tested as determined necessary by the Owner's Representative. The Contractor, at the direction of the Owner's Representative, shall be required to proof roll subgrades. All proof rolling, if required, shall be done in the presence of the Owner's Representative.

H. No materials or fill shall be placed by the Contractor until the subgrades are observed and tested by the Owner's Representative.

3.4 FILLING AND BACKFILLING

A. The Contractor shall not place fill or backfill until underlying subgrades have been observed and tested as required by the Owner's Representative.

B. Materials shall be placed at the locations shown on the Drawings, and as directed by the Owner's Representative

C. Delivery and compaction of materials shall be made during the presence of the Owner's Representative and shall be subject to its review. This inspection by no means absolves the Contractor from responsibility to properly compact and test as specified.

D. Acceptance and/or rejection of materials placed and compacted shall be based upon in-place density test result requirements and other requirements as stated in these specifications.

E. Placement and Compaction:
   1. Select fill shall be placed in maximum loose lift thicknesses of 9-inches. Select fill shall be compacted to a minimum of 95 percent of the maximum Modified Proctor density as determined by ASTM D1557.
   2. Equipment used to compact select fill must be compatible with the material type, lift thickness, and constraints posed by size and configuration of excavated area being filled.

3.5 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Provide non-conducting dielectric connections wherever jointing dissimilar metals.

C. Route piping in orderly manner and maintain gradient. Route parallel and perpendicular to walls.

D. Install piping to maintain headroom, conserve space, and not interfere with use of space.

E. Group piping whenever practical at common elevations.

F. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings.

G. Provide access where valves and fittings are not exposed.
   1. Cooridiante size and location of access doors with the general contractor's specifications and drawings.

H. Install bell and spigot pipe with bell end upstream.

I. Provide rigid sway bracing at changes in direction greater than 45 degrees for pipe sizes 4 inches and larger.

J. Provide cleanouts at base of all vertical storm and sanitary risers.

K. Install water piping to ASME B31.9.

L. Copper Pipe and Tube: Make soldered joints in accordance with ASTM B828, using specified solder, and flux meeting ASTM B813; in potable water systems use flux also complying with NSF 61 and NSF 372.

M. CPVC Pipe: Make solvent-welded joints in accordance with ASTM D 2855.

N. Sleeve pipes passing through partitions, walls, and floors.

O. Inserts:
   1. Provide inserts for placement in concrete formwork.
   2. Provide inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.
   3. Provide hooked rod to concrete reinforcement section for inserts carrying pipe over 4 inches.
   4. Where concrete slabs form finished ceiling, locate inserts flush with slab surface.
   5. Where inserts are omitted, drill through concrete slab from below and provide through-bolt with recessed square steel plate and nut above slab.

P. Pipe Hangers and Supports:
   1. Install in accordance with ASME B31.9.
   2. Support horizontal piping as indicated.
   3. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work.
   4. Place hangers within 12 inches of each horizontal elbow.
   5. Provide hanger below each P-trap on sanitary piping systems.
   6. Use hangers with 1-1/2 inch minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.
   7. Support vertical piping at every floor. Support riser piping independently of connected horizontal piping.
   8. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.
   9. Provide copper plated hangers and supports for copper piping.

3.6 EXCAVATING

A. Excavate to accommodate construction operations.

B. Notify Engineer of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.
C. Slope banks of excavations deeper than 4 feet to angle of repose or less until shored.
D. Do not interfere with 45 degree bearing splay of foundations.
E. Cut utility trenches wide enough to allow inspection of installed utilities.
F. Hand trim excavations. Remove loose matter.
G. Correct areas that are over-excavated and load-bearing surfaces that are disturbed.
H. Grade top perimeter of excavation to prevent surface water from draining into excavation.
I. Remove excavated material that is unsuitable for re-use from site.
J. Stockpile excavated material to be re-used in area designated on site .
K. Remove excess excavated material from site.

3.7 FILLING

A. Fill to contours and elevations indicated or required using unfrozen materials.
B. Fill up to finish grade elevations unless otherwise indicated.
C. Employ a placement method that does not disturb or damage other work.
D. Systematically fill to allow maximum time for natural settlement. Do not fill over porous, wet, frozen or spongy subgrade surfaces.
E. Maintain optimum moisture content of fill materials to attain required compaction density.
F. Soil Fill: Place and compact material in equal continuous layers not exceeding 12 inches compacted depth.
G. Correct areas that are over-excavated.
    1. Other areas: Use general fill, flush to required elevation, compacted to minimum 97 percent of maximum dry density.
H. Reshape and re-compact fills subjected to vehicular traffic.

3.8 APPLICATION

A. Install unions downstream of valves and at equipment or apparatus connections.
B. Install ball valves for shut-off and to isolate equipment, part of systems, or vertical risers.

3.9 TOLERANCES

A. Drainage Piping: Establish invert elevations within 1/2 inch vertically of location indicated and slope to drain at minimum of 1/4 inch per foot slope for 3 inch and larger, 1/4 inch per foot slope for sizes smaller than 3 inch.
B. Water Piping: Slope at minimum of 1/32 inch per foot and arrange to drain at low points.

3.10 FLUSHING AND DISINFECTING POTABLE WATER SYSTEMS

A. Flushing: The water service piping and distribution piping to all fixtures and outlets shall be flushed until the water runs clear and free of debris or particles. Faucet aerators or screens shall be removed during the flushing operations.
B. Disinfecting:
    1. The new and repaired water service piping and the hot and cold water distribution piping shall be purged of deleterious matter and disinfected after flushing and prior to use. The procedure used shall be as follows, or an approved equivalent, that meets the New York

State Plumbing Code Section 610 and with the method followed being in accordance with the New York State Department of Health regulations:

a. All water outlets shall be posted to warn against use during disinfecting operations.
b. Disinfecting shall be performed by persons experienced in such work.
c. The water supply to the piping system or parts thereof being disinfected shall be valved-off from the normal water source to prevent the introduction of disinfecting agents into the well storage tank or portions of a system that are not being disinfected.
d. The piping shall be disinfected with a water-chlorine solution. During the injection of the disinfecting agent into the piping, each outlet shall be fully opened several times until a concentration of not less than 50 parts per million chlorine is present at every outlet. The solution shall be allowed to stand in the piping for at least 24 hours.
e. An acceptable alternate to the 50 ppm/24 hour procedure described above shall be to maintain a level of not less than 200 parts per million chlorine for not less than three hours. If this alternate procedure is used, the heavily concentrated chlorine shall not be allowed to stand in the piping system for more than 6 hours. Also, special procedures shall be used to dispose of the heavily concentrated chlorine in an environmentally acceptable and approved manner.
f. At the end of the required retention time, the residual level of chlorine at every outlet shall be not less than five parts per million. If the residual is less than five parts per million, the disinfecting procedure shall be repeated until the required minimum chlorine residual is obtained at every outlet.
g. After the required residual chlorine level is obtained at every outlet, the system shall be flushed to remove the disinfecting agent. Flushing shall continue until the chlorine level at every outlet is reduced to that of the incoming water supply.
h. Any faucet aerators or screens that were removed shall be reinstalled.
i. A certification of performance and laboratory test report showing the absence of coliform organisms shall be submitted to the Authority Having Jurisdiction upon satisfactory completion of the disinfecting operations.

2. The disinfecting procedures shall meet or exceed the requirements set forth in the American Water Works Association Standard C651-14, Disinfection of Water Mains.

3.11 TESTING OF DOMESTIC WATER PIPING

A. Preparation for Testing: Prepare piping as follows:
   1. Leave joints uninsulated and exposed for examination during the test.
   2. Flush system with clean water. Clean strainers.
   3. 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.
   4. 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 overpressure during the test.

B. Testing: Test domestic water piping as follows:
   1. Leave joints uninsulated and exposed for examination during the test.
   2. Test piping in accordance with New York State Building Code.
   3. Test water service pipes and rough piping installations prior to covering or concealment.
   4. 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 the workmen and compatible with the piping system components.

5. Use vents installed at high points in the system to release trapped air while filling the system. Use drains installed at low points in the system for complete removal of the test liquid.
6. Examine system to ensure that equipment and components that cannot withstand test pressures are properly isolated. Examine test equipment to ensure tight connection and that low pressure filling lines have been disconnected.
7. Upon completion of a section of or the entire water supply system, the system, or portion completed, shall be tested and proved tight under a water pressure not less than the working pressure of the system; or by an air test of not less than 50 psi (344 kPa). The water utilized for tests shall be obtained from a potable source of supply. Isolate the system expansion tank from the tested system for the hydrostatic system test. Isolate building plumbing fixtures from the tested system for the hydrostatic system test.
8. After the test pressure has been applied for at least 10 minutes, 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.

C. Testing: Test all Domestic Water connected Plumbing Fixtures as follows:
1. Prior to construction closeout, a lead test shall be done to the domestic water plumbing fixtures in accordance with the New York State Department of Health Codes, Rules and Regulations chapter 10 volume A-1a, subchapter G, Part 67. Draw samples shall be collected from all outlets, as defined in Subpart 67-4. Draw sample volume shall be 250 milliliters (mL), collected from each cold water outlet before any water is used. The water shall be motionless in the pipes for a minimum of 8 hours, but not more than 18 hours, before sample collection.
2. All draw samples shall be analyzed by a laboratory approved to perform such analyses by the New York State Department's Environmental Laboratory Approval Program (ELAP). A copy of the results shall be handed over the school's representative as well as included in any closeout documentation to the New York State Education Department.

3.12 TESTING DRAINAGE, WASTE AND VENT PIPING

A. Provide testing of the drainage, waste and vent piping of either air or water testing, as described below.

B. Preparation for Testing: Prepare piping as follows:
1. Leave joints uninsulated and exposed for examination during the test.

C. Test drainage, waste and vent piping as follows:
1. Test piping with either an water test or an air test in accordance with New York State Building Code, and as follows:
   a. A water test shall be applied to the drainage system either in its entirety or in sections. If applied to the entire system, all openings in the piping shall be tightly closed, except the highest opening, and the system shall be filled with water to point of overflow. If the system is tested in sections, each opening shall be tightly plugged except the highest openings of the section under test, and each section shall be filled with water, but no section shall be tested with less than a 10-foot (3048 mm) head of water. In testing successive sections, at least the upper 10 feet (3048 mm) of the next preceding section shall be tested so that no joint or pipe in the building, except the uppermost 10 feet (3048 mm) of the system, shall have been submitted to a test of less than a 10-foot (3048 mm) head of water. The water shall be kept in the system, or in the portion under test, for at least 15 minutes before inspection starts. The system shall then be tight at all points.
   b. An air test shall be made by forcing air into the system until there is a uniform gauge pressure of 5 pounds per square inch (psi) (34.5 kPa) or sufficient to balance a 10-inch (254 mm) column of mercury. This pressure shall be held for a test period of at

least 15 minutes. Any adjustments to the test pressure required because of changes in ambient temperature or the seating of gaskets shall be made prior to the beginning of the test period.

D. Completed sanitary drainage and vent systems:
   1. After all plumbing fixtures have been installed and all traps have been filed with water, every part of the sanitary drainage and vent systems within the building walls shall be subjected to a final test as prescribed herein. For the duration of testing, flow of water in the system shall be halted and the building drain shall be sealed adjacent to its point of entry inside the building. If requested by the authority of jurisdiction, remove any cleanout plugs to ascertain that the testing is effective in all parts of the system.
   2. The final test of the completed drainage and vent system shall be visual and in sufficient detail to determine compliance with the provisions of this code except that the plumbing shall be subjected to a smoke test where necessary for cause. Where the smoke test is utilized, it shall be made by filling all traps with water and then introducing into the entire system a pungent, thick smoke produced by one or more smoke machines. When the smoke appears at stack openings on the roof, the stack openings shall be closed and a pressure equivalent to a 1-inch water column (248.8 Pa) shall be maintained for 15 minutes before inspection starts.

3.13 TESTING OF DRAINAGE AND VENT SYSTEMS

A. Rough Plumbing:
   1. Except for outside leaders and perforated or open jointed drain tile, the piping of plumbing drainage and venting systems shall be tested upon completion of the rough piping installation by water or air and proved watertight. The Authority Having Jurisdiction may require the removal of any cleanout plugs to ascertain if the pressure has reached all parts of the system. Either of the following test methods shall be used:
      a. The water test shall be applied to the drainage system either in its entirety or in sections after rough piping has been installed. If applied to the entire system, all openings in the piping shall be tightly closed, except the highest opening, and the system filled with water to point of overflow. If the system is tested in sections, each opening shall be tightly plugged except the highest opening of the section under test, and each section shall be filled with water, but no section shall be tested with less than a 10-foot head of water. In testing successive sections at least the upper 10 feet of the next preceding section shall be tested, so that no joint or pipe in the building (except the uppermost 10 feet of the system) shall have been submitted to a test of less than 10-foot head of water. The water shall be kept in the system or in the portion under test for at least 15 minutes before inspection starts; the system shall then be tight at all points.
      b. The air test shall be made by attaching an air compressor testing apparatus to any suitable opening and after closing all other inlets and outlets to the system, forcing air into the system until there is a uniform gauge pressure of 5 pounds per square inch or sufficient to balance a column of mercury 10 inches in height. This pressure shall be held without introduction of additional air for a period of at least 15 minutes.

B. Finished Plumbing
   1. When the rough plumbing has been tested in accordance with the paragraphs above, a final test of the finished plumbing system may be required to insure that the final fixture connections to the drainage system are gas-tight.
   2. After the plumbing fixtures have been set and their traps filled with water, their connections shall be tested and proved gas and watertight. A final smoke or peppermint test shall b required, except in the case of a previous or site-inspected water or air tested system. If a smoke or peppermint test is required, the following test methods shall be employed:

a. A smoke test shall be made by filling all traps with water and then re introducing into the entire system a pungent, thick smoke produced by one or more smoke machines. When the smoke appears at stack openings on the roof, they shall be closed and a pressure equivalent to a one-inch water column shall be developed and maintained for the period of the inspection.
b. Where the Authority Having Jurisdiction, due to practical difficulties or hardships, finds that a smoke test cannot be performed, a peppermint test shall be substituted in lieu thereof. Such peppermint test shall be conducted by the introduction of two ounces of oil of peppermint into the roof terminal of every line or stack to be tested. The oil of peppermint shall be followed at once by ten quarts of hot (140 degrees F) water whereupon all roof vent terminals shall be sealed. A positive test, which reveals leakage, shall be the detection of the odor of peppermint at any trap or other point on the system. Oil of peppermint or person or clothes have come in contact with oil of peppermint shall be excluded from the test area.

3.14 TESTING STORM DRAINAGE SYSTEM

A. Provide testing of the storm drainage system as described below.
B. Preparation for Testing: Prepare piping as follows:
   1. Leave joints exposed for examination during the test.
C. Test storm drainage piping as follows:
   1. Test piping with either an water test or an air test in accordance with New York State Building Code, and as follows:
      a. A water test shall be applied to the drainage system either in its entirety or in sections. If applied to the entire system, all openings in the piping shall be tightly closed, except the highest opening, and the system shall be filled with water to point of overflow. If the system is tested in sections, each opening shall be tightly plugged except the highest openings of the section under test, and each section shall be filled with water, but no section shall be tested with less than a 10-foot (3048 mm) head of water. In testing successive sections, at least the upper 10 feet (3048 mm) of the next preceding section shall be tested so that no joint or pipe in the building, except the uppermost 10 feet (3048 mm) of the system, shall have been submitted to a test of less than a 10-foot (3048 mm) head of water. The water shall be kept in the system, or in the portion under test, for at least 15 minutes before inspection starts. The system shall then be tight at all points.
      b. An air test shall be made by forcing air into the system until there is a uniform gauge pressure of 5 pounds per square inch (psi) (34.5 kPa) or sufficient to balance a 10-inch (254 mm) column of mercury. This pressure shall be held for a test period of at least 15 minutes. Any adjustments to the test pressure required because of changes in ambient temperature or the seating of gaskets shall be made prior to the beginning of the test period.

3.15 INSPECTION, TESTING AND PURGING OF NATURAL GAS PIPING

A. General: Prior to acceptance and initial operation, all piping installations shall be inspected and pressure tested to determine that the materials, design, fabrication, and installation practices comply with the requirements of authority having jurisdiction.
   1. Inspections: Inspection shall consist of visual examination, during or after manufacture, fabrication, assembly, or pressure tests as appropriate. Supplementary types of nondestructive inspection techniques, such as magnetic-particle, radiographic, ultrasonic, etc., shall not be required unless specifically listed herein or in the engineering design.
   2. Repairs and additions: In the event repairs or additions are made following the pressure test, the affected piping shall be tested.

a. EXCEPTION: Minor repairs or additions, provided the work is inspected and connections are tested with a noncorrosive leak-detecting fluid.

3. Section testing: A piping system shall be permitted to be tested as a complete unit or in sections. Under no circumstances shall a valve in a line be used as a bulkhead between gas in one section of the piping system and test medium in an adjacent section, unless two valves are installed in series with a valved "telltale" located between these valves. A valve shall not be subjected to the test pressure unless it can be determined that the valve, including the valve closing mechanism, is designed to safely withstand the test pressure.
4. Regulators and valve assemblies. Regulator and valve assemblies fabricated independently of the piping system in which they are to be installed shall be permitted to be tested with inert gas or air at the time of fabrication.

B. Test medium: The test medium shall be air or an inert gas. Oxygen shall not be used.

C. Test preparation: 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 this section, they shall be permitted to be covered or concealed.
1. Expansion joints: Expansion joints shall be provided with temporary restraints, if required, for the additional thrust load under test.
2. Equipment isolation: 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. Equipment disconnection: 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).
4. Valve isolation: Where the piping system is connected to equipment or components designed for operating pressures equal to or greater than the test pressure, such equipment shall be isolated from the piping system by closing the individual equipment shutoff valve(s).
5. Testing precautions: All testing of piping systems shall be done with due regard for the safety of employees and the public during the test. Bulkheads, anchorage, and bracing suitably designed to resist test pressures shall be installed if necessary. Prior to testing, the interior of the pipe shall be cleared of all foreign material.

D. Test Pressure measurement: 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.
1. Test pressure: The test pressure to be used shall be no less than 1-1/2 times the proposed maximum working pressure, but not less than 15 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.
2. Test duration: Test duration shall be not less than 1 hour for each 500 cubic feet (14 m3) of pipe volume or fraction thereof.

E. Detection of leaks and defects: 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 gages shall be deemed to indicate the presence of a leak unless such reduction can be readily attributed to some other cause.
1. Detection methods: The leakage shall be located by means of an approved combustible gas detector, a noncorrosive leak detection fluid, or an equivalent nonflammable solution.

Matches, candles, open flames, or other methods that could provide a source of ignition shall not be used.

2. Corrections: Where leakage or other defects are located, the affected portion of the piping system shall be repaired or replaced and retested.

F. System and equipment leakage test: Leakage testing of systems and equipment shall be in accordance with the following:
   1. Test gases: Fuel gas shall be permitted to be used for leak checks in piping systems that have been tested in accordance with requirements of this section.
   2. Before turning gas on: Before gas is introduced into a system of new gas piping, the entire system shall be inspected to determine that there are no open fittings or ends and that all manual valves at outlets on equipment are closed and all unused valves at outlets are closed and plugged or capped.
   3. Test for leakage: Immediately after the gas is turned on into a new system or into a system that has been initially restored after an interruption of service, the piping system shall be tested for leakage. If leakage is indicated, the gas supply shall be shut off until the necessary repairs have been made.
   4. Placing equipment in operation: Gas utilization equipment shall be permitted to be placed in operation after the piping system has been tested and determined to be free of leakage and purged in accordance with the following table:

Nominal Pipe Size (inches)	Length of Piping Requiring Purging
3	> 30 feet
4	> 15 feet
6	> 10 feet
8 or larger	Any length

G. Purging: Purging of piping shall comply with the following:
   1. Removal from service: Where gas piping is to be opened for servicing, addition, or modification, the section to be worked on shall be turned off from the gas supply at the nearest convenient point, and the line pressure vented to the outdoors, or to ventilated areas of sufficient size to prevent accumulation of flammable mixtures.
   2. The remaining gas in this section of pipe shall be displaced with an inert gas as required by the following table:

Nominal Pipe Size (inches)	Length of Piping Requiring Purging
2-1/2	> 50 feet
3	> 30 feet
4	> 15 feet
6	> 10 feet
8 or larger	Any length

   3. Placing in operation: Where piping full of air is placed in operation, the air in the piping shall be displaced with fuel gas, provided the piping does not exceed the length shown in the table below. The air can be safely displaced with fuel gas provided that a moderately rapid and continuous flow of fuel gas is introduced at one end of the line and air is vented out at the other end. The fuel gas flow shall be continued without interruption until the vented gas is free of air. The point of discharge shall not be left unattended during purging. After purging, the vent shall then be closed. Where required by the table below, the air in the piping shall first be displaced with an inert gas, and the inert gas shall then be displaced with fuel gas:

Nominal Pipe Size (inches)	Length of Piping Requiring Purging
3	> 30 feet
4	>15 feet
6	>10 feet
8 or larger	Any length

4. Discharge of purged gases: The open end of piping systems being purged shall not discharge into confined spaces or areas where there are sources of ignition unless precautions are taken to perform this operation in a safe manner by ventilation of the space, control of purging rate, and elimination of all hazardous conditions.
5. Placing equipment in operation: After the piping has been placed in operation, all equipment shall be purged and then placed in operation, as necessary.

3.16 VALVE INSTALLATIONS

A. General Application: Use ball, and butterfly valves for shut-off duty; ball, and butterfly for throttling duty. Refer to piping system specification sections for specific valve applications and arrangements.

B. Locate valves for easy access and provide separate support where necessary.

C. Install valves and unions for each item of equipment arranged to allow equipment removal without system shutdown. Unions are not required on flanged devices.

D. Install valves in horizontal piping with stem at or above the center of the pipe.

E. Install valves in a position to allow full stem movement.

F. Installation of Check Valves: Install for proper direction of flow as follows:

3.17 SOLDER CONNECTIONS

A. Cut tube square and to exact lengths.

B. Clean end of tube to depth of valve socket with steel wool, sand cloth, or a steel wire brush to a bright finish. Clean valve socket in the same manner.

C. Apply a proper soldering flux in an even coat to inside of valve socket and outside of tube.

D. Insert tube into valve socket, making sure the end rests against the shoulder inside valve. Rotate valve or tube slightly to ensure even distribution of the flux.

E. Apply heat evenly to outside of valve around joint until solder will melt upon contact. Feed solder until it completely fills the joint around the tube. Avoid hot spots or overheating valve. Once the solder starts cooling, remove excess amounts around the joint with a cloth or brush.

3.18 PRESS FITTING CONNECTIONS FOR DOMESTIC WATER PIPING

A. Press connections: Copper and copper alloy press connections shall be made in accordance with the manufacturer's installation instructions. The tubing shall be fully inserted into the fitting and the tubing marked at the shoulder of the fitting. The fitting alignment shall be checked against the mark on the tubing to assure the tubing is fully engaged (inserted) in the fitting. The joints shall be pressed using the tool(s) approved by the manufacturer.

3.19 PRESS FITTING CONNECTIONS FOR NATURAL GAS PIPING

A. Cold press mechanical joint fittings shall be installed in accordance with the manufacturer's installation instructions. The protective corrosion coating shall be removed from the outside of the pipe end. The pipe shall be fully inserted into the fitting and the pipe marked at the shoulder of the fitting. The fitting alignment shall be checked against the mark on the pipe to assure the

pipe is fully engaged (inserted) in the fitting. The joints shall be pressed using the tool(s) approved by the manufacturer.

B. Air Testing: The piping system shall be air tested for joint tightness. The piping system shall be pressurized with air to the maximum pressure of the system or to the code or standard required minimum for the required length of time. The system shall have no leaks at the rated pressure.

3.20 THREADED CONNECTIONS

A. Note the internal length of threads in valve ends, and proximity of valve internal seat or wall, to determine how far pipe should be threaded into valve.

B. Align threads at point of assembly.

C. Apply appropriate tape or thread compound to the external pipe threads (except where dry seal threading is specified).

D. Assemble joint, wrench tight. Wrench on valve shall be on the valve end into which the pipe is being threaded.

3.21 FLANGED CONNECTIONS

A. Align flange surfaces parallel.

B. Assemble joints by sequencing bolt tightening to make initial contact of flanges and gaskets as flat and parallel as possible. Use suitable lubricants on bolt threads. Tighten bolts gradually and uniformly with a torque wrench.

3.22 VALVE IDENTIFICATION SCHEDULE

A. Valve Service Identification Tags:
   1. Tag all valves with a brass tag fastened to the valve handle or stem, marked to indicate service and numbered in sequence.

3.23 SCHEDULES

A. Pipe Hanger Spacing:
   1. Cast Iron Piping: 5 feet maximum horizontal spacing, 15 feet maximum vertical spacing. Where 10 foot lengths of cast iron piping are installed, maximum horizontal spacing may be increased to 10 feet. All cast iron joints shall be supported.
   2. Copper Piping:
      a. 1-1/4 inch diameter and smaller: 6 feet maximum horizontal spacing, 10 feet maximum vertical spacing.
      b. 1-1/2 inch diameter and larger: 10 feet maximum horizontal spacing, 10 feet maximum vertical spacing.
   3. CPVC Pipe or Tubing:
      a. 1 inch or smaller: 3 feet maximum horizontal spacing, 10 feet maximum vertical spacing.
      b. 1-1/4 inches and larger: 4 feet maximum horizontal spacing, 10 feet maximum vertical spacing.
   4. PVC Pipe or Tubing: 4 feet maximum horizontal spacing, 10 feet maximum vertical spacing.

END OF SECTION 22 10 05

SECTION 22 10 06 - PLUMBING PIPING SPECIALTIES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Roof Drains.
B. Floor Drains.
C. Cleanouts.
D. Trap Seal Devices.
E. Pipe-applied Atmospheric-type Vacuum Breaker.
F. Backflow preventers with atmospheric vents.
G. Mixing valves.
H. Vent Pipe Extensions.

1.2 REFERENCE STANDARDS

A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.
B. ASME A112.6.3 - Floor and Trench Drains; 2001 (R2007).
C. ASME A112.6.4 - Roof, Deck, and Balcony Drains; 2003.
D. ASSE 1011 - Hose Connection Vacuum Breakers; 2004.
E. NEMA MG 1 - Motors and Generators; 2014.
F. NSF 2 - Food Equipment; 2014.
G. NSF 61 - Drinking Water System Components - Health Effects; 2014 (Errata 2015).
H. NSF 372 - Drinking Water System Components - Lead Content; 2011.
I. PDI-WH 201 - Water Hammer Arresters; 2010.

1.3 SUBMITTALS

A. Product Data: Provide component sizes, rough-in requirements, service sizes, and finishes.
B. Sustainable Design Documentation: Submit appropriate evidence that materials used in potable water systems comply with the specified requirements.
C. Shop Drawings: Indicate dimensions, weights, and placement of openings and holes.
D. Manufacturer's Instructions: Indicate Manufacturer's Installation Instructions: Indicate assembly and support requirements.
E. Sustainable Design Documentation: Submit appropriate evidence that materials used in potable water systems comply with the specified requirements.
F. Operation Data: Indicate frequency of treatment required for interceptors.
G. Maintenance Data: Include installation instructions, spare parts lists, exploded assembly views.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with not less than three years documented experience.
B. Potable water system components intended to dispense water for human consumption, including pipe and joining materials, shall comply with the following:

1. A weighted average lead content of not more than 0.25 percent as determined by NSF/ANSI 372.
2. NSF/ANSI 61.

C. Acceptance product marking: NSF®-61 and NSF®-372 (or NSF®-61-G) or other accepted certifier marks demonstrating third party certification with these requirements.

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS

A. Specialties in Potable Water Supply Systems: Provide products that comply with NSF 61 and NSF 372 for maximum lead content.

2.2 DRAINS

A. Roof Drains:
1. Assembly: ASME A112.6.4.
2. Body: Lacquered cast iron with sump.
3. Strainer: Removable cast iron domewith vandal proof screws.
4. Accessories: Coordinate with roofing type.
   a. Membrane flange and membrane clamp with integral gravel stop.
   b. Adjustable under deck clamp.
   c. Roof sump receiver.
   d. Waterproofing flange.
   e. Leveling frame.
   f. Adjustable extension sleeve for roof insulation.

B. Floor Drain FD-1:
1. ASME A112.6.3; lacquered cast iron two piece body with double drainage flange, weep holes, reversible clamping collar, and round, adjustable nickel-bronze strainer.

C. Floor Drain (FD-2):
1. ASME A112.6.3; lacquered cast iron, two piece body with double drainage flange, weep holes, reversible clamping collar, and round, adjustable round nickel bronze strainer with 4" [102mm] diameter funnel.

2.3 CLEANOUTS

A. Round Cleanouts at Interior Finished Floor Areas (DPCO-1):
1. Cast iron body with nickel bronze top, gasket seal, caulked outlet.

B. Cleanouts at Interior Finished Floor Areas (CO-3):
1. Lacquered cast iron body with anchor flange, reversible clamping collar, threaded top assembly, and round gasketed scored cover in service areas and round gasketed depressed cover to accept floor finish in finished floor areas.

C. Cleanouts at Interior Finished Wall Areas (WCO):
1. Line type with lacquered cast iron body and round epoxy coated gasketed cover, and round stainless steel access cover secured with machine screw.

D. Cleanouts at Interior Unfinished Accessible Areas (CO-5): Calked or threaded type. Provide bolted stack cleanouts on vertical rainwater leaders.

2.4 PIPE-APPLIED ATMOSPHERIC-TYPE VACUUM BREAKER

A. A spill-resistant vacuum breaker shall be installed, in accordance with the manufacturer's instructions, as noted on the plans. The valve shall consist of a one-piece modular check and float assembly made of engineered thermoplastic and housed in a Lead Free cast copper silicon alloy body. Springs shall be stainless steel. The Health Hazard, Anti-Siphon, Spill Resistant Backflow Preventer shall be constructed using Lead Free materials. Lead Free Health Hazard, Anti-Siphon, Spill Resistant Backflow Preventer shall comply with state codes and standards, where applicable, requiring reduced lead content. The valve shall be constructed with a molded diaphragm separating the air inlet from the potable water supply to prevent spillage.

B. The valve shall be a Watts Series LF008PCQT or equal.

C. Maximum Working Pressure: 150psi (10.3 bar)

D. Temperature Range: 33°F – 180°F (0.5°C – 83°C)

E. End Connections: Female NPT - Ball Valve shutoffs

2.5 PLUMBING VENT PIPING EXTENSIONS

A. Tubos, Inc. Pre-Fabricated Plumbing Vent Pipe Extensions.

B. Plumbing vent pipe extensions shall be installed locations where called out on the drawings.

C. Materials:
   1. PVC
   2. Specific Gravity ASTM D-792 1.42
   3. Tensile Yield, PSI ASTM D-638 7,400
   4. Tensile Modulus, PSI ASTM D- 430,000
   5. Flexural Strength, PSI ASTM D-790 14,000
   6. Flexural Modulus, PSI ASTM D-790 381,000 IZOD
   7. Impact, Ft-Lbs / In 1/8" ASTM D-256 1.1
   8. Heat Distortion Temp ASTM D-648 77
   9. Flammability ASTM D-635
   10. Self-Extinguishing Bulk Density ASTM D-1895 0.58
   11. Cell Classification ASTM D-1784 12454B
   12. Base Resin Inherent Viscosity ASTM D-1243 0.905

2.6 BACKFLOW PREVENTERS/RPZ

A. Backflow preventers with atmospheric vents (RPZ)
   1. A Dual Check Valve with Atmospheric Vent shall be installed at referenced cross-connections. Valve shall feature stainless steel and rubber internals protected by an integral strainer. Primary check shall be rubber to rubber seated, backed by the secondary check with rubber to metal seating. Device shall be certified lead free. The device shall be ASSE approved under Std. 1012 and shall be a Watts Series 9D.
   2. Check valve with atmospheric vents shall be installed in domestic cold water branch piping connections to each undercounter ice machine.

2.7 WATER HAMMER ARRESTORS

A. Water Hammer Arrestors:
   1. Stainless steel construction, bellows type sized in accordance with PDI-WH 201, precharged suitable for operation in temperature range minus 100 to 300 degrees F and maximum 250 psi working pressure.

2.8 MIXING VALVES

A. Emergency Shower fixture mixing valves:
   1. Thermostatic mixing valve (factory set to 85°F) for single emergency shower. Unit shall include a built-in cold water bypass, rough bronze finish, solid bimetal thermostat, locking temperature regulator with high temperature limit stop factory set for 90°F, integral check stops, and dial thermometer.
   2. Performance: Unit shall have a flow range of 3 GPM to 30.3 GPM with a maximum pressure loss of 30 PSI and come with a full 2-year warranty.
   3. Quality Assurance: Unit shall be certified to ASSE 1071. Unit shall be certified to meet Low Lead requirements of wetted surface area containing less than 0.25% lead by weight.

B. Emergency Eye/Face Wash mixing valves:
   1. Temperature Control. Valve shall have a precision thermal actuator to accurately blend hot and cold water. Valve is factory preset to deliver 85° F (29° C) tepid water with high temperature limit stop at 90° F (32° C). Temperature can be adjusted in field up to limit and locked.
   2. Capacity. Valve shall have a flow capacity of 13 GPM (49 L/min) at 30 PSI (2.1 bar) pressure drop.
   3. Failsafe Protection. In event the hot water supply fails, the valve shall deliver cold water only (i.e. bypass mode) at a flow rate of 9 GPM (34 L/min) at 30 PSI pressure drop. In the event the cold water supply fails, the valve shall close and not deliver any water at all.
   4. Supply Pressure. Maximum supply pressure is 125 PSI. Pressure of hot and cold water supplies can vary up to 25% and still deliver the flow and temperature required by ANSI/ASSE 1071.
   5. Construction. Valve shall be furnished with lockable shutoff valves on the hot and cold water supplies, internal check valves to prevent cross-mixing of hot and cold water and stainless steel basket filters to remove debris from the water flow. Valve shall be furnished with outlet temperature gauge and stainless steel mounting bracket. Valve shall meet the requirements of the U.S. Safe Drinking Water Act as lead-free.
   6. Inlets/Outlet. Valve shall have ½" NPT female inlets and outlet. Inlets can be positioned in the field for top, back or bottom supply. Outlet can be positioned on top or bottom.
   7. Quality Control. Valve shall be third-party certified to comply with ANSI/ASSE 1071 and shall be fully assembled and factory tested prior to shipment.

2.9 TRAP SEAL DEVICES

A. Provide Trap Seal devices that form a barrier to minimize the evaporation of the trap seal of a floor drain or open-ended drain inlet pipe. The Trap Seal shall open to allow drainage and close when there is no flow.

B. Basis of Design Manufacturer/Model: JR Smith Quad Close Trap Seal figure 2692.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Extend cleanouts to finished floor or wall surface. Lubricate threaded cleanout plugs with mixture of graphite and linseed oil. Ensure clearance at cleanout for rodding of drainage system.

C. Install floor cleanouts at elevation to accommodate finished floor.

D. Install approved potable water protection devices on plumbing lines where contamination of domestic water may occur; on premise isolation, flush valves, ice machine domestic water connections, interior and exterior hose bibbs.

E. Provide pipe applied atmospheric-type vacuum breaker on domestic cold water supply piping connected to dishwashers.

END OF SECTION 22 10 06

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SECTION 22 40 00 - PLUMBING FIXTURES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Flush valve water closets.
B. Bidets.
C. Wall hung urinals.
D. Lavatories.
E. All-in-one lavatory system.
F. Sinks.
G. Eye and face wash fountains.

1.2 REFERENCE STANDARDS

A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.
B. ASME A112.6.1M - Supports for Off-the-Floor Plumbing Fixtures for Public Use; 1997 (Reaffirmed 2002).
C. ASME A112.18.1 - Plumbing Supply Fittings; 2012.
D. ASME A112.19.2 - Ceramic Plumbing Fixtures; 2013.
E. ASME A112.19.3 - Stainless Steel Plumbing Fixtures (Designed for Residential Use); 2008 (R2013).
F. ASSE 1070 - Performance Requirements for Water Temperature Limiting Devices; 2004.
G. NSF 61 - Drinking Water System Components - Health Effects; 2014 (Errata 2015).
H. NSF 372 - Drinking Water System Components - Lead Content; 2011.

1.3 SUBMITTALS

A. Product Data: Provide catalog illustrations of fixtures, sizes, rough-in dimensions, utility sizes, trim, and finishes.
B. Manufacturer's Instructions: Indicate installation methods and procedures.
C. Maintenance Data: Include fixture trim exploded view and replacement parts lists.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Accept fixtures on site in factory packaging. Inspect for damage.
B. Protect installed fixtures from damage by securing areas and by leaving factory packaging in place to protect fixtures and prevent use.

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS

A. Potable Water Systems: Provide plumbing fittings and faucets that comply with NSF 61 and NSF 372 for maximum lead content; label pipe and fittings.

2.2 REGULATORY REQUIREMENTS

A. Comply with applicable codes for installation of plumbing systems.

2.3 FLUSH VALVE WATER CLOSETS

A. Water Closets: Vitreous china, ASME A112.19.2, floor mounted, siphon jet flush action, china bolt caps.
   1. Flush Valve: Exposed (top spud).
   2. Flush Operation: Sensor operated.

B. Flush Valves: ASME A112.18.1, diaphragm type, complete with vacuum breaker stops and accessories.
   1. Sensor-Operated Type: Motor-driven, normal voltage hard-wired, infrared sensor with over-ride push button.
   2. Exposed Type: Chrome plated, escutcheon, integral screwdriver stop.

C. Seats:
   1. Plastic: Solid, white finish, enlongated shape, open front, slow-closing hinged seat cover, extended back complete with self-sustaining hinges, and brass bolts with covers.

D. Water Closet Carriers:
   1. ASME A112.6.1M; adjustable cast iron frame, integral drain hub and vent, adjustable spud, lugs for floor and wall attachment, threaded fixture studs with nuts and washers.

2.4 WALL HUNG URINALS

A. Vitreous china, ASME A112.19.2, wall hung with side shields and concealed carrier.
   1. Consumption Volume: 0.125 gal per flush, maximum.
   2. Flush Valve: Exposed (top spud).
   3. Flush Operation: Sensor operated.
   4. Trapway Outlet: Integral.

B. Flush Valves: ASME A112.18.1, diaphragm type, complete with vacuum breaker stops and accessories.
   1. Sensor-Operated Type: Motor-driven, normal voltage hard-wired, infrared sensor with over-ride push button.
   2. Exposed Type: Chrome plated, escutcheon, integral screwdriver stop.

C. Carriers:
   1. ASME A112.6.1M; cast iron and steel frame with tubular legs, lugs for floor and wall attachment, threaded fixture studs for fixture hanger, bearing studs.

2.5 LAVATORIES

A. Wall-Hung Basin LAV-1/LAV3:
   1. Vitreous China: ASME A112.19.2; white rectangular basin with splash lip, front overflow, soap depression, and hanger. Size as indicated on drawings with 4 inch centerset spacing.

B. Supply Faucet:
   1. ASME A112.18.1; chrome plated combination supply fitting with pop-up waste, water economy aerator with maximum flow of 2.2 gpm, indexed handles.

C. Sensor Operated Faucet: Cast brass, chrome plated, deck mounted with sensor located on neck of spout.
   1. Spout Style: Standard.
   2. Power Supply:
   3. Power Supply: Per manufacturer's requirements.
      a. Cord and plug.
   4. Aerator: Vandal resistant, 0.5 gpm, laminar flow device.
   5. Finish: Polished chrome.

D. Thermostatic Mixing Valve:
   1. ASSE 1070 listed with combination stop, strainer, and check valves, and flexible stainless steel connectors.

E. Lavatory Carrier:
   1. ASME A112.6.1M; cast iron and steel frame with tubular legs, lugs for floor and wall attachment, threaded studs for fixture hanger, bearing plate and studs.

2.6 ALL-IN-ONE LAVATORY SYSTEM

A. Wall-Mounted Integrated Lavatory Unit: Formed from molded solid surface material with integral bowl, wall mounting frame, built-in faucet, built-in soap dispenser, and hand dryer.

B. Bowl and Deck Material:
   1. Fabricate from bio-based resin and preconsumer recycled granules with minimum 25 percent preconsumer recycled content and 8 percent bio-based resins, solid surface material, certified by an approved independent testing agency and meeting requirements of IAPMO Z124.

C. Cabinet Construction: Type 300 stainless steel end panels with No. 3 finish, with high impact polymer front enclosure, mounted to wall with stainless steel mounting frame and basin support.

D. Fittings: Includes drain, P-trap, and flexible stainless steel supply connections.

E. Faucet:
   1. Built-in vandal-resistant, low profile faucet, formed from composite fiberglass-reinforced polymer with painted, clear-coat finish, with low-voltage sensor using a zone-focused, hand-detecting, infrared, transmitting beam and timed, turn-off delay.
   2. Flow Rate: Not greater than 0.50 gpm.
   3. Power Supply: 120V 2A 12V DC adapter that plugs directly into the electrical outlet.
   4. Provide lavatory with combination stop and strainer.
   5. Thermostatic Mixing Valve: ASSE 1070 listed and NSF 372 compliant. Provide with check valves, and flexible, stainless steel connectors.

F. Liquid Soap Dispenser:
   1. Built-in vandal-resistant, low profile electronic dispenser formed from composite fiberglass-reinforced polymer with painted, clear-coat finish, with low-voltage hand-detecting infrared sensor, activation rate control, and overflow fill protection.
   2. Top filled from tamper-resistant cover.
   3. Capacity: 64 ounce.

2.7 SINKS

A. Single Compartment Bowl SK-1
   1. ASME A112.19.3; 19-1/2 by 19 by 6-1/2 inch outside dimensions 18 gauge, .040 inch thick, Type 304 stainless steel, self rimming and undercoated, with ledge back drilled for trim.
   2. Drain: 1-1/2 inch chromed brass.

3. Faucet: Deck mount, ceramic disc valve, brass material, 1.8 GPM, gooseneck spout, 360 degree spout swing rotation, lever handle, 6-1/2 inch spout reach, chrome finish.

B. SK-2
1. Stainless Steel 31" x 19.5" x 10-1/2", Wall Hung Single Bowl Hand Wash Sink Kit. Sink shall be manufactured from 14 gauge 304 Stainless Steel with a Buffed Satin finish, Center drain placement.
2. Drain: 3-1/2 inch
3. 8" Centerset Wall Mount Faucet w/5" Gooseneck Spout, 6" Wristblade Handles, 1/2" Offset Inlet. Faucet shall have a flow rate of 1.5 GPM, and be made of Chrome-plated Brass material, with a Quarter Turn Ceramic Disc valve. Faucet shall require 2 faucet holes.

2.8 EMERGENCY EYE AND FACE WASH

A. Wall mounted, eye/face wash with stainless steel bowl, ½" U.S. made chrome-plated brass stay-open ball valve, powder-coated cast aluminum flag handle and wall bracket. Unit shall have (2) polypropylene spray heads with integral "flip-top" dust covers, filters and 3.2 GPM flow control orifices mounted on a chrome- plated brass eyewash assembly. Unit shall include ANSI compliant sign.

B. Performance: Unit shall be fully factory assembled and hydrostatically tested to meet or exceed ANSI Z358.1 - 2014, and come with a full 2-year warranty.

C. Fixture: Guardian Equipment G1750 or approved equal.

2.9 FIXTURE SEALANT

A. Bathtub/Tile Sealant: White silicone; ASTM C 920, Uses M and A; single component, mildew resistant.
1. Applications: Use for: Joints between plumbing fixtures and floor and wall surfaces.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that walls and floor finishes are prepared and ready for installation of fixtures.

B. Verify that electric power is available and of the correct characteristics.

C. Confirm that millwork is constructed with adequate provision for the installation of counter top lavatories and sinks.

3.2 PREPARATION

A. Rough-in fixture piping connections in accordance with minimum sizes indicated in fixture rough-in schedule for particular fixtures.

3.3 INSTALLATION

A. Install each fixture with trap, easily removable for servicing and cleaning.

B. Provide chrome plated rigid or flexible supplies to fixtures with loose key stops, reducers, and escutcheons.

C. Install components level and plumb.

D. Install and secure fixtures in place with wall supports and bolts.

E. Solidly attach water closets to floor with lag screws. Lead flashing is not intended hold fixture in place.

3.4 INTERFACE WITH WORK OF OTHER SECTIONS

A. Review millwork shop drawings. Confirm location and size of fixtures and openings before rough-in and installation.

3.5 ADJUSTING

A. Adjust stops or valves for intended water flow rate to fixtures without splashing, noise, or overflow.

3.6 CLEANING

A. Clean plumbing fixtures and equipment.

3.7 PROTECTION

A. Protect installed products from damage due to subsequent construction operations.

B. Do not permit use of fixtures by construction personnel.

C. Repair or replace damaged products before Date of Substantial Completion.

END OF SECTION 22 40 00

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SECTION 23 05 01 - BASIC HVAC MATERIALS AND METHODS

PART 1 GENERAL

1.1 SUMMARY

A. This section includes the following basic mechanical materials and methods to complement other Division 23 Sections.
   1. Field-fabricated metal and wood equipment supports.
   2. Water soluble flux.
   3. Plumbing solder.
   4. Installation requirements common to equipment specifications.
   5. Firestopping (refer to specification section 078413).
   6. Cutting and patching.
   7. Touchup painting and finishing.
   8. Demolition.
   9. Mechanical System Commissioning
   10. Mechanical Equipment Instruction

B. Pipe and pipe fitting materials are specified in piping system Sections.

1.2 DEFINITIONS

A. Pipe, pipe fittings, and piping include tube, tube fittings, and tubing.

B. Finished Spaces: Spaces other than mechanical and electrical equipment rooms furred spaces, pipe and duct shafts, unheated spaces immediately below the roof, spaces above ceilings, unexcavated spaces, crawl spaces and tunnels.

C. Exposed Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.

D. Exposed Exterior Installations: Exposed to view outdoors, or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.

E. Concealed Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in duct shafts.

F. Concealed Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants, but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.

1.3 SUBMITTALS

A. General: Submit the following according to the conditions of the Contract and Division 1 Specification Sections.
   1. Product Data: Provide product data for piping specialties.
   2. Shop Drawings: Detailing fabrication and installation for metal and wood supports, and anchorage for mechanical materials and equipment.
   3. Identification materials and devices.
   4. Certificates: Welder certificates signed by the Contractor certifying that welders meet or exceed the requirements specified under the "Quality Assurance" Article.
   5. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Nanuet Union Free School District's name and registered with manufacturer.

1.4 QUALITY ASSURANCE

A. Perform work in accordance with the Building Code of New York State.

B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

C. Installer Qualifications: Company specializing in performing the work of this section with minimum three years of experience.

D. Qualify welding processes and operators for structural steel according to AWS D1.1 "Structural Welding Code--Steel."

E. Qualify welding processes and operators for piping according to ASME "Boiler and Pressure Vessel Code," Section IX, "Welding and Brazing Qualifications."
   1. Comply with provisions of ASME B31 Series "Code for Pressure Piping."
   2. Certify that each welder has passed AWS qualification tests for the welding processes involved and that certification is current.

F. Equipment Selection: Equipment of greater or larger power, dimensions, capacities, and ratings may be furnished provided such proposed equipment is approved in writing and connecting mechanical and electrical services, circuit breakers, conduit, motors, bases and equipment spaces are increased. No additional costs will be approved for these increases, if larger equipment is approved. If minimum energy ratings or efficiencies of the equipment are specified, the equipment must meet the design requirements and commissioning requirements.

1.5 SEQUENCING AND SCHEDULING

A. Coordinate mechanical equipment installation with other building components.

B. Arrange for chases, slots, and openings in building structure during progress of construction to allow for mechanical installations.

C. Coordinate the installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.

D. Sequence, coordinate, and integrate installations of mechanical materials and equipment for efficient flow of the Work.

E. Coordinate connection of electrical services.

F. Coordinate connection of mechanical systems with utilities and services. Comply with requirements of governing regulations, landlord, franchised service companies, and controlling agencies.

G. Coordinate requirements for access panels and doors where mechanical items requiring access are concealed behind finished surfaces. Refer to architectural specifications for access door requirements and sizes. Provide access doors per the architectural specifications at inaccessible ceiling locations at all locations where access is required to mechanical components. This includes at all gypsum wall board ceiling and soffit systems.

H. Coordinate installation of identifying devices after completing covering and painting where devices are applied to surfaces. Install identifying devices prior to installing acoustical ceilings and similar concealment.

PART 2 PRODUCTS

2.1 WATER SOLUBLE FLUX

A. Water Soluble Flux: Taramet Sterling(R) lead-free water soluble flux, conforming to ASTM B 813.

2.2 PLUMBING SOLDER

A. Plumbing Solder: Sterling® solder, ASTM B 32, Alloy Grade TC; 95 percent tin, 4.85 percent copper, 0.15 percent selenium.
   1. Certified to comply with NSF 61.
   2. Melting Temperature: 410 degrees F..
   3. Tensile Strength: 7,130 psi.
   4. Shear Strength: 5,979 psi.
   5. Elongation Percent: 19.1.
   6. Brinell Hardness: 15.1.
   7. Burst Strength: 5,800 psi.
   8. Pressure/Temperature Test Data on Copper Tube Assemblies comprised of 3 inch, 2 inch, 1 inch, 3/4 inch, and 1/2 inch Tubing with a Reducing Tee:
      a. No leaks at 180 degrees F., 200 psi, held for 2 minutes.

2.3 PIPING SPECIALTIES

A. Escutcheons: Manufactured wall, ceiling, and floor plates; deep-pattern type where required to conceal protruding fittings and sleeves.
   1. Inside Diameter: Closely fit around pipe, tube and insulation.
   2. Outside Diameter: Completely cover opening.
   3. Stamped Steel: One-piece, with set-screw and chrome-plated finish.
   4. Cast-Iron Floor Plate: One-piece casting.

B. Dielectric Fittings: Assembly or fitting having insulating material isolating joined dissimilar metals to prevent galvanic action and stop corrosion.
   1. Description: Combination of copper alloy and ferrous; threaded, solder, plain, and weld neck end types and matching piping system materials.
   2. Insulating Material: Suitable for system fluid, pressure and temperature.
   3. Dielectric Unions: Factory-fabricated, union assembly for 250-psig minimum working pressure at a 180 deg. F temperature.

PART 3 EXECUTION

3.1 PREPARATION

A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.

B. Remove scale and dirt on inside and outside before assembly.

C. Prepare piping connections to equipment with flanges or unions.

D. Keep open ends of pipe free from scale and dirt. Whenever work is suspended during construction protect open ends with temporary plugs or caps.

E. After completion, fill, clean, and treat systems. Refer to Section 232500.

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Route piping in orderly manner, plumb and parallel to building structure, and maintain gradient.

C. Install piping to conserve building space and avoid interference with use of space.

D. Sleeve pipe passing through partitions, walls, and floors.

E. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.

F. Inserts:
   1. Provide inserts for placement in concrete formwork.
   2. Provide inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.
   3. Where concrete slabs form finished ceiling, locate inserts flush with slab surface.
   4. Where inserts are omitted, drill through concrete slab from below and provide through-bolt with recessed square steel plate and nut above slab.

3.3 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

A. Install equipment to provide the maximum possible headroom where mounting heights are not indicated.

B. Install equipment according to approved submittal data. Portions of the Work are shown only in diagrammatic form. Refer conflicts to the Architect.

C. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, except where otherwise indicated.

D. Install mechanical equipment to facilitate servicing, maintenance, and repair or replacement of equipment components. Connect equipment for ease of disconnecting, with minimum of interference with other installations. Extend grease fittings to an accessible location

E. Install equipment giving right-of-way to piping systems installed at a required slope.

3.4 PAINTING AND FINISHING

A. Damage and Touch Up: Repair marred and damaged factory-painted finishes with materials and procedures to match original factory finish

3.5 ERECTION OF METAL SUPPORTS AND ANCHORAGE

A. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor mechanical materials and equipment.

B. Field Welding: Comply with AWS D1.1 "Structural Welding Code--Steel."

3.6 CUTTING AND PATCHING

A. Cut, channel, chase, and drill floors, walls, partitions, ceilings, and other surfaces necessary for mechanical installations. Perform cutting by skilled mechanics of the trades involved.

B. Repair cut surfaces to match adjacent surfaces.

3.7 MECHANICAL EQUIPMENT COMMISSIONING

A. Provide startup and commissioning services by factory-trained representatives of the equipment manufacturer for the following equipment:
   1. Controls.

B. Commissioning shall include the following:
   1. Provide commissioning services for the equipment included in the contract, in accordance with SMACNA HVAC Systems Commissioning Manual; 1994.
   2. Start-up the equipment specified and provide all manufacturer-recommended tests for startup of new installations.
   3. Verify equipment operation under normal operating conditions through a complete range of equipment conditions from minimum through maximum equipment capacity.
   4. Check operating condition and capacity of all required maintenance items, including, but not limited to oil, refrigerant or other consumables.

3.8 MECHANICAL EQUIPMENT INSTRUCTION

A. Provide instruction of the Owner's representatives for the duration specified below in operation and maintenance of the following equipment:
   1. Make-up Air Units (minimum 2 hours).
   2. Variable Air Volume Air Terminal Units (minimum 2 hours).
   3. Sprinkler Booster Pumps (minimum 4 hours).
   4. Multi-Zone Heat Pump Systems (minimum 2 hours).
   5. Rooftop Air Handling Units (minimum 2 hours).
   6. Radiant Heating Panels (minimum 2 hours).
   7. Gas Fired Make-up Air Units (minimum 2 hours).
   8. Controls (minimum 16 hours).
   9. Exhaust Fans (minimum 2 hours).
   10. Dust Collection Systems (minimum 4 hours).
   11. Single Zone Heat Pump systems (minimum 2 hours).
   12. Heating Coils (minimum 1 hour).

3.9 DEMOLITION

A. Disconnect, demolish, and remove work specified under Division 23 and as indicated.

B. Where pipe, breeching, insulation, or equipment to remain is damaged or disturbed, remove damaged portions and install new products of equal capacity and quality.

C. Accessible Work: Remove indicated exposed pipe and breeching in its entirety.

D. Removal: Remove indicated equipment from the project site.

E. Temporary Disconnection: Remove, store, clean, reinstall, reconnect, and make operational, equipment indicated for relocation.

END OF SECTION 23 05 01

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SECTION 23 05 16 - EXPANSION FITTINGS AND LOOPS FOR HVAC PIPING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Flexible pipe connectors.

B. Expansion joints and compensators.

1.2 REFERENCE STANDARDS

A. ASTM A269/A269M - Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service; 2015.

B. EJMA (STDS) - EJMA Standards; Tenth Edition.

C. UL (DIR) - Online Certifications Directory; current listings at database.ul.com.

1.3 SUBMITTALS

A. Product Data:

1. Flexible Pipe Connectors: Indicate maximum temperature and pressure rating, face-to-face length, live length, hose wall thickness, hose convolutions per foot and per assembly, fundamental frequency of assembly, braid structure, and total number of wires in braid.
2. Expansion Joints/Loops: Indicate maximum temperature and pressure rating, and maximum expansion compensation.

B. Design Data: Indicate selection calculations.

C. Manufacturer's Instructions: Indicate manufacturer's installation instructions, special procedures, and external controls.

D. Project Record Documents: Record installed locations of flexible pipe connectors, expansion joints, anchors, and guides.

PART 2 PRODUCTS

2.1 REGULATORY REQUIREMENTS

A. Comply with UL (DIR) requirements.

2.2 FLEXIBLE PIPE CONNECTORS

A. Corrugated stainless steel hose with single layer of stainless steel exterior braiding or bronze hose and braid, minimum 12" Live Length for piping 2-1/2" and less, minimum 18" Live Length for 3" and 4" piping and minimum 24" of Live Length for piping 5" and over; for maximum working pressure of 500 psi.

B. Flexible metal braided connectors shall be installed in a straight line without offsets or twists. Support pipe without any load on flexible connectors.

C. Connectors for pipe sizes 2" and below shall have threaded ends, and connectors for pipe sizes 2-1/2" and larger shall be flanged. Connectors for copper piping shall have copper tube ends. Connectors shall be constructed of annular corrugations and butt-welded seams. Utilize connectors of 300 series stainless steel corrugated hose and braid and carbon steel welded-on end fittings for connection to steel piping. Connectors to be installed on copper piping shall be constructed of bronze hose and braid with copper end connections.

2.3 EXPANSION JOINTS, HEATING WATER PIPING SYSTEMS

A. When indicated use flexible seismic/expansion "V" or "U" connectors of the size, type, and end fitting noted. "V" and "U" connectors shall be designed and constructed to accept motion in three planes (X, Y &Z), and to pass on no pressure thrust loads on the anchors. "V" and "U" connectors shall be installed in the neutral length listed on the manufacturer's diagrams, unless otherwise directed by the engineer. "V" and "U" connectors shall be positioned and supported per manufacturer's installation instructions. The "V" connectors shall consist of two flexible legs of metallic braided hose, two 45-degree elbows and a 90-degree return elbow. The "U" connectors shall consist of two flexible sections of hose and braid, two 90 degree elbows and a 180 degree return equaling a 360 degree pipe change.

B. Flexible "V" and "U" connectors are rated for a minimum of 150 PSIG working pressure in all sizes. Flanged, weld type, threaded, or copper tube end fittings to be provided to match connecting pipe. "V" connectors shall be rated for 2, 3, or 4 inches of motion, as indicated on project drawings.

C. In expansion compensation situations, the V and U connector can be installed pre-compressed or pre-extended, only if the full range of motion will be encountered in only one direction.

D. At least one pipe alignment guide shall be provided within four pipe diameters on each side of the loop.

2.4 ACCESSORIES

A. Pipe Alignment Guides:
   1. Two piece welded steel with enamel paint, bolted, with spider to fit standard pipe, frame with four mounting holes, clearance for insulation thickness required, minimum 2 inches travel.

B. Anchor Clamps:
   1. Carbon steel, light weight anchor that clamps to pipe and shall be either bolted or welded to the structure.
   2. Approximate spring force (in pounds) required for anchors by pipe size:
      a. 3/4" pipe size: 41 pounds.
      b. 1" pipe size: 46 pounds.
      c. 1-1/4" pipe size: 65 pounds.
      d. 1-1/2" pipe size: 68 pounds.
      e. 2" pipe size: 82 pounds.
      f. 2-1/2" pipe size: 160 pounds.
      g. 3" pipe size: 160 pounds.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install in accordance with EJMA (Expansion Joint Manufacturers Association) Standards.

C. Install flexible pipe connectors on pipes connected to vibration isolated equipment. Provide line size flexible connectors.

D. Anchor pipe to building structure where indicated. Provide pipe guides so movement is directed along axis of pipe only. Erect piping such that strain and weight is not on cast connections or apparatus.

END OF SECTION 23 05 16

SECTION 23 05 19 - METERS AND GAUGES FOR HVAC PIPING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Thermometers and thermometer wells.

1.2 REFERENCE STANDARDS

A. ASTM E1 - Standard Specification for ASTM Liquid-in-Glass Thermometers; 2014.

B. ASTM E77 - Standard Test Method for Inspection and Verification of Thermometers; 2014.

1.3 QUALITY ASSURANCE

A. Provide meters and gages that are rated by the manufacturer for both the temperature and pressure of the duty for the intended systems.

1.4 SUBMITTALS

A. Product Data: Provide list that indicates use, operating range, total range and location for manufactured components.

B. Project Record Documents: Record actual locations of components and instrumentation.

PART 2 PRODUCTS

2.1 STEM TYPE THERMOMETERS

A. Thermometer: ASTM E 1, adjustable angle, mercury free, blue spirit fill, lens front tube, cast aluminum case with enamel finish, cast aluminum adjustable joint with positive locking device.
   1. Size: 7 inch scale.
   2. Window: Clear Lexan.
   3. Stem: 3/4 inch NPT brass.
   4. Accuracy: 2 percent, per ASTM E77.
   5. Calibration: Degrees F.

2.2 THERMOMETER SUPPORTS

A. Socket: Brass separable sockets for thermometer stems with or without extensions as required, and with cap and chain.

2.3 TEST PLUGS

A. Test Plug: 1/4 inch or 1/2 inch brass fitting and cap for receiving 1/8 inch outside diameter pressure or temperature probe with Nordel core for temperatures up to 350 degrees F.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install thermometers in piping systems in sockets in short couplings. Enlarge pipes smaller than 2-1/2 inch for installation of thermometer sockets. Ensure sockets allow clearance from insulation.

C. Install thermometers in locations where they are easily read from normal operating level. Install vertical to 45 degrees off vertical.

D. Adjust thermometers to final angle, clean windows and lenses, and calibrate to zero.

3.2 SCHEDULE

A. Stem Type Thermometers, Location and Scale Range:
   1. Heating Coil inlet and outlet, 0 to 240 degrees F.

B. Thermometer Sockets, Location:
   1. Control valves 1 inch & larger - inlets and outlets.
   2. VAV Box Reheat coils - inlets and outlets.

END OF SECTION 23 05 19

SECTION 23 05 48 - VIBRATION CONTROLS FOR HVAC PIPING AND EQUIPMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Vibration isolation requirements.

B. Vibration isolators.

1.2 REFERENCE STANDARDS

A. ASCE 7 - Minimum Design Loads for Buildings and Other Structures; 2010, with 2013 Supplements and Errata.

B. ASHRAE (HVACA) - ASHRAE Handbook - HVAC Applications; 2015.

1.3 SUBMITTALS

A. Product Data: Provide manufacturer's standard catalog pages and data sheets for products, including materials, fabrication details, dimensions, and finishes.
   1. Vibration Isolators: Include rated load capacities and deflections; include information on color coding or other identification methods for spring element load capacities.

B. Manufacturer's Instructions: Indicate installation instructions with special procedures and setting dimensions.

1.4 QUALITY ASSURANCE

A. Comply with applicable building code.

B. Perform design and installation in accordance with applicable codes.

C. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than 5 years of documented experience.
   1. Member of Vibration Isolation and Seismic Control Manufacturers Association (VISCMA).

D. Installer Qualifications: Company specializing in performing the work of this section with minimum 5 years of experience.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Kinetics Noise Control, Inc: www.kineticsnoise.com.

B. Mason Industries: www.mason-ind.com.

C. Vibration Eliminator Company, Inc: www.veco-nyc.com.

2.2 PERFORMANCE REQUIREMENTS

A. General:
   1. All vibration isolators to conform to all uniform deflection and stability requirements under all operating loads.
   2. Steel springs to function without undue stress or overloading.
   3. Lateral to vertical stiffness ratio to not exceed 0.08 with spring deflection at minimum 75 percent of specified deflection.

2.3 VIBRATION ISOLATORS

A. General Requirements:
   1. Resilient Materials for Vibration Isolators: Oil, ozone, and oxidant resistant.
   2. Spring Elements for Spring Isolators:
      a. Color code or otherwise identify springs to indicate load capacity.
      b. Lateral Stability: Minimum lateral stiffness to vertical stiffness ratio of 0.8.
      c. Designed to operate in the linear portion of their load versus deflection curve over deflection range of not less than 50 percent above specified deflection.
      d. Designed to provide additional travel to solid of not less than 50 percent of rated deflection at rated load.
      e. Selected to provide designed deflection of not less than 75 percent of specified deflection.
      f. Selected to function without undue stress or overloading.

B. Vibration Isolators for Non-seismic Applications:
   1. Resilient Material Isolator Mounts, Nonseismic:
      a. Description: Mounting assemblies for bolting equipment to supporting structure utilizing elastomeric (e.g., neoprene, rubber) isolator material; fail-safe type.
   2. Housed Spring Isolators:
      a. Description: Isolator assembly consisting of single or multiple free-standing, laterally stable steel spring(s) within a metal housing.
      b. Furnished with integral elastomeric snubbing elements, nonadjustable type, for limiting equipment movement and preventing metal-to-metal contact between housing elements.
      c. Bottom Load Plate: Steel with nonskid, elastomeric isolator pad with provisions for bolting to supporting structure as required.
      d. Furnished with integral leveling device for positioning and securing supported equipment.
   3. Resilient Material Isolator Hangers, Nonseismic:
      a. Description: Isolator assembly designed for installation in hanger rod suspension system utilizing elastomeric (e.g., neoprene, rubber) or fiberglass isolator material for the lower hanger rod connection.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as shown on the drawings.

B. Verify that mounting surfaces are ready to receive vibration isolation and/or seismic control components and associated attachments.

C. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Install anchors and fasteners in accordance with ICC Evaluation Services, LLC (ICC-ES) evaluation report conditions of use where applicable.

C. Secure fasteners according to manufacturer's recommended torque settings.

D. Install flexible piping connections to provide sufficient slack for vibration isolation and/or seismic relative displacements as indicated or as required.

E. Vibration Isolation Systems:
   1. Spring Isolators:
      a. Position equipment at operating height; provide temporary blocking as required.
      b. Lift equipment free of isolators prior to lateral repositioning to avoid damage to isolators.
      c. Level equipment by adjusting isolators gradually in sequence to raise equipment uniformly such that excessive weight or stress is not placed on any single isolator.
   2. Clean debris from beneath vibration-isolated equipment that could cause short-circuiting of isolation.
   3. Use elastomeric grommets for attachments where required to prevent short-circuiting of isolation.
   4. Adjust isolators to be free of isolation short circuits during normal operation.
   5. Do not overtighten fasteners such that resilient material isolator pads are compressed beyond manufacturer's maximum recommended deflection.

3.3 INSTALLATION - GENERAL

A. Install in accordance with manufacturer's instructions.

B. On closed spring isolators, adjust so side stabilizers are clear under normal operating conditions.

C. Prior to making piping connections to equipment with operating weights substantially different from installed weights, block up equipment with temporary shims to final height. When full load is applied, adjust isolators to load to allow shim removal.

3.4 SCHEDULE

A. Equipment Isolation Schedule.
   1. Ceiling Cassette style and horizontal ducted fan coil units: Resilient Material Isolator Hangers

END OF SECTION 23 05 48

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SECTION 23 05 53 - IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Nameplates.
B. Tags.
C. Stencils.
D. Pipe markers.

1.2 REFERENCE STANDARDS

A. ASME A13.1 - Scheme for the Identification of Piping Systems; 2007.
B. ASTM D709 - Standard Specification for Laminated Thermosetting Materials; 2013.

1.3 SUBMITTALS

A. List: Submit list of wording, symbols, letter size, and color coding for mechanical identification.
B. Chart and Schedule: Submit valve chart and schedule, including valve tag number, location, function, and valve manufacturer's name and model number.
C. Product Data: Provide manufacturers catalog literature for each product required.
D. Manufacturer's Installation Instructions: Indicate special procedures, and installation.
E. Project Record Documents: Record actual locations of tagged valves.

PART 2 PRODUCTS

2.1 IDENTIFICATION APPLICATIONS

A. Exhaust Fans: Nameplates.
B. Make-up Air Units/Rooftop Units: Nameplates.
C. Air Terminal Units: Nameplates.
D. Automatic Controls: Tags. Key to control schematic.
E. Control Panels: Nameplates.
F. Ductwork: Stencilled painting.
G. Major Control Components: Nameplates.
H. Piping: Pipe markers and Tags.
I. Relays: Tags.
J. Small-sized Equipment: Tags.
K. Valves: Tags .
L. Duct Silencers: Nameplates.
M. Fan Coil Units: Nameplates.
N. Heat Pumps: Nameplates.

2.2 NAMEPLATES

A. Letter Color: White.

B. Letter Height: 1/4 inch.

C. Background Color: Black.

D. Plastic: Comply with ASTM D709.

2.3 TAGS

A. Metal Tags: Brass with stamped letters; tag size minimum 1-1/2 inch diameter with smooth edges.

B. Valve Tag Chart: Typewritten letter size list in anodized aluminum frame.

2.4 STENCILS

A. Stencil Paint: As specified in Section 099123, semi-gloss enamel, colors complying with ASME A13.1.

B. Stencil Paint: Semi-gloss enamel, colors complying with ASME A13.1.

2.5 PIPE MARKERS

A. Color: Comply with ASME A13.1.

B. Plastic Pipe Markers: Factory fabricated, flexible, semi- rigid plastic, preformed to fit around pipe or pipe covering; minimum information indicating flow direction arrow and identification of fluid being conveyed.

2.6 VALVE SERVICE IDENTIFICATION TAGS

A. Type: No. 19 B & S gage brass, with 1/4 inch high valve service abbreviated lettering on one line over 1/2 inch high valve service chart number, both deep stamped and black filled; and with 3/16 inch top hole for fastener.

B. Sizes:
   1. 1-1/2 inch dia round.

C. Fasteners: Brass "S" hook or brass jack chain of size as required for valve stem or handle to which tag is attached.

D. Acceptable Manufacturers:
   1. Seton
   2. Brady
   3. Emedco

PART 3 EXECUTION

3.1 PREPARATION

A. Degrease and clean surfaces to receive adhesive for identification materials.

3.2 INSTALLATION

A. Install nameplates with corrosive-resistant mechanical fasteners, or adhesive. Apply with sufficient adhesive to ensure permanent adhesion and seal with clear lacquer.

B. Install tags with corrosion resistant chain.

C. Install plastic tape pipe markers complete around pipe in accordance with manufacturer's instructions.

D. Use tags on piping 3/4 inch diameter and smaller.
   1. Identify service, flow direction, and pressure.
   2. Install in clear view and align with axis of piping.
   3. Locate identification not to exceed 20 feet on straight runs including risers and drops, adjacent to each valve and Tee, at each side of penetration of structure or enclosure, and at each obstruction.

E. Install ductwork with stencilled painting. Identify with air handling unit identification number and area served. Locate identification at air handling unit, at each side of penetration of structure or enclosure, and at each obstruction.

END OF SECTION 23 05 53

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SECTION 23 05 93 - TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Testing, adjustment, and balancing of air systems.

B. Testing, adjustment, and balancing of hydronic and refrigerating systems.

C. Field quality-control testing of Laboratory fume hoods.

D. Measurement of final operating condition of HVAC systems.

E. Sound measurement of equipment operating conditions.

1.2 REFERENCE STANDARDS

A. AABC (NSTSB) - AABC National Standards for Total System Balance, 7th Edition; 2016.

B. AABC MN-1 - AABC National Standards for Total System Balance; 2002.

C. NEBB (TAB) - Procedural Standards for Testing Adjusting Balancing of Environmental Systems; 2005, Seventh Edition.

1.3 SUBMITTALS

A. Installer Qualifications: Submit name of adjusting and balancing agency and TAB supervisor for approval within 30 days after award of Contract.

B. Certification: All reports submitted, whether progress reports or final reports shall be certified and shall bear the seal of the certification agency.

C. TAB Plan: Submit a written plan indicating the testing, adjusting, and balancing standard to be followed and the specific approach for each system and component.
   1. Submit to Engineer.
   2. Submit to the Commissioning Authority, Construction Manager, and HVAC controls contractor.
   3. Submit six weeks prior to starting the testing, adjusting, and balancing work.
   4. Include certification that the plan developer has reviewed Contract Documents, the equipment and systems, and the control system with the Engineer and other installers to sufficiently understand the design intent for each system.
   5. Include at least the following in the plan:
      a. List of all air flow, water flow, sound level, system capacity and efficiency measurements to be performed and a description of specific test procedures, parameters, formulas to be used.
      b. Copy of field checkout sheets and logs to be used, listing each piece of equipment to be tested, adjusted and balanced with the data cells to be gathered for each.
      c. Identification and types of measurement instruments to be used and their most recent calibration date.
      d. Discussion of what notations and markings will be made on the duct and piping drawings during the process.
      e. Final test report forms to be used.
      f. Detailed step-by-step procedures for TAB work for each system and issue, including:
         1) Terminal flow calibration (for each terminal type).
         2) Diffuser proportioning.
         3) Branch/submain proportioning.
         4) Total flow calculations.

5) Rechecking.
6) Diversity issues.

g. Expected problems and solutions, etc.
h. Details of how TOTAL flow will be determined; for example:
1) Air: Sum of terminal flows via control system calibrated readings or via hood readings of all terminals, supply (SA) and return air (RA) pitot traverse, SA or RA flow stations.
2) Water: Pump curves, circuit setter, flow station, ultrasonic, etc.
i. Proposed selection points for sound measurements and sound measurement methods.
j. Methods for making coil or other system plant capacity measurements, if specified.
k. Time schedule for TAB work to be done in phases (by floor, etc.).
l. Time schedule for deferred or seasonal TAB work, if specified.
m. False loading of systems to complete TAB work, if specified.
n. Procedures for field technician logs of discrepancies, deficient or uncompleted work by others, contract interpretation requests and lists of completed tests (scope and frequency).
o. Procedures for formal deficiency reports, including scope, frequency and distribution.

D. Control System Coordination Reports: Communicate in writing to the controls installer all setpoint and parameter changes made or problems and discrepancies identified during TAB that affect, or could affect, the control system setup and operation.

E. Final Report: Indicate deficiencies in systems that would prevent proper testing, adjusting, and balancing of systems and equipment to achieve specified performance.
1. Submit to the the Construction Manager and HVAC controls contractor within two weeks after completion of testing, adjusting, and balancing.
2. Revise TAB plan to reflect actual procedures and submit as part of final report.
3. Submit draft copies of report for review prior to final acceptance of Project. Provide final copies for Engineer and for inclusion in operating and maintenance manuals.
4. Include actual instrument list, with manufacturer name, serial number, and date of calibration.
5. Form of Test Reports: Where the TAB standard being followed recommends a report format use that; otherwise, follow ASHRAE Std 111.
6. Units of Measure: Report data in I-P (inch-pound) units only.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

A. Perform total system balance in accordance with the following:
1. AABC (NSTSB), AABC National Standards for Total System Balance.
2. NEBB Procedural Standards for Testing Adjusting Balancing of Environmental Systems.

B. Begin work after completion of systems to be tested, adjusted, or balanced and complete work prior to Substantial Completion of the project.

C. TAB Agency Qualifications:
1. Company specializing in the testing, adjusting, and balancing of systems specified in this section.

2. Having minimum of three years documented experience.
3. Certified by the following:
   a. AABC, Associated Air Balance Council: www.aabc.com/#sle; upon completion submit AABC National Performance Guaranty.

D. TAB Supervisor and Technician Qualifications: Certified by same organization as TAB agency.

3.2 EXAMINATION

A. Verify that systems are complete and operable before commencing work. Ensure the following conditions:
   1. Systems are started and operating in a safe and normal condition.
   2. Temperature control systems are installed complete and operable.
   3. Proper thermal overload protection is in place for electrical equipment.
   4. Final filters are clean and in place. If required, install temporary media in addition to final filters.
   5. Duct systems are clean of debris.
   6. Fans are rotating correctly.
   7. Fire, combination fire/smoke and volume dampers are in place and open.
   8. Air coil fins are cleaned and combed.
   9. Access doors are closed and duct end caps are in place.
   10. Air outlets are installed and connected.
   11. Duct system leakage is minimized.
   12. Hydronic systems are flushed, filled, and vented.
   13. Pumps are rotating correctly.
   14. Proper strainer baskets are clean and in place.
   15. Service and balance valves are open.

B. Submit field reports. Report defects and deficiencies that will or could prevent proper system balance.

C. Beginning of work means acceptance of existing conditions.

3.3 PREPARATION

A. Hold a pre-balancing meeting at least one week prior to starting TAB work.
   1. Require attendance by all installers whose work will be tested, adjusted, or balanced.

B. Provide instruments required for testing, adjusting, and balancing operations. Make instruments available to Engineer to facilitate spot checks during testing.

C. Provide additional balancing devices as required.

3.4 ADJUSTMENT TOLERANCES

A. Air Handling Systems: Adjust to within plus or minus 5 percent of design for supply systems and plus or minus 10 percent of design for return and exhaust systems.

B. Air Outlets and Inlets: Adjust total to within plus 10 percent and minus 5 percent of design to space. Adjust outlets and inlets in space to within plus or minus 5 percent of design.

C. Hydronic Systems: Adjust to within plus or minus 10 percent of design.

3.5 RECORDING AND ADJUSTING

A. Field Logs: Maintain written logs including:
   1. Running log of events and issues.
   2. Discrepancies, deficient or uncompleted work by others.
   3. Contract interpretation requests.

4. Lists of completed tests.

B. Ensure recorded data represents actual measured or observed conditions.

C. Permanently mark settings of valves, dampers, and other adjustment devices allowing settings to be restored. Set and lock memory stops.

D. Mark on drawings the locations where traverse and other critical measurements were taken and cross reference the location in the final report.

E. After adjustment, take measurements to verify balance has not been disrupted or that such disruption has been rectified.

F. Leave systems in proper working order, replacing belt guards, closing access doors, closing doors to electrical switch boxes, and restoring thermostats to specified settings.

3.6 FUME HOOD TESTING (ON SITE)

A. General: Test fume hoods as installed to assess airflow velocity, airflow visualization, and level of containment. Perform tests with static mode (set sash position) conditions. Conduct testing as outlined below for 100% of the hoods provided in the Project.

B. Preparation: Visit the project site to confirm that construction activities related to the fume hood system(s) and equipment are complete. Review design documents and Contractor's submittals. Verify that mechanical ventilation systems serving the space are functioning and operating in the normal mode. Notify Nanuet Union Free School District in writing, if conditions exist which preclude proper fume hood testing. Starting of testing constitutes acceptance of site conditions.

C. Testing Requirements:
1. Perform the following tests, in order:
   a. Airflow Velocity Test.
   b. Airflow Visualization Test.
2. Airflow Velocity Test: Comply with Section 9 of NEBB (FHT) Fume Hood Testing Standard - current edition.
3. Airflow Visualization Test: Comply with Section 10 of NEBB (FHT) Fume Hood Testing Standard - current edition.

3.7 AIR SYSTEM PROCEDURE

A. Adjust air handling and distribution systems to provide required or design supply, return, and exhaust air quantities at site altitude.

B. Make air quantity measurements in ducts by Pitot tube traverse of entire cross sectional area of duct.

C. Measure air quantities at air inlets and outlets.

D. Adjust distribution system to obtain uniform space temperatures free from objectionable drafts and noise.

E. Use volume control devices to regulate air quantities only to extent that adjustments do not create objectionable air motion or sound levels. Effect volume control by duct internal devices such as dampers and splitters.

F. Vary total system air quantities by adjustment of fan speeds. Vary branch air quantities by damper regulation.

G. Provide system schematic with required and actual air quantities recorded at each outlet or inlet.

H. Measure static air pressure conditions on air supply units, including filter and coil pressure drops, and total pressure across the fan. Make allowances for 50 percent loading of filters.

I. Adjust outside air automatic dampers, outside air, return air, and exhaust dampers for design conditions.

J. Measure temperature conditions across outside air, return air, and exhaust dampers to check leakage.

K. Where modulating dampers are provided, take measurements and balance at extreme conditions.

L. For variable air volume system powered units set volume controller to air flow setting indicated. Confirm connections properly made and confirm proper operation for automatic variable air volume temperature control.

3.8 WATER SYSTEM PROCEDURE

A. Adjust water systems to provide required or design quantities.

B. Use calibrated Venturi tubes, orifices, or other metered fittings and pressure gages to determine flow rates for system balance. Where flow metering devices are not installed, base flow balance on temperature difference across various heat transfer elements in the system.

C. Adjust systems to provide specified pressure drops and flows through heat transfer elements prior to thermal testing. Perform balancing by measurement of temperature differential in conjunction with air balancing.

D. Effect system balance with automatic control valves fully open to heat transfer elements.

E. Effect adjustment of water distribution systems by means of balancing cocks, valves, and fittings. Do not use service or shut-off valves for balancing unless indexed for balance point.

3.9 COMMISSIONING

A. Perform prerequisites prior to starting commissioning activities.

B. Fill out Prefunctional Checklists for:
   1. Air side systems.
   2. Water side systems.

C. Furnish to the Commissioning Authority, upon request, any data gathered but not shown in the final TAB report.

D. In the presence of the Commissioning Authority, verify that:
   1. Final settings of all valves, splitters, dampers and other adjustment devices have been permanently marked.
   2. The air system is being controlled to the lowest possible static pressure while still meeting design loads, less diversity; this shall include a review of TAB methods, established control setpoints, and physical verification of at least one leg from fan to diffuser having all balancing dampers wide open and that during full cooling of all terminal units taking off downstream of the static pressure sensor, the terminal unit on the critical leg has its damper 90 percent or more open.
   3. The water system is being controlled to the lowest possible pressure while still meeting design loads, less diversity; this shall include a review of TAB methods, established control setpoints, and physical verification of at least one leg from the pump to the coil having all balancing valves wide open and that during full heating the heating coil valve of that leg is 90 percent or more open.

3.10 SCOPE

A. Test, adjust, and balance the following:
   1. Make-Up Air Units.
   2. Terminal Heat Transfer Units.

3. Rooftop Air Handling Units
4. Fans.
5. Air Filters.
6. Air Terminal Units.
7. Air Inlets and Outlets.
8. Heating Coils.
9. Heat Pump Units.
10. Radiant Heating Panels.

3.11 MINIMUM DATA TO BE REPORTED

A. Electric Motors:
1. Manufacturer.
2. Model/Frame.
3. HP/BHP.
4. Phase, voltage, amperage; nameplate, actual, no load.
5. RPM.
6. Service factor.
7. Starter size, rating, heater elements.

B. Combustion Equipment (Gas Make-Up Air Units, Gas Rooftop Units):
1. Model number.
2. Serial number.
3. Firing rate.
4. Overfire draft.
5. Gas meter timing dial size.
6. Gas meter time per revolution.
7. Gas pressure at meter outlet.
8. Heat input.
9. Burner manifold gas pressure.
10. Percent carbon monoxide (CO).
11. Percent carbon dioxide (CO2).
12. Percent oxygen (O2).
13. Percent excess air.
14. Flue gas temperature at outlet.
15. Ambient temperature.
16. Net stack temperature.
17. Percent stack loss.
18. Percent combustion efficiency.
19. Heat output.

C. Heat Pumps Units:
1. Identification/number.
2. Location.
3. Manufacturer.
4. Model number.
5. Serial number.
6. Entering DB air temperature, design and actual.
7. Leaving DB air temperature, design and actual.
8. Number of compressors.

D. Cooling Coils:
1. Identification/number.
2. Location.

3. Service.
4. Manufacturer.
5. Air flow, design and actual.
6. Entering air DB temperature, design and actual.
7. Entering air WB temperature, design and actual.
8. Leaving air DB temperature, design and actual.
9. Leaving air WB temperature, design and actual.
10. Saturated suction temperature, design and actual.
11. Air pressure drop, design and actual.

E. Heating Coils:
1. Identification/number.
2. Location.
3. Service.
4. Manufacturer.
5. Air flow, design and actual.
6. Water flow, design and actual.
7. Water pressure drop, design and actual.
8. Entering water temperature, design and actual.
9. Leaving water temperature, design and actual.
10. Entering air temperature, design and actual.
11. Leaving air temperature, design and actual.
12. Air pressure drop, design and actual.

F. Air Moving Equipment:
1. Location.
2. Manufacturer.
3. Model number.
4. Serial number.
5. Arrangement/Class/Discharge.
6. Air flow, specified and actual.
7. Return air flow, specified and actual.
8. Outside air flow, specified and actual.
9. Total static pressure (total external), specified and actual.
10. Inlet pressure.
11. Discharge pressure.
12. Sheave Make/Size/Bore.
13. Number of Belts/Make/Size.
14. Fan RPM.

G. Return Air/Outside Air:
1. Identification/location.
2. Design air flow.
3. Actual air flow.
4. Design return air flow.
5. Actual return air flow.
6. Design outside air flow.
7. Actual outside air flow.
8. Return air temperature.
9. Outside air temperature.
10. Required mixed air temperature.
11. Actual mixed air temperature.
12. Design outside/return air ratio.

13. Actual outside/return air ratio.

H. Exhaust Fans:
1. Location.
2. Manufacturer.
3. Model number.
4. Serial number.
5. Air flow, specified and actual.
6. Total static pressure (total external), specified and actual.
7. Inlet pressure.
8. Discharge pressure.
9. Fan RPM.

I. Duct Traverses:
1. System zone/branch.
2. Duct size.
3. Area.
4. Design velocity.
5. Design air flow.
6. Test velocity.
7. Test air flow.
8. Duct static pressure.
9. Air temperature.
10. Air correction factor.

J. Duct Leak Tests:
1. Description of ductwork under test.
2. Duct design operating pressure.
3. Duct design test static pressure.
4. Duct capacity, air flow.
5. Maximum allowable leakage duct capacity times leak factor.
6. Test apparatus:
    a. Blower.
    b. Orifice, tube size.
    c. Orifice size.
    d. Calibrated.
7. Test static pressure.
8. Test orifice differential pressure.
9. Leakage.

K. Flow Measuring Stations:
1. Identification/number.
2. Location.
3. Size.
4. Manufacturer.
5. Model number.
6. Serial number.
7. Design Flow rate.
8. Design pressure drop.
9. Actual/final pressure drop.
10. Actual/final flow rate.
11. Station calibrated setting.

L. Terminal Unit Data:

1. Manufacturer.
2. Type, constant, variable, single, dual duct.
3. Identification/number.
4. Location.
5. Model number.
6. Size.
7. Minimum static pressure.
8. Minimum design air flow.
9. Maximum design air flow.
10. Maximum actual air flow.
11. Inlet static pressure.

M. Air Distribution Tests:
1. Air terminal number.
2. Room number/location.
3. Terminal type.
4. Terminal size.
5. Area factor.
6. Design velocity.
7. Design air flow.
8. Test (final) velocity.
9. Test (final) air flow.
10. Percent of design air flow.

N. Sound Level Reports:
1. Locations:
    a. High School:
        1) Science Classroom 231
        2) Science Classroom 230
2. Octave bands - equipment off.
3. Octave bands - equipment on.

END OF SECTION 23 05 93

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SECTION 23 07 13 - DUCT INSULATION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Duct insulation.

B. Duct liner.

C. Insulation jackets.

1.2 REFERENCE STANDARDS

A. ASTM C177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus; 2013.

B. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus; 2010.

C. ASTM C534/C534M - Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form; 2014.

D. ASTM C553 - Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications; 2013.

E. ASTM C612 - Standard Specification for Mineral Fiber Block and Board Thermal Insulation; 2014.

F. ASTM C916 - Standard Specification for Adhesives for Duct Thermal Insulation; 2014.

G. ASTM C1071 - Standard Specification for Fibrous Glass Duct Lining Insulation (Thermal and Sound Absorbing Material); 2012.

H. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.

I. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2014.

J. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi; 2015.

K. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2005.

L. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

1.3 SUBMITTALS

A. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section with not less than three years of documented experience.

B. Applicator Qualifications: Company specializing in performing the type of work specified in this section, with minimum 3 years of experience and approved by manufacturer.

C. Code Compliance: All insulation products provided on the contract shall be fully in compliance with all material and installation requirements of the New York State Energy Conservation Construction Code, latest addition with all amendments. Insulation products shall meet all "k" values and thicknesses as described in the Code.

1.5 REGULATORY REQUIREMENTS

A. Materials: Flame spread/smoke developed rating of 25/50 in accordance with ASTM E 84.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Accept materials on site in original factory packaging, labelled with manufacturer's identification, including product density and thickness.

B. Protect insulation from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original wrapping.

1.7 FIELD CONDITIONS

A. Maintain ambient temperatures and conditions required by manufacturers of adhesives, mastics, and insulation cements.

B. Maintain temperature during and after installation for minimum period of 24 hours.

PART 2 PRODUCTS

2.1 REGULATORY REQUIREMENTS

A. Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84 or UL 723.

2.2 GLASS FIBER, FLEXIBLE

A. Manufacturer:

B. Insulation: ASTM C553; flexible, noncombustible blanket.
   1. 'K' value: 0.31 at 75 degrees F, when tested in accordance with ASTM C518.
   2. Maximum Service Temperature: 1,200 degrees F.
   3. Maximum Water Vapor Absorption: 5.0 percent by weight.
   4. Density: 1.5 pounds per cubic foot.

C. Vapor Barrier Jacket:
   1. Kraft paper with glass fiber yarn and bonded to aluminized film.
   2. Moisture Vapor Permeability: 0.02 perm inch, when tested in accordance with ASTM E96/E96M.
   3. Secure with pressure-sensitive tape.

D. Vapor Barrier Tape:
   1. Kraft paper reinforced with glass fiber yarn and bonded to aluminized film, with pressure-sensitive rubber-based adhesive.

E. Indoor Vapor Barrier Mastic:
   1. Vinyl emulsion type acrylic or mastic, compatible with insulation, black color.

2.3 GLASS FIBER, RIGID

A. Insulation: ASTM C612; rigid, noncombustible blanket.
   1. K Value: 0.24 at 75 degrees F, when tested in accordance with ASTM C518.
   2. Maximum Service Temperature: 450 degrees F.
   3. Maximum Water Vapor Absorption: 5.0 percent.
   4. Maximum Density: 8.0 lb/cu ft.

B. Vapor Barrier Jacket:
   1. Kraft paper with glass fiber yarn and bonded to aluminized film.

2. Moisture Vapor Permeability: 0.029 ng/Pa s m (0.02 perm inch), when tested in accordance with ASTM E96/E96M.
3. Secure with pressure sensitive tape.

C. Vapor Barrier Tape:
1. Kraft paper reinforced with glass fiber yarn and bonded to aluminized film, with pressure sensitive rubber based adhesive.

D. Indoor Vapor Barrier Finish:
1. Cloth: Untreated; 9 oz/sq yd weight, glass fabric.
2. Vinyl emulsion type acrylic, compatible with insulation, white color.

2.4 JACKETS

A. Field Applied or Pre-Applied Vapor Barrier and Weather Proofing Jacket:
1. Field-applied or pre-applied protective finishing, operating within the range of -30°F (-23°C) and 300°F (149°C), will be jacketed with laminated, flexible, self-adhering, protective jacketing, vapor barrier and weather proofing membrane, having a high performance acrylic adhesive capable of installation with no additional mechanical attachment.
2. Material is to be VentureClad 1577CW (5ply) White finish selected based on availability and desired final appearance of insulated system.
3. Jacketing material is to have a maximum flame spread/smoke developed index of 10/20 per UL 723 test, a .0000 water vapor permeance rating per ASTM E-96, and mold inhibitors incorporated.
4. All products are UV stable.

2.5 DUCT LINER

A. Elastomeric Foam Insulation: Preformed flexible elastomeric cellular rubber insulation complying with ASTM C534/C534M Grade 1, in sheet form.
1. Minimum Service Temperature: Minus 40 degrees F.
2. Maximum Service Temperature: 180 degrees F.
3. Fungal Resistance: No growth when tested according to ASTM G21.
4. Apparent Thermal Conductivity: Maximum of 0.28 at 75 degrees F.
5. Minimum Noise Reduction Coefficients:
a. 1/2 inch Thickness: 0.30.
b. 1 inch Thickness: 0.40.
c. 1-1/2 inches Thickness: 0.50.
d. 2 inch Thickness: 0.60.
6. Erosion Resistance: Does not show evidence of breaking away, flaking off, or delamination at velocities of 10,000 fpm when tested in accordance with ASTM C1071.
7. Connection: Waterproof vapor barrier adhesive.

B. Elastomeric Foam Adhesive: Air dried, contact adhesive, compatible with insulation. Comply with ASTM C916.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install in accordance with NAIMA National Insulation Standards.

C. Insulated Ducts Conveying Air Below Ambient Temperature:

1. Provide insulation with vapor barrier jackets.
2. Finish with tape and vapor barrier jacket.
3. Continue insulation through walls, sleeves, hangers, and other duct penetrations.
4. Insulate entire system, including fittings, joints, flanges, fire dampers, flexible connections, and expansion joints.

D. Ducts Exposed in Mechanical Equipment Room and Finished Spaces, and exterior, double wall ductwork: Finish with field applied weather-proofing jacketing.

E. External Duct Insulation Application:
1. Secure insulation with vapor barrier with wires and seal jacket joints with vapor barrier adhesive or tape to match jacket.
2. Secure insulation without vapor barrier with staples, tape, or wires.
3. Install without sag on underside of duct. Use adhesive or mechanical fasteners where necessary to prevent sagging. Lift duct off trapeze hangers and insert spacers.
4. Seal vapor barrier penetrations by mechanical fasteners with vapor barrier adhesive.
5. Stop and point insulation around access doors and damper operators to allow operation without disturbing wrapping.

F. Duct Liner Application:
1. Adhere insulation with adhesive for 100 percent coverage.
2. Secure insulation with mechanical liner fasteners. Refer to SMACNA (DCS) for spacing.
3. Seal and smooth joints. Seal and coat transverse joints.
4. Seal liner surface penetrations with adhesive.
5. Duct dimensions indicated are net inside dimensions required for air-flow. Increase duct size to allow for insulation thickness.

3.2 SCHEDULES

A. Exhaust Ducts Within 10 ft of Exterior Openings: 1-1/2" flexible glass fiber duct wrap insulation.

B. Outside Air Intake Ducts: 2 inch thick flexible glass fiber duct wrap insulation.

C. High School and Middle School Exterior Supply Ducts: Double wall ductwork systems with 2" thick internal elastomeric foam duct liner.

D. High School Exterior Exhaust Ducts: Double wall ductwork systems with 1" thick internal elastomeric foam duct liner.

E. Middle School Supply Ducts (Concealed): 2" thick flexible glass fiber duct wrap insulation.
1. Exposed supply ducts shall be un-insulated.

F. High School Interior, Rectangular Supply ducts After VAV Terminal Unit Boxes (concealed): 1/2" thick internal elastomeric foam duct liner.

G. High School Interior, Round Supply ducts After VAV Terminal Unit Boxes (concealed): 1-1/2" thick flexible glass fiber duct wrap insulation.

H. High School Interior, Rectangular Supply ducts Before VAV Terminal Unit Boxes (concealed): 1" thick external glass fiber board insulation.

I. High School Interior, Round Supply ducts Before VAV Terminal Unit Boxes (concealed): 1-1/2" flexible glass fiber duct wrap insulation.

END OF SECTION 23 07 13

SECTION 230716 - HVAC EQUIPMENT INSULATION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Equipment insulation.

1.2 REFERENCE STANDARDS

A. ASTM C534/C534M - Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form; 2014.

B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.

C. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

1.3 SUBMITTALS

A. Product Data: Provide product description, thermal characteristics, list of materials and thickness for equipment scheduled.

B. Manufacturer's Instructions: Indicate installation procedures that ensure acceptable workmanship and installation standards will be achieved.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with not less than three years of documented experience.

PART 2 PRODUCTS

2.1 REGULATORY REQUIREMENTS

A. Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84 or UL 723.

2.2 FLEXIBLE ELASTOMERIC CELLULAR INSULATION

A. Insulation: Preformed flexible elastomeric cellular rubber insulation complying with ASTM C534/C534M Grade 1, in sheet form.
   1. Minimum Service Temperature: Minus 40 degrees F.
   2. Maximum Service Temperature: 220 degrees F.
   3. Connection: Waterproof vapor barrier adhesive.

B. Elastomeric Foam Adhesive: Air dried, contact adhesive, compatible with insulation.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Apply insulation close to equipment by grooving, scoring, and beveling insulation. Fasten insulation to equipment with studs, pins, clips, adhesive, wires, or bands.

C. Fill joints, cracks, seams, and depressions with bedding compound to form smooth surface. On cold equipment, use vapor barrier cement.

D. Equipment Requiring Access for Maintenance, Repair, or Cleaning: Install insulation so it can be easily removed and replaced without damage.

3.2 SCHEDULE

A. Heating Systems:
   1. Heating Coils: 1" thick flexible elastomeric insulation over all exposed surfaces of heating coil.
   2. Interior Duct Silencers: 1" thick flexible elastomeric insulation over all exposed surfaces of Duct Silencers.

END OF SECTION 23 07 16

SECTION 23 07 19 - HVAC PIPING INSULATION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Piping insulation.

B. Jackets and accessories.

C. Engineered wall outlet seals and refrigerant piping insulation protection.

1.2 REFERENCE STANDARDS

A. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2015.

B. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2014.

C. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate [Metric]; 2014.

D. ASTM C177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus; 2013.

E. ASTM C195 - Standard Specification for Mineral Fiber Thermal Insulating Cement; 2007 (Reapproved 2013).

F. ASTM C449 - Standard Specification for Mineral Fiber Hydraulic-Setting Thermal Insulating and Finishing Cement; 2007 (Reapproved 2013).

G. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus; 2010.

H. ASTM C533 - Standard Specification for Calcium Silicate Block and Pipe Thermal Insulation; 2013.

I. ASTM C534/C534M - Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form; 2014.

J. ASTM C547 - Standard Specification for Mineral Fiber Pipe Insulation; 2015.

K. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation; 2015a.

L. ASTM C585 - Standard Practice for Inner and Outer Diameters of Thermal Insulation for Nominal Sizes of Pipe and Tubing; 2010.

M. ASTM C795 - Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel; 2008 (Reapproved 2013).

N. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers--Tension; 2006a (Reapproved 2013).

O. ASTM D570 - Standard Test Method for Water Absorption of Plastics; 1998 (Reapproved 2010).

P. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.

Q. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2014.

R. ASTM E283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2004 (Reapproved 2012).

S. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000 (Reapproved 2009).

T. ASTM E2178 - Standard Test Method for Air Permeance of Building Materials; 2013.

U. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi; 2015.

V. ASTM G153 - Standard Practice for Operating Enclosed Carbon Arc Light Apparatus for Exposure of Nonmetallic Materials; 2013.

W. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

1.3 SUBMITTALS

A. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.

B. Manufacturer's Instructions: Indicate installation procedures that ensure acceptable workmanship and installation standards will be achieved.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with not less than three years of documented experience.

B. Applicator Qualifications: Company specializing in performing the type of work specified in this section with minimum 3 years of experience.

PART 2 PRODUCTS

2.1 REGULATORY REQUIREMENTS

A. Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84 or UL 723.

2.2 GLASS FIBER, RIGID

A. Insulation: ASTM C547 and ASTM C795; semi-rigid, noncombustible, end grain adhered to jacket.
   1. Maximum Service Temperature: 650 degrees F.
   2. Maximum Moisture Absorption: 0.2 percent by volume.

B. Vapor Barrier Jacket: White kraft paper with glass fiber yarn, bonded to aluminized film; moisture vapor transmission when tested in accordance with ASTM E96/E96M of 0.02 perm-inches.

C. Tie Wire: 0.048 inch stainless steel with twisted ends on maximum 12 inch centers.

D. Vapor Barrier Lap Adhesive: Compatible with insulation.

E. Insulating Cement/Mastic: ASTM C195; hydraulic setting on mineral wool.

F. Fibrous Glass Fabric:
   1. Cloth: Untreated; 9 oz/sq yd weight.
   2. Blanket: 1.0 lb/cu ft density.
   3. Weave: 5 by 5.

G. Indoor Vapor Barrier Finish:
   1. Cloth: Untreated; 9 oz/sq yd weight.
   2. Vinyl emulsion type acrylic, compatible with insulation, black color.

H. Insulating Cement: ASTM C449.

2.3 FLEXIBLE ELASTOMERIC CELLULAR INSULATION

A. Insulation: Preformed flexible elastomeric cellular rubber insulation complying with ASTM C534/C534M Grade 1; use molded tubular material wherever possible.
   1. Minimum Service Temperature: Minus 40 degrees F.
   2. Maximum Service Temperature: 180 degrees F.
   3. Connection: Waterproof vapor barrier adhesive.

B. Elastomeric Foam Adhesive: Air dried, contact adhesive, compatible with insulation.

C. Weather Barrier Coating: Air dried, contact adhesive, compatible with insulation and ASTM E84 compliant.

2.4 JACKETS

A. PVC Plastic.
   1. Jacket: One piece molded type fitting covers and sheet material, off-white color.
      a. Minimum Service Temperature: 0 degrees F.
      b. Maximum Service Temperature: 150 degrees F.
      c. Moisture Vapor Permeability: 0.002 perm inch, maximum, when tested in accordance with ASTM E96/E96M.
      d. Thickness: 10 mil.
      e. Connections: Brush on welding adhesive.
   2. Covering Adhesive Mastic: Compatible with insulation.

2.5 ENGINEERED WALL OUTLET SEALS AND REFRIGERANT PIPING INSULATION PROTECTION

A. Basis of Design: Airex Manufacturing, Inc; www.airexmfg.com.
   1. Pipe Penetration Wall Seal: Airex Titan Outlet.
   2. Refrigeration Pipe Insulation Protection System: Airex E-Flex Guard.
   3. Pipe Penetration Wall Seal and Insulation Protection System: Airex Pro-System Kit.

B. Pipe Penetration Wall Seal: Seals HVAC piping wall penetrations with compression gasket wall mounted rigid plastic outlet cover.
   1. Wall Outlet Size, Stucco and Masonry Applications: 7-1/2 inch wide by 10 inch high.
      a. Elastomeric Sleeve Diameter: 2-3/8 inch.
   2. Outlet Cover Color: Gray.
   3. Water Penetration: Comply with ASTM E331.
   4. Air Leakage: Comply with ASTM E283.
   5. Air Permeance: Comply with ASTM E2178.

C. Insulation Protection System: Refrigerant piping insulation PVC protective cover.
   1. PVC Insulation Cover Color: White with full-length velcro fastener.
   2. Weatherization and Ultraviolet Exposure Protection: Comply with ASTM G153.
   3. Water/Vapor Permeability: Comply with ASTM E96/E96M.
   4. Anti-Fungal and Anti-Microbial Resistance: Comply with ASTM G21.
   5. Flame Spread and Smoke Development Rating of 24/450: Comply with ASTM E84 or UL 723.
   6. Carbon Arc Light Exposure: Comply with ASTM G153.
   7. Tensile Strength After UV Exposure and Water Immersion: Comply with ASTM D412.
   8. Water Absorption of Plastics: Comply with ASTM D570.
   9. Adhesive free.

PART 3 EXECUTION

3.1 EXAMINATION

A. Test piping for design pressure, liquid tightness, and continuity prior to applying insulation materials.

B. Verify that surfaces are clean and dry, with foreign material removed.

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install in accordance with NAIMA National Insulation Standards.

C. Exposed Piping: Locate insulation and cover seams in least visible locations.

D. Insulated pipes conveying fluids below ambient temperature; insulate entire system including fittings, valves, unions, flanges, strainers, flexible connections, and expansion joints.

E. Glass Fiber Insulated Pipes Conveying Fluids Below Ambient Temperature:
   1. Provide vapor barrier jackets, factory-applied or field-applied; secure with self-sealing longitudinal laps and butt strips with pressure sensitive adhesive. Secure with outward clinch expanding staples and vapor barrier mastic.
   2. Insulate fittings, joints, and valves with molded insulation of like material and thickness as adjacent pipe. Finish with PVC fitting covers.

F. For hot piping conveying fluids over 140 degrees F, insulate flanges and unions at equipment.

G. Glass Fiber Insulated Pipes Conveying Fluids Above Ambient Temperature:
   1. Provide standard jackets, with or without vapor barrier, factory-applied, or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure-sensitive adhesive. Secure with outward clinch expanding staples.
   2. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe. Finish with PVC fitting covers.

H. Inserts and Shields:
   1. Application: Piping 1-1/2 inches diameter or larger.
   2. Shields: Galvanized steel between pipe hangers or pipe hanger rolls and inserts.
   3. Insert location: Between support shield and piping and under the finish jacket.
   4. Insert Configuration: Minimum 6 inches long, of same thickness and contour as adjoining insulation; may be factory fabricated.
   5. Insert Material: Hydrous calcium silicate insulation or other heavy density insulating material suitable for the planned temperature range.

I. Continue insulation through walls, sleeves, pipe hangers, and other pipe penetrations. Finish at supports, protrusions, and interruptions. At fire separations, refer to Section 078413.

J. Pipe Exposed in Mechanical Equipment Rooms, Electric Rooms, Fin tube and convector enclosure systems and Finished Spaces: Finish with PVC jacket and fitting covers.

3.3 SCHEDULE

A. Heating Systems:
   1. Heating Hot Water:
      a. Piping Size Range: Up to 1-1/4 inches: 1-1/2 inch thick glass fiber.
      b. Piping Size 1-1/2 inches and larger: 2 inches thick glass fiber.
      c. Run-outs to terminal units can be insulated with 1" thick glass fiber insulation for maximum length of 10-feet.

d. For heating water supply and return piping run-outs less than 1-1/2" in size routed within wall partitions and within fin tube and convector enclosure systems, insulation shall be reduced to a thickness of 1 inch.

B. Cooling Systems:
1. Refrigerant:
a. Refrigerant Suction Piping: 1 inch thick flexible elastomeric.
b. Refrigerant Liquid Piping: 1/2 inch thick flexible elastomeric
c. Provide Airex Titan Outlet piping wall penetration kit or equal at all individual refrigerant suction/refrigerant liquid exterior wall penetration locations. Provide Airex EFlex Guard or equal refrigerant piping insulation protection system over each individual refrigerant liquid/refrigerant suction connection to each individual condensing unit system from the exterior wall penetration to the condensing unit connection.

C. Other Systems:
1. Condensate Drain Piping: 1/2" thick glass fiber insulation with vapor barrier jacketing.

END OF SECTION 23 07 19

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SECTION 23 08 00 - COMMISSIONING OF HVAC

PART 1 GENERAL

1.1 SUMMARY

A. This section covers the Contractor's responsibilities for commissioning; each subcontractor or installer responsible for the installation of a particular system or equipment item to be commissioned is responsible for the commissioning activities relating to that system or equipment item.

B. The Commissioning Authority (CA) directs and coordinates all commissioning activities and provides Pre-functional Checklists and Functional Test Procedures for Contractor's use.

C. The entire HVAC system is to be commissioned, including commissioning activities for the following specific items:
   1. Control system.
   2. Major and minor equipment items.
   3. Piping systems and equipment.
   4. Ductwork and accessories.
   5. Terminal units.
   6. Sound control devices (duct silencers).
   7. Vibration control devices.
   8. Variable frequency drives.
   9. Special Ventilation:
      a. Fume hoods.
   10. Other equipment and systems explicitly identified elsewhere in Contract Documents as requiring commissioning.

D. The Pre-functional Checklist and Functional Test requirements specified in this section are in addition to, not a substitute for, inspection or testing specified in other sections.

1.2 SUBMITTALS

A. Updated Submittals: Keep the Commissioning Authority informed of all changes to control system documentation made during programming and setup; revise and resubmit when substantial changes are made.

B. Draft Pre-functional Checklists and Functional Test Procedures for Control System: Detailed written plan indicating the procedures to be followed to test, checkout and adjust the control system prior to full system Functional Testing; include at least the following for each type of equipment controlled:
   1. System name.
   2. List of devices.
   3. Step-by-step procedures for testing each controller after installation, including:
      a. Process of verifying proper hardware and wiring installation.
      b. Process of downloading programs to local controllers and verifying that they are addressed correctly.
      c. Process of performing operational checks of each controlled component.
      d. Plan and process for calibrating valve and damper actuators and all sensors.
      e. Description of the expected field adjustments for transmitters, controllers and control actuators should control responses fall outside of expected values.
   4. Copy of proposed log and field checkout sheets to be used to document the process; include space for initial and final read values during calibration of each point and space to

specifically indicate when a sensor or controller has “passed” and is operating within the contract parameters.
5. Description of the instrumentation required for testing.
6. Indicate what tests on what systems should be completed prior to TAB using the control system for TAB work. Coordinate with the Commissioning Authority and TAB contractor for this determination.

C. Startup Reports, Pre-functional Checklists, and Trend Logs: Submit for approval of Commissioning Authority.

D. HVAC Control System O&M Manual Requirements. In addition to documentation specified elsewhere, compile and organize at minimum the following data on the control system:
1. Specific step-by-step instructions on how to perform and apply all functions, features, modes, etc. mentioned in the controls training sections of this specification and other features of this system. Provide an index and clear table of contents. Include the detailed technical manual for programming and customizing control loops and algorithms.
2. Full as-built set of control drawings.
3. Full as-built sequence of operations for each piece of equipment.
4. Full points list; in addition to the information on the original points list submittal, include a listing of all rooms with the following information for each room:
    a. Floor.
    b. Room number.
    c. Room name.
    d. Air handler unit ID.
    e. Reference drawing number.
    f. Air terminal unit tag ID.
    g. Heating and/or cooling valve tag ID.
    h. Minimum air flow rate.
    i. Maximum air flow rate.
5. Full print out of all schedules and set points after testing and acceptance of the system.
6. Full as-built print out of software program.
7. Electronic copy on disk of the entire program for this facility.
8. Marking of all system sensors and thermostats on the as-built floor plan and HVAC drawings with their control system designations.
9. Maintenance instructions, including sensor calibration requirements and methods by sensor type, etc.
10. Control equipment component submittals, parts lists, etc.
11. Warranty requirements.
12. Copies of all checkout tests and calibrations performed by the Contractor (not commissioning tests).
13. Organize and subdivide the manual with permanently labeled tabs for each of the following data in the given order:
    a. Sequences of operation.
    b. Control drawings.
    c. Points lists.
    d. Controller and/or module data.
    e. Thermostats and timers.
    f. Sensors and DP switches.
    g. Valves and valve actuators.
    h. Dampers and damper actuators.
    i. Program setups (software program printouts).

PART 2 PRODUCTS

2.1 TEST EQUIPMENT

A. Provide all standard testing equipment required to perform startup and initial checkout and required functional performance testing; unless otherwise noted such testing equipment will NOT become the property of Nanuet Union Free School District.

B. Equipment-Specific Tools: Where special testing equipment, tools and instruments are specific to a piece of equipment, are only available from the vendor, and are required in order to accomplish startup or Functional Testing, provide such equipment, tools, and instruments as part of the work at no extra cost to Nanuet Union Free School District; such equipment, tools, and instruments are to become the property of Nanuet Union Free School District.

PART 3 EXECUTION

3.1 PREPARATION

A. Cooperate with the Commissioning Authority in development of the Pre-functional Checklists and Functional Test Procedures.

B. Furnish additional information requested by the Commissioning Authority.

C. Prepare a preliminary schedule for HVAC pipe and duct system testing, flushing and cleaning, equipment start-up and testing, adjusting, and balancing start and completion for use by the Commissioning Authority; update the schedule as appropriate.

D. Notify the Commissioning Authority when pipe and duct system testing, flushing, cleaning, startup of each piece of equipment and testing, adjusting, and balancing will occur; when commissioning activities not yet performed or not yet scheduled will delay construction notify ahead of time and be proactive in seeing that the Commissioning Authority has the scheduling information needed to efficiently execute the commissioning process.

E. Put all HVAC equipment and systems into operation and continue operation during each working day of testing, adjusting, and balancing and commissioning, as required.

F. Provide test holes in ducts and plenums where directed to allow air measurements and air balancing; close with an approved plug.

G. Provide temperature and pressure taps in accordance with Contract Documents.

3.2 INSPECTING AND TESTING - GENERAL

A. Submit startup plans, startup reports, and Pre-functional Checklists for each item of equipment or other assembly to be commissioned.

B. Perform the Functional Tests directed by the Commissioning Authority for each item of equipment or other assembly to be commissioned.

C. Provide two-way radios for use during the testing.

D. Valve/Damper Stroke Setup and Check:
   1. For all valve/damper actuator positions checked, verify the actual position against the control system readout.
   2. Set pump/fan to normal operating mode.
   3. Command valve/damper closed; visually verify that valve/damper is closed and adjust output zero signal as required.
   4. Command valve/damper open; verify position is full open and adjust output signal as required.
   5. Command valve/damper to a few intermediate positions.

6. If actual valve/damper position does not reasonably correspond, replace actuator or add pilot positioner (for pneumatics).
7. Closure for Heating Coil Valves - Normally Open:
    a. Set heating setpoint 20 degrees F above room temperature.
    b. Observe valve open.
    c. Remove control air or power from the valve and verify that the valve stem and actuator position do not change.
    d. Restore to normal.
    e. Set heating setpoint to 20 degrees F below room temperature.
    f. Observe the valve close.
    g. Restore to normal.

E. Coil Valve Leak Check:
1. Method 1 - Water Temperature With 2-Way Valve:
    a. Calibrate water temperature sensors on each side of coil to be within 0.2 degree F of each other.
    b. Turn off air handler fans, close outside air dampers. Keep pump running. Make sure appropriate coil dampers are open.
    c. Normally closed valves will close.
    d. Override normally open valves to the closed position.
    e. After 10 minutes observe water delta T across coil. If it is greater than 2 degrees F (, leakage is probably occurring.
    f. Reset valve stroke to close tighter.
    g. Repeat test until compliance is achieved.
2. Method 2 - Air Temperature With 2 or 3-Way Valve: Water leak-by less than 10 percent will likely not be detected with this method.
    a. Calibrate air temperature sensors on each side of coil to be within 0.2 degree F of each other.
    b. Air handler fans should be on.
    c. Change mixed or discharge air setpoint, override values or bleed or squeeze bulb pneumatic controller to cause the valve to close.
    d. After 5 minutes observe air delta T across coil. If it is greater than one degree F (, leakage is probably occurring.
    e. Reset valve stroke to close tighter.
    f. Repeat test until compliance is achieved.

F. Isolation Valve or System Valve Leak Check: For valves not by coils.
1. With full pressure in the system, command valve closed.
2. Use an ultra-sonic flow meter to detect flow or leakage.

G. Deficiencies: Correct deficiencies and re-inspect or re-test, as applicable, at no extra cost to Nanuet Union Free School District.

3.3 TAB COORDINATION

A. TAB: Testing, adjusting, and balancing of HVAC.

B. Coordinate commissioning schedule with TAB schedule.

C. Review the TAB plan to determine the capabilities of the control system toward completing TAB.

D. Provide all necessary unique instruments and instruct the TAB technicians in their use; such as handheld control system interface for setting terminal unit boxes, etc.

E. Have all required Pre-functional Checklists, calibrations, startup and component Functional Tests of the system completed and approved by the Commissioning Authority prior to starting TAB.

F. Provide a qualified control system technician to operate the controls to assist the TAB technicians or provide sufficient training for the TAB technicians to operate the system without assistance.

3.4 CONTROL SYSTEM FUNCTIONAL TESTING

A. Pre-functional Checklists for control system components will require a signed and dated certification that all system programming is complete as required to accomplish the requirements of Contract Documents and the detailed Sequences of Operation documentation submittal.

B. Do not start Functional Testing until all controlled components have themselves been successfully Functionally Tested in accordance with Contract Documents.

C. Using a skilled technician who is familiar with this building, execute the Functional Testing of the control system as required by the Commissioning Authority.

D. Functional Testing of the control system constitutes demonstration and trend logging of control points monitored by the control system.
   1. The scope of trend logging is partially specified; trend log up to 50 percent more points than specified at no extra cost to Nanuet Union Free School District.
   2. Perform all trend logging specified in Pre-functional Checklists and Functional Test procedures.

E. Functionally Test integral or stand-alone controls in conjunction with the Functional Tests of the equipment they are attached to, including any interlocks with other equipment or systems; further testing during control system Functional Test is not required unless specifically indicated below.

F. Demonstrate the following to the Commissioning Authority during testing of controlled equipment; coordinate with commissioning of equipment.
   1. Setpoint changing features and functions.
   2. Sensor calibrations.

G. Demonstrate to the Commissioning Authority:
   1. That all specified functions and features are set up, debugged and fully operable.
   2. That scheduling features are fully functional and setup, including holidays.
   3. That all graphic screens and value readouts are completed.
   4. Correct date and time setting in central computer.
   5. That field panels read the same time as the central computer; sample 10 percent of field panels; if any of those fail, sample another 10 percent; if any of those fail test all remaining units at no extra cost to Nanuet Union Free School District.
   6. Functionality of field panels using local operator keypads and local ports (plug-ins) using portable computer/keypad; demonstrate 100 percent of panels and 10 percent of ports; if any ports fail, sample another 10 percent; if any of those fail, test all remaining units at no extra cost to Nanuet Union Free School District.
   7. Power failure and battery backup and power-up restart functions.
   8. Global commands features.
   9. Security and access codes.
   10. Occupant over-rides (manual, telephone, key, keypad, etc.).
   11. O&M schedules and alarms.
   12. Occupancy sensors and controls.
   13. All control strategies and sequences not tested during controlled equipment testing.

H. If the control system, integral control components, or related equipment do not respond to changing conditions and parameters appropriately as expected, as specified and according to acceptable operating practice, under any of the conditions, sequences, or modes tested, correct all systems, equipment, components, and software required at no additional cost to Nanuet Union Free School District.

3.5 OPERATION AND MAINTENANCE MANUALS

A. Add design intent documentation furnished by Engineer to manuals prior to submission to Nanuet Union Free School District.

B. Submit manuals related to items that were commissioned to Commissioning Authority for review; make changes recommended by Commissioning Authority.

C. Commissioning Authority will add commissioning records to manuals after submission to Nanuet Union Free School District.

3.6 DEMONSTRATION AND TRAINING

A. Demonstrate operation and maintenance of HVAC system to Nanuet Union Free School District' personnel; if during any demonstration, the system fails to perform in accordance with the information included in the O&M manual, stop demonstration, repair or adjust, and repeat demonstration. Demonstrations may be combined with training sessions if appropriate.

B. These demonstrations are in addition to, and not a substitute for, Pre-functional Checklists and demonstrations to the Commissioning Authority during Functional Testing.

C. Provide classroom and hands-on training of Nanuet Union Free School District's designated personnel on operation and maintenance of the HVAC system, control system, and all equipment items indicated to be commissioned. Provide the following minimum durations of training:

D. TAB Review: Instruct Nanuet Union Free School District's personnel for minimum 2 hours, after completion of TAB, on the following:
   1. Review final TAB report, explaining the layout and meanings of each data type.
   2. Discuss any outstanding deficient items in control, ducting or design that may affect the proper delivery of air or water.
   3. Identify and discuss any terminal units, duct runs, diffusers, coils, fans and pumps that are close to or are not meeting their design capacity.
   4. Discuss any temporary settings and steps to finalize them for any areas that are not finished.
   5. Other salient information that may be useful for facility operations, relative to TAB.

E. HVAC Control System Training: Perform training in at least three phases:
   1. Phase 1 - Basic Control System: Provide minimum of 4 hours of actual training on the control system itself. Upon completion of training, each attendee, using appropriate documentation, should be able to perform elementary operations and describe general hardware architecture and functionality of the system.
      a. This training may be held on-site or at the manufacturer's facility.
      b. If held off-site, the training may occur prior to final completion of the system installation.
      c. For off-site training, Contractor shall pay expenses of up to two attendees.
   2. Phase 2 - Integrating with HVAC Systems: Provide minimum of 4 hours of on-site, hands-on training after completion of Functional Testing. Include instruction on:
      a. The specific hardware configuration of installed systems in this facility and specific instruction for operating the installed system, including interfaces with other systems, if any.

b. Security levels, alarms, system start-up, shut-down, power outage and restart routines, changing setpoints and alarms and other typical changed parameters, overrides, freeze protection, manual operation of equipment, optional control strategies that can be considered, energy savings strategies and set points that if changed will adversely affect energy consumption, energy accounting, procedures for obtaining vendor assistance, etc.
c. Trend logging and monitoring features (values, change of state, totalization, etc.), including setting up, executing, downloading, viewing both tabular and graphically and printing trends; provide practice in setting up trend logging and monitoring during training session.
d. Every display screen, allowing time for questions.
e. Point database entry and modifications.

3. Phase 3 - Post-Occupancy: Six months after occupancy conduct minimum of 2 hours of training. Tailor training session to questions and topics solicited beforehand from Nanuet Union Free School District. Also be prepared to address topics brought up and answer questions concerning operation of the system.

F. Provide the services of manufacturer representatives to assist instructors where necessary.

G. Provide the services of the HVAC controls instructor at other training sessions, when requested, to discuss the interaction of the controls system as it relates to the equipment being discussed.

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SECTION 23 09 23 - DIRECT-DIGITAL CONTROL SYSTEM FOR HVAC

PART 1 GENERAL

1.1 SCOPE OF WORK

A. General:

1. The existing School District's DDC is manufactured by Siemens Industry, Inc, which is the building's certified temperature control system. The products, control equipment, software, hardware, programming, graphics, wiring and conduit specified in this section shall be provided by Siemens Industry, Inc, 8 Fernwood Road, Florham Park, NJ 07932. All control system requirements specified in this section shall connect to the existing Siemens Industries, Inc. network system that exists on the Nanuet Union Free School District campus.
2. The work of this section shall include the furnishing and installing of a complete Building Management System (BMS). The BMS shall be an extension of the existing Siemens Apogee Automation System at Nanuet Schools. Building Operating Personnel shall utilize existing Desigo workstation software to schedule and control the HVAC equipment. All controllers, sensors, and end devices shall match existing site DDC equipment as furnished by Siemens Industry, Inc. APOGEE Product Line. Siemens Industry, Inc. 8 Fernwood Road, Florham Park, NJ.
3. The entire system shall be computer driven and shall employ Direct Digital Control (DDC) processes for energy management, equipment monitoring and control, utilizing open communications capabilities as herein specified.
4. The Building Automation System (BAS) manufacturer’s local corporate branch office shall furnish and install a fully integrated building automation system, incorporating direct digital control (DDC) for energy management, equipment monitoring and control, and subsystems with open communications capabilities as herein specified. To ensure the highest quality of long-term service, the use of an independent distributor, non-corporate branch office is not permissible.
5. Actuators for valves and dampers shall be electric.
6. Analog Outputs: All analog outputs referenced in the specifications or on the drawings shall be true modulating control signals activating devices with spring return features so that the end device fails into the normal position as described or indicated. Floating point type control accomplished by power-open and power-close signals using multiple digital outputs or pulse width modulation shall not be acceptable except for devices in which the sequences or the drawings specifically identify floating point operation. All devices indicated with normally open (NO) or normally closed (NC) positions shall feature spring return to the normal position upon loss of power or failure of signal.
7. Provide operator training to the Nanuet Union Free School District as described in Section 3.
8. Provide installation and calibration, supervision, adjustments, and fine tuning necessary for complete and fully operational system.
9. The Temperature Control Contractor shall furnish and wire all control valves, motorized dampers, air flow measuring stations, pressure sensors (duct, piping), temperature sensors (wall, duct, piping) shown on the drawings and included in this section. The mechanical contractor shall install all control valves, motorized dampers, temperature sensing piping wells for immersion temperature sensors, piping pressure taps, airflow measuring stations and all other related temperature control equipment installed within ductwork and piping systems.

1.2 DDC SYSTEM DESCRIPTION

A. The entire Energy Management and Control System (EMCS) shall be comprised of a network of interoperable, stand-alone digital controllers communicating on an open protocol communication network. All information from the EMCS shall be available to local computers within the building via local Intranet and to remote computers or from multiple facilities via the Internet. The EMCS shall be capable of communicating to third party systems such as HVAC, lighting, energy metering, power management, clock displays, security, access control, fire-life safety systems and other building management related devices with open, interoperable communication capabilities.

B. All labor, material, equipment and software not specifically referred to herein or on the plans, that are required to meet the functional intent of this specification, shall be provided without additional cost to the Owner.

C. The intent of this specification is to provide open protocol field mounted Direct Digital controls. Open protocol, fully programmable, DDC controllers for each piece of mechanical equipment being controlled are mandatory. Controls that are “packaged” and supplied by the manufacturer are not acceptable. All systems as described in the sequence of operation shall be shown via dynamic Web based graphics with all pertinent system alarms for proper operation and maintenance.

D. Provide DDC controllers and all required field devices, sensors, and actuators, as specified herein, required for a complete and operating extension to the existing Apogee DDC System for the following equipment:
   1. Integration to Make-Up Air Unit (MAU)/Rooftop Unit (RTU) manufacturers furnished BACnet MS/TP compatible controls
   2. Field Installation of RTU controls
   3. Controls for VAV terminal units, heating coils, hydronic radiant panels, dust collection systems, multi-zone and single zone heat pump systems, exhaust fans, unit ventilators
   4. Representative Siemens zone temperature sensors as shown on the drawings
   5. Integration into existing Insight Graphical Operators Workstation

E. To ensure installation of a product of the highest quality, the BAS manufacturer must be UL registered and ISO 9001:2000 registered under Automatic Controls for Regulating Commercial Environments and Appliances for The Design and Manufacture of Environmental Controls and Energy Management Products and ISO 14001:1996 Registered as an Energy Management System. Proof of ISO 9001:2000 and ISO 14001:1996 registration must be submitted prior to bid. Quality Management System Manual detailing the BAS manufacturer’s ISO registered Quality Management System must be submitted with the manufacturer’s submittal.

F. The installation of the control system shall be performed by the controls manufacturer’s corporate branch office with the shop drawings, flow diagrams, bill of materials, component designation or identification number and sequence of operation all bearing the name of the manufacturer.

G. All materials and equipment used shall be standard components, regularly manufactured for this and/or other systems and not custom designed specially for this project. All systems and components shall have been thoroughly tested and proven in actual use for at least two years.

H. BAS manufacturer shall be responsible for all BAS and Temperature Control wiring for a complete and operable system. All wiring shall be done in accordance with all local and national codes. Systems shall be complete in all respects including thermostats, valves, dampers, relays, wiring, conduit, etc. to provide the functions described, regardless of whether or not thermostats, relays, etc., are specifically mentioned.

I. System Architecture:
   1. Provide a twisted pair for DDC system communication with BACNet protocol between intelligent devices and controllers. All communications wiring shall be plenum rated.

2. Provide programming for graphical display of all contract control systems on the existing head end.

1.3 CONTROL DIAGRAMS AND POINT SCHEDULES

A. The performance sequences described are provided to supplement the temperature control diagrams and point schedules as shown on the contract drawings. Where individual points are described in the diagrams and/or point schedules but are not required to meet the sequences specified, the points shall be included in the system as indicated on the drawings. All points shown on the drawings shall be provided whether or not they are required for the sequences. Additionally, provide all points which are required to meet the specified sequences, whether or not they are specifically identified on either the diagrams or the point schedules. The diagrams and point schedules are provided to enhance document clarity, and are not to be utilized to limit the hardware utilized in engineering the temperature control.

1.4 MANUFACTURER'S RECOMMENDATIONS

A. Where this specification does not describe installation procedures, or other equipment required to be in accordance with the recommendations of the manufacturer of the control system, provide those procedures and equipment without additional cost to the Owner as if it was explicitly specified in this contract. The contractor shall provide a complete and operable system which meets the recommendations of the equipment manufacturers.

1.5 REFERENCES

A. NFPA 70 - National Electrical Code; National Fire Protection Association; 2005.

B. UL-916 Energy Management Systems

C. ULC, UL Canadian Standards Association

D. FCC, Part 15, Subpart J, Class A Computing Devices

1.6 SUBMITTALS

A. Product Data: Provide data for each system component and software module.

B. Shop Drawings:
   1. Indicate trunk cable schematic showing programmable control unit locations, and trunk data conductors.
   2. List connected data points, including connected control unit and input device.
   3. Indicate system graphics indicating monitored systems, data (connected and calculated) point addresses, and operator notations.
   4. Show system configuration with peripheral devices, batteries, power supplies, diagrams, modems, and interconnections.
   5. Indicate description and sequence of operation of operating, user, and application software.
   6. Provide a complete point schedule demonstrating compliance with the point schedules included in the contract documents. Schedule format shall be such as to easily confirm that all the scheduled points are being provided.
   7. Provide a copy of all proposed system graphics.
   8. Schematics, sequences and flow diagrams.
   9. Revised BAS architecture diagram indicating the new equipment.
   10. Equipment data cut sheets
   11. System schematics, including:
      a. sequence of operations
      b. point names
      c. point addresses

d. interface wiring diagrams
e. panel layouts
f. system riser diagrams

12. Points schedule for each real point in the BAS, including: Tag, Point Type, System Name and Display Units.
13. Samples of Graphic Display screen types and associated menu penetrations to show hierarchy and functional interrelationships.
14. Detailed Bill of Material list for each Node, identifying quantity, part number, description, and optional features.
15. Control Damper Schedule including a separate line for each damper and a column for each of the damper attributes, including: Code Number, Fail Position, Damper Type, Damper Operator, Blade Type, Bearing Type, Seals, Duct Size, Damper Size, Mounting, and Actuator Type.
16. Control Valve Schedules including a separate line for each valve and a column for each of the valve attributes: Code Number, Configuration, Fail Position, Pipe Size, Valve Size, Body Configuration, Close off Pressure, Capacity, Valve CV, Calculated CV, Design Pressure, Actual Pressure, and Actuator Type.
17. Room schedue including a separate line for each variable air volume terminal unit indicating maximum airflow, minimum airflow, minimum ventilation rate, and heating coil flow rate (where scheduled).
18. Details of all BAS interfaces and connections to the work of other trades.
19. Product data sheets for all products including software.
20. Training provided, including outlines for each session.

C. Manufacturer's Instructions: Indicate manufacturer's installation instructions for all manufactured components.

D. Project Record Documents: Record actual locations of control components, including control units, thermostats, and sensors.
1. Revise shop drawings to reflect actual installation and operating sequences.
2. Include submittals data in final "Record Documents" form.

E. Operation and Maintenance Data:
1. Include interconnection wiring diagrams complete field installed systems with identified and numbered, system components and devices.
2. Include keyboard illustrations and step-by-step procedures indexed for each operator function.
3. Include inspection period, cleaning methods, cleaning materials recommended, and calibration tolerances.

1.7 QUALITY ASSURANCE

A. Single Source Responsibility: The contractor shall be fully responsible for the proper operation of all control systems, including, but not limited to sensors and controls, and peripheral devices. After the installation, the contractor shall be responsible for the calibration of the system. The control system manufacturer shall be fully responsible for providing and loading the specified software packages, to include the loading of all necessary operational parameters. Any debugging of software problems shall be performed solely by the control system manufacturer.

B. Electrical Work and Safety Requirements:
1. Electrical work shall be in strict accordance with applicable NFPA, ANSI and UL requirements. Fully enclose or properly guard electrical wiring, terminal blocks and other high voltage contacts and mark to prevent accidental injury to personnel.
2. All wiring associated with and required by the control system (including power circuits as indicated on the drawings) shall be the responsibility of the contractor.

3. Comply with all the latest federal, state and local rules, regulations, ordinances having jurisdiction over this work, including OSHA requirements. These codes and standards shall supersede the specifications and drawings. All work under this contract shall be in accordance with the latest editions of the National Electrical Code (NEC) and the electric codes in the locale in which the work is being performed.
4. The term "wiring" shall be construed to include furnishing of wire, conduit, miscellaneous materials and labor as required for mounting and connecting electrical control devices, and providing electrical interlocks between equipment. Low voltage sensor wiring shall be installed per NEC and local codes.

C. Perform work in accordance with NFPA 70 and NFPA 90A.

D. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc., as suitable for the purpose specified and indicated.

E. The BAS system components shall match existing system components.

F. The BAS system shall be designed and installed, commissioned and serviced by manufacturer employed, factory trained personnel. Manufacturer shall have an in-place support facility within 30 miles of the site with technical staff, spare parts inventory and necessary test and diagnostic equipment. Distributors or licensed installing contractors are not acceptable.

G. The manufacturer shall provide on site, experienced project manager for this work, responsible for direct supervision of the design, installation, start up and commissioning of the B.M.S.

H. Materials and equipment shall be the catalogued products of manufacturers regularly engaged in production and installation of automatic temperature control systems and shall be manufacturer's latest standard design that complies with the specification requirements.

I. All BAS peer-to-peer network controllers, central system controllers and local user displays shall be UL Listed under Standard UL 916, category PAZX; Standard ULC C100, category UUKL7; and under Standard UL 864, categories UUKL, UDTZ, and QVAX. and be so listed at the time of bid. All floor level controllers shall comply, at a minimum, with UL Standard UL 91 6category PAZX; Standard UL 864, categories UDTZ, and QVAX. and be so listed at the time of Bid.

J. DDC peer-to-peer controllers shall be compliant with the European EMC Directive, Standards EN 50081-2 and EN 50082-2, at the Industrial Levels. Additionally the equipment shall be compliant with the European LVD Directive and bear the CE mark in order to show compliance to both Directives.

K. All electronic equipment shall conform to the requirements of FCC Regulation, Part 15, Governing Radio Frequency Electromagnetic Interference and be so labeled.

L. The manufacturer of the building automation system shall provide documentation supporting compliance with ISO-9002 (Model for Quality Assurance in Production, Installation, and Servicing) and ISO-140001 (The application of well-accepted business management principles to the environment). The intent of this specification requirement is to ensure that the products from the manufacturer are delivered through a Quality System and Framework that will assure consistency in the products delivered for this project.

M. This system shall have a documented history of compatibility by design for a minimum of 15 years. Future compatibility shall be supported for no less than 10 years. Compatibility shall be defined as the ability to upgrade existing field panels to current level of technology, and extend new field panels on a previously installed network.

N. Compatibility shall be defined as the ability for any existing field panel microprocessor to be connected and directly communicate with new field panels without bridges, routers or protocol converters.

1.8 SYSTEM PERFORMANCE

A. Performance Standards. System shall conform to the following minimum standards over network connections. Systems shall be tested using manufacturer's recommended hardware and software for operator workstation (server and browser for web-based systems).
   1. Graphic Display. A graphic with 20 dynamic points shall display with current data within 10 sec.
   2. Graphic Refresh. A graphic with 20 dynamic points shall update with current data within 8 sec. and shall automatically refresh every 15 sec.
   3. Multiple Alarm Annunciations. Each workstation on the network shall receive alarms within 5 sec of other workstations.

1.9 DELIVERY, STORAGE AND HANDLING

A. Provide factory-shipping cartons for each piece of equipment and control device. Maintain cartons through shipping, storage, and handling as required to prevent equipment damage. Store equipment and materials inside and protected from weather.

1.10 SPECIFICATION NOMENCLATURE

A. Acronyms used in this specification are as follows:
   1. BAS Building Automation System
   2. EMCS Energy Management and Control System
   3. DDC Direct Digital Control
   4. NAC Network Area Controller
   5. IBCI nteroperable BACNet Controller
   6. ASC Application Specific Controller
   7. FUI Full User Interface
   8. BUI Browser User Interface
   9. POT Portable Operator’s Terminal
   10. PMI Power Measurement Interface
   11. LAN Local Area Network
   12. WAN Wide Area Network
   13. OOT Object Oriented Technology
   14. PICS Product Interoperability Compliance Statement

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Siemens Industry, Inc. APOGEE Product Line, Installed by the Corporate Branch Office Only, 8 Fernwood Road, Florham Park, NJ. Contact: Bert Vecchiarelli, 973 396-4159, bert.vecchiarelli@siemens.com

2.2 MATERIALS

A. All products used in this project installation shall be new and currently manufactured and shall have been applied in similar installations. Do not use this installation as a product test site unless explicitly approved in writing by Owner or Owner's representative. Spare parts shall be available for at least five years after completion of this contract.

2.3 DDC CONTROLLER FLOOR LEVEL NETWORK

A. This level communication shall support a family of application specific controllers and shall communicate with the peer to peer network through DDC Controllers for transmission of global data.

2.4 NETWORKED PRIMARY DDC CONTROLLERS

A. The Networked Primary DDC Controllers shall reside on the Building Level Network and communicate on a peer to peer basis.

B. Networked Primary DDC Controllers which require different programming languages or tools on a network are not acceptable.

C. Networked Primary DDC Controllers which do not meet the functions specified in Section 2.4.1 and Section 2.5 are not acceptable

D. Acceptable DDC Controllers Include:
   1. Siemens Industry, inc.: Apogee: PXM, PXC.
   2. DDC controllers listed will be deemed acceptable only if DDC controllers meet the performance criteria and functionality specified herein.

2.5 NETWORKED PRIMARY DDC CONTROLLERS

A. Networked Primary DDC Controllers shall be, at minimum, a 32-bit stand-alone, multi tasking, multi user, real time digital control processors consisting of modular hardware with plug in enclosed processors.

B. Each Primary Controller shall house a minimum of 16 MB RAM and 8 MB Flash ROM memory to support its own operating system and databases, including:
   1. Control processes
   2. Energy management applications
   3. Alarm management applications including custom alarm messages for each level alarm for each point in the system.
   4. Historical/trend data for points specified
   5. Maintenance support applications
   6. Custom processes
   7. Operator I/O
   8. Remote communications

C. Networked Primary DDC Controllers shall provide a RS 232C serial data communication port for operation of operator I/O devices such as industry standard printers, operator terminals, modems and portable laptop operator's terminals.

D. Networked Primary DDC Controllers shall provide local LED status indication for each digital input and output for constant, up to date verification of all point conditions without the need for an operator I/O device.

E. Each Networked Primary DDC Controller shall continuously perform self diagnostics, communication diagnosis and diagnosis of all components. The HVAC Mechanical Equipment Primary Controller shall provide both local and remote annunciation of any detected component failures, low battery conditions or repeated failure to establish communication.

F. If indicated in the point I/O schedule, the operator shall have the ability to manually override automatic or centrally executed commands at the Networked Primary DDC Controller via local, point discrete, on board hand/off/auto operator override switches for digital control type points and gradual switches for analog control type points.
   1. Switches shall be mounted either within the Networked Primary DDC Controllers key accessed enclosure, or externally mounted with each switch keyed to prevent unauthorized overrides.

2. Networked Primary DDC Controllers shall monitor the status of all overrides and inform the operator that automatic control has been inhibited. DDC Controllers shall also collect override activity information for reports.

G. Isolation shall be provided at all peer to peer network terminations, as well as all field point terminations to suppress induced voltage transients consistent with:
1. RF-Conducted Immunity (RFCI) per ENV 50141 (IEC 1000-4-6) at 3 V
2. Electro Static Discharge (ESD) Immunity per EN 61000-4-2 (IEC 1000-4-2) at 8 kV air discharge, 4 kV contact
3. Electrical Fast Transient (EFT) per EN 61000-4-4 (IEC 1000-4-4) at 500 V signal, 1 kV power
4. Output Circuit Transients per UL 864 (2,400V, 10A, 1.2 Joule max) Isolation shall be provided at all peer to peer panel's AC input terminals to suppress induced voltage transients consistent with:
   a. IEEE Standard 587 1980
   b. UL 864 Supply Line Transients
   c. Voltage Sags, Surge, and Dropout per EN 61000-4-11 (EN 1000-4-11)

H. In the event of the loss of normal power, there shall be an orderly shutdown of all Networked Primary DDC Controllers to prevent the loss of database or operating system software. Non volatile memory shall be incorporated for all critical controller configuration data and battery backup shall be provided to support the real time clock and all volatile memory for a minimum of 72 hours.

2.6 NETWORKED PRIMARY DDC CONTROLLER RESIDENT SOFTWARE FEATURES

A. General:
1. The software programs specified in this Section shall be provided as an integral part of Networked Primary DDC Controllers and shall not be dependent upon any higher level computer for execution.
2. All points shall be identified by up to 30 character point name and 16 character point descriptor. The same names shall be used at the PC workstation.
3. All digital points shall have user defined two-state status indication (descriptors with minimum of 8 characters allowed per state (i.e. summer/winter)).

B. Control Software Description:
1. The Networked Primary DDC Controllers shall have the ability to perform the following pre tested control algorithms:
   a. Two position control
   b. Proportional control
   c. Proportional plus integral control
   d. Proportional, integral, plus derivative control
   e. Automatic tuning of control loops
   f. Model Free Adaptive Control

2.7 FLOOR LEVEL NETWORK APPLICATION SPECIFIC CONTROLLERS (ASC)

A. Each DDC Controller shall be able to extend its performance and capacity through the use of remote application specific controllers (ASCs) through Floor Level LAN Device Networks.

B. Each ASC shall operate as a stand-alone controller capable of performing its specified control responsibilities independently of other controllers in the network. Each ASC shall be a microprocessor based, multi tasking, real time digital control processor. Each ASC shall be capable of control of the terminal device independent of the manufacturer of the terminal device.

C. Terminal Equipment Controllers:

1. Controllers shall include all point inputs and outputs necessary to perform the specified control sequences. Analog outputs shall be 0-10v, allowing for interface to a variety of modulating actuators.
2. All controller sequences and operation shall provide closed loop control of the intended application. Closing control loops over the FLN, BLN or MLN is not acceptable
3. Wireless FLN communications and Wireless Room sensors are acceptable with the requirement that MESH technology is utilized and the anticipated sensor battery life exceeds (4) years.

2.8 PERSONAL COMPUTER OPERATOR WORKSTATION HARDWARE

A. The existing Insight Server and Workstation Architecture Hardware shall remain and be used as the interface into new BAS equipment furnished in this project.

2.9 WORKSTATION OPERATOR INTERFACE (EXISTING TO BE RE-USED)

A. The existing operator interface, Apogee Building Automation System Software, shall be modified to include additional graphics, schedules, trend reports, alarm definitions required for the Work.

B. Basic Interface Description
   1. Operator workstation interface software shall minimize operator training through the use of user-friendly and interactive graphical applications, 30-character English language point identification, on-line help, and industry standard Windows application software. Interface software shall simultaneously communicate with and share data between any combination of dedicated, modem autodial, and Ethernet-connected building level networks. The software shall provide, as a minimum, the following functionality:
      a. Real-time graphical viewing and control of the BAS environment
      b. Reporting
      c. Scheduling and override of building operations
      d. Collection and analysis of historical data
      e. Point database editing, storage and downloading of controller databases.
      f. Utility for combining points into logical Point Groups. The Point Groups shall then be manipulated in Graphics, trend graphs and reports in order to streamline the navigation and usability of the system
      g. Alarm reporting, routing, messaging, and acknowledgment
      h. “Collapsible tree,” dynamic system architecture diagram application:
         1) Showing the real-time status and definition details of all workstations and devices on a management level network.
         2) Showing the real-time status and definition details of all DDC and HVAC Mechanical Controllers at the building level.
         3) Showing the status and definition details of all field-level application controllers.
      i. Definition and construction of dynamic color graphic displays.
      j. Online, context-sensitive help, including an index, glossary of terms, and the capability to search help via keyword or phrase.
      k. On-screen access to User Documentation, via online help or PDF-format electronic file.
      l. Automatic database backup at the workstation for database changes initiated at DDC Controller operator interface terminals
         1) Backups shall produce a configuration file that contains pertinent details regarding the specific backup. This log file shall be created each time a backup is run and be stored in the backup directory.
         2) Restore dialog box shall list detailed information to facilitate the restore of the correct database.

3) Ability to restore selected components of a backup.
4) Delete old backup directories automatically or individually from a detailed list.

m. Transfer trend data to 3rd party spreadsheet software

2. Provide a graphical user interface that shall minimize the use of keyboard through the use of a mouse or similar pointing device, with a "point and click" approach to menu selection and a “drag and drop” approach to inter-application navigation. Selection of applications within the workstation software shall be via a graphical toolbar menu – the application toolbar menu shall have the option to be located in a docked position on any of the four sides of the visible desktop space on the workstation display monitor, and the option to automatically hide itself from the visible monitor workspace when not being actively manipulated by the user.
3. Operator-specific password access protection shall be provided to allow the administrator/manager to limit users’ workstation control, display and data base manipulation capabilities as deemed appropriate for each user, based upon an assigned password. Operator privileges shall "follow" the operator to any workstation logged onto (up to 999 user accounts shall be supported). The administrator/manager shall be able to grant discrete levels of access and privileges, per user, for each point, graphic, report, schedule, and BAS workstation application. And each BAS workstation user account shall use a Windows user account as a foundation.
4. Dynamic Color Graphics application shall include the following:
   a. Shall include graphic editing and modifying capabilities
   b. A library of standard control application graphics and symbols must be included
   c. Must be able to command points directly off graphics application
   d. Navigation through various graphic screens shall be optionally achieved through a hierarchical “tree” structure or view recently opened graphics through a backward and forward paging.
   e. Graphics viewing shall include zoom capabilities
   f. Graphics shall automatically display the HAND status of points that have been overridden by a field HAND switch, for points that have been designed to provide a field HAND override capability.
5. Scheduling and override
   a. Provide a calendar type format for simplification of time and date scheduling and overrides of building operations. Schedule definitions reside in the PC workstation, DDC Controller, and HVAC Mechanical Equipment Controller to ensure time equipment scheduling when PC is off-line -- PC is not required to execute time scheduling. Provide override access through menu selection, graphical mouse action or function key. Provide the following capabilities as a minimum:
      1) Weekly schedules
      2) Zone schedules
      3) Event schedules – an event consists of logical combinations of equipment and/or zones
      4) Ability to schedule for a minimum of up to 365 days in advance

C. Dynamic Color Graphic Displays
1. Floor plan graphics shall contain dynamic data indicating zone indoor air quality conditions including zone temperatures.
2. Provide graphic summary screens such that status of all air handling equipment, rooftop units, make-up air units, including supply temperature, alarms, fan status is displayed on one screen. Links are contained from summary screen to individual equipment.
3. Provide floor plan graphic sheet for the roof of the High School, Miller Elementary School and Barr Middle School showing all equipment connected to the DDC system with links to the equipment on the roof floor plan graphic.

4. Provide a graphic summary sheet for each Supply VAV terminal unit box and each exhaust EVAV terminal unit box including the points connected to the DDC system.

D. System Configuration & Definition
1. A “Collapsible tree” dynamic system architecture diagram/display application of the site-specific BAS architecture showing status of controllers, PC workstations and networks shall be provided. This application shall include the ability to add and configure workstations, DDC Controllers or HVAC Mechanical Equipment controllers, as well as 3rd-party integrated components. Symbols/Icons representing the system architecture components shall be user-configurable and customizable, and a library of customized icons representing 3rd-party integration solutions shall be included. This application shall also include the functionality for real-time display, configuration and diagnostics of dial-up modems to DDC Controllers.
2. Network wide control strategies shall not be restricted to a single DDC Controller or HVAC Mechanical Equipment controller, but shall be able to include data from any and all other network panels to allow the development of Global control strategies.
3. Point database configuration shall be available to the user within a dedicated point database editor application included in the workstation software. The editor shall allow the user to create, view existing, modify, copy, and delete points from the database. The point editor shall also allow the user to configure the alarm management strategy for each point. The editor shall provide the option for editing the point database in an online or offline mode with the DDC Controllers.

E. Alarm Management
1. Alarm Routing shall allow the user to send alarm notification to selected printers or workstation location(s) based on time of day, alarm severity, or point type.
2. Alarm Display shall have the ability to list & sort the alarms based on alarm status, point name, ascending or descending alarm time.
3. Directly from the Alarm Display, the user shall have the ability to acknowledge, silence the alarm sound, print, or erase each alarm. The interface shall also have the option to inhibit the erasing of active acknowledged alarms, until they have returned to normal status.
4. Alarm messages shall be customizable for each point, or each alarm priority level, to display detailed instructions to the user regarding actions to take in the event of an alarm.

2.10 FIELD DEVICES

A. General
1. Specified in this section are the following hard-wired input/output devices connected to the Networked Primary DDC Controller or ASC.
a. Automatic Dampers
b. Electric Damper Actuators
c. Automatic Control Valves
d. Binary Temperature Devices
e. Temperature Sensors
f. Differential Pressure Switches
g. Relays
h. Current Switches

B. ELECTRIC DAMPER ACTUATORS
1. General
a. The actuator shall have mechanical or electronic stall protection to prevent damage to the actuator throughout the rotation of the actuator.
b. Where shown, for power-failure/safety applications, an internal mechanical, spring-return mechanism shall be built into the actuator housing. Alternatively, an

uninterruptible power supply (UPS) may be provided. On terminal unit valves actuators capacitor driven fail action is permitted.

c. Proportional actuators shall accept a 0 to 10 VDC or 4 to 20 mA control signal.
d. All 24 VAC/VDC actuators shall operate on Class 2 wiring
e. All actuators shall have an external manual gear release to allow manual positioning of the damper when the actuator is not powered. Spring-return actuators with more than 7 Nm (60 in.-lb) torque capacity shall have a manual crank for this purpose.
f. Electric actuators for emergency generator damper control shall be rated for 350 degrees F. maximum operating temperature and capable to drive fully open and close within 15 seconds.

C. AUTOMATIC CONTROL VALVES.
1. General:
a. Control valves shall be two-way or three-way type single seated globe type for two-position or modulating service as shown. Valves shall meet ANSI Class IV leakage rating.
b. Body pressure rating and connection type construction shall conform to pipe, fitting and valve schedules. Where pressure and flow combinations exceed ratings for commercial valves and operators, industrial class valves and operators shall be provided.
c. Valve operators shall be of electric type.
d. The valves shall be quiet in operation and fail-safe in either normally open or normally closed position in the event of power failure.
e. Control valve operators shall be sized to close against a differential pressure equal to the design pump head plus 10 percent.
f. Provide valves 2" and smaller with screwed end bronze bodies and stainless-steel trim. Provide valves 2-1/2" and larger with flanged ends, cast iron body and stainless-steel trim.

D. BINARY TEMPERATURE DEVICES
1. Low-temperature safety thermostat:
a. Low-limit air stream thermostats shall be UL listed, vapor pressure type, with a sensing element of 20 ft. minimum length. Element shall respond to the lowest temperature sensed by any 1 ft. section. The low-limit thermostat shall be automatic reset, SPDT type.

E. TEMPERATURE SENSORS
1. Provide the following instrumentation as required by the monitoring, control and optimization functions. All temperature sensors shall use platinum RTD elements only, nickel or silicon are not acceptable.
2. Room Temperature:

a.	Temperature monitoring range	+40/+90 F	
b.	Output signal		Resistance
c.	Installation adjustments		none required
d.	Calibration adjustments		zero & span
e.	Factory calibration point		70 deg F
f.	Accuracy at calibration point	+/-0.8 F	

3. Duct (Single Point) Temperature:

a.	Temperature monitoring range	-40/240 F	
b.	Output signal		Resistance
c.	Installation adjustments		none required
d.	Calibration adjustments		zero & span
e.	Factory calibration point		70 deg F
f.	Accuracy at calibration point	+/-0.8 F	

4. Duct (Averaging) Temperature:
   a. Temperature monitoring range -40/240 F
   b. Output signal Resistance
   c. Installation adjustments none required
   d. Calibration adjustments zero & span
   e. Factory calibration point 70 deg F
   f. Accuracy at calibration point +/-0.8 F

F. TERMINAL UNIT SPACE SENSORS
1. Temperature sensor specifications with relative humidity signal output included - Wired:
   a. As called for in the sequences of operations, provide temperature sensors with digital displays and space relative humidity sensing capability.
   b. The sensing element for the space temperature sensor must be IC-based and provide the following.
      1) Digitally communicating with the Application Specific Controller.
      2) Mountable to and fully covering a 2 x 4 electrical junction box without the need for an adapter wall plate.
      3) IC Element Accuracy: +/- 0.9°F
      4) Operating Range: 55 to 95°F
      5) Setpoint Adjustment Range: User limiting to +/- 2 degrees F, selectable range between 55 and 95°F
      6) Display of temperature setpoint with numerical temperature values
      7) Display of temperature setpoint graphically, with a visual Hotter/Colder setpoint indication
      8) Calibration: Single point, field adjustable at the space sensor to +/- 5°F
      9) Installation: Up to 100 ft. from controller
      10) Auxiliary Communications Port: included
      11) Local OLED Temperature Display: included
      12) Display of Temperature to one decimal place
      13) Temperature Setpoint Adjustment included (between 68 and 72 degrees F for heating and between 74 and 79 degrees F for cooling)
      14) Occupancy Override Function: included (provide 3 hour timed override capability)
      15) Relative Humidity measuring range: 0 to 100%
      16) Relative Humidity signal output: 0 to 10 VDC or 0 to 20 mA.
      17) Siemens model QFA2060D or equal with LCD display
   c. Auxiliary Communication Port. Each room temperature sensor shall include a terminal jack integral to the sensor assembly. The terminal jack shall be used to connect a portable operator's terminal to control and monitor all hardware and software points associated with the controller. RS-232 communications port shall allow the operator to query and modify operating parameters of the local room terminal unit from the portable operator’s terminal.
   d. Provide labeling for all terminal blocks, wire ends at terminations and BAS system panel devices.
2. Provide the following options:
   a. Setpoint Adjustment. The setpoint adjustment function shall allow for modification of the temperature by the building operators. Setpoint adjustment may be locked out, overridden, or limited as to time or temperature through software by an authorized operator at any central workstation, Building Controller, room sensor two-line display, or via the portable operator's terminal.
   b. Override Switch. An override button on each temperature sensor shall initiate override of the night setback mode to normal (day) operation when activated by the

occupant and enabled by building operators. The override shall be limited to three (3) hours (adjustable.) The override function may be locked out, overridden, or limited through software by an authorized operator at the operator interface, Building Controller, room sensor two-line display or via the portable operator's terminal.

c. Space Combination Temperature and Humidity Sensors. Each controller performing space temperature control shall be provided with a matching room temperature sensor, which also includes the ability to measure humidity for either monitoring or control purposes. The combination temperature and humidity sensors shall have the same appearance as the space temperature sensors. Humidity elements shall measure relative humidity with a +/- 3% accuracy over the range of 0 to 95% relative humidity. Humidity element shall be an IC (integrated circuit) sensing element. Humidity sensing elements shall be removable and field replaceable if needed.

G. DIFFERENTIAL PRESSURE SWITCHES.

1. Air Differential Pressure Switch
   a. Differential pressure switches shall be diaphragm type, with die-cast aluminum housing and adjustable set point. Switch rating shall be a minimum 5 amps at 120 VAC. Switches shall be SPDT and be used for fan status as specified in the point schedule. Switch pressure range shall be suited for application. (e.g. filter 0-2.0", fan status 0-5.0", etc.)

H. RELAYS.

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 solid-state plug-in type with adjustable time delay. Delay shall be adjustable ±200% (minimum) from set point 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.

I. CURRENT SWITCHES.

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.

2.11 AIRFLOW MEASURING DEVICES

A. Fan Array Measuring Devices:

1. Airflow Measurement Devices (AMD) with Temperature Output and Airflow Alarming Capability
2. General:
   a. Provide one AMD for each measurement location provided on the plans, schedules and/or control diagrams to determine the average airflow rate and temperature of each fan at each measurement location.
   b. Each AMD shall be provided with a microprocessor-based transmitter and one or more sensor probes.
   c. Devices that have electronic signal processing components on or in the sensor probe are not acceptable.
   d. Airflow measurement shall be field configurable to determine the average actual or standard mass airflow rate.
   e. Actual airflow rate calculations shall have the capability of being corrected by the transmitter for altitudes other than sea level.
   f. Temperature measurement shall be field configurable with velocity-weighted inlet average temperature as the default, or simple arithmetic inlet average air temperature.
3. Sensor Probes:

a. Sensor probes shall consist of one sensor node mounted on a 304 stainless steel block with two adjustable zinc plated steel rods connected to 304 stainless steel pivoting mounting feet.
b. Sensor node internal wiring connections shall be sealed and protected from the elements and suitable for direct exposure to water.
c. Each sensor probe shall be provided with an integral, FEP jacket, plenum rated CMP/CL2P, UL/cUL Listed cable rated for exposures from -67°F to 392 °F (-55° C to 200° C) and continuous and direct UV exposure.
d. Plenum rated PVC jacket cables are not acceptable.
e. Each sensor probe cable shall be provided with a connector plug with gold plated pins for connection to the transmitter.
f. Sensor node airflow and temperature calibration data shall be stored in a serial memory chip in the cable connecting plug and not require matching or adjustments to the transmitter in the field.
g. Each sensor node shall be provided with two bead-in-glass, hermetically sealed thermistors potted in a marine grade waterproof epoxy with sensor housings constructed of glass-filled polypropylene. Upon request, the manufacture shall provide a written independent laboratory test result of 100% survival rate in a 30 day saltwater and acid vapor test.
h. Devices that use epoxy or glass encapsulated chip thermistors are not acceptable.
i. Devices with exposed leads are not acceptable.
j. Each thermistor shall be individually calibrated at a minimum of 3 temperatures to NIST-traceable temperature standards.
k. Each sensor node shall be individually calibrated at 16 measurement points to airflow standards directly calibrated at NIST to the NIST Laser Doppler Anemometer (LDA) primary velocity standard and have an accuracy of ±2% of reading over the entire calibrated airflow range of 0 to 10,000 FPM (50.8 m/s).
l. Upon request the manufacture shall submit for AMD approval a copy of the NIST report of calibration used for the reference standard used.
m. Devices calibrated against standards other than the NIST LDA or against NIST temperature standards only are not acceptable.
n. Accuracy shall include the combined uncertainty of the sensor nodes and transmitter.
o. Devices whose overall accuracy is based on individual accuracy specifications of the sensor probes and transmitter shall demonstrate compliance with this requirement over the entire operating range.
p. Each sensing node shall have a temperature accuracy of ±0.15° F (0.08° C) over an operating range of -20° F to 160° F (-28.9° C to 71.1° C) and humidity range of 0 to 100% RH.
q. The number of independent sensor nodes provided shall be as follows:
    1) SWSI and DWDI fans: 2 probes x 1 sensor node/per probe in each fan inlet.
    2) Fan Arrays (1 to 8 fans): 1 probe x 1 sensor node probe in each fan inlet.

4. Transmitter
    a. A remotely located microprocessor-based transmitter shall be provided for each measurement location.
    b. The transmitter shall be comprised of a main circuit board and interchangeable interface card.
    c. All printed circuit board interconnects, edge fingers, and test points shall be gold plated.
    d. All printed circuit boards shall be electroless nickel immersion gold (ENIG) plated.
    e. All integrated circuitry shall be temperature rated as ‘industrial-grade’. Submissions containing ‘commercial-grade’ integrated circuitry are not acceptable.

f. The transmitter shall be capable of determining the airflow rate and temperature of each fan.
   1) Separate integration buffers shall be provided for display airflow output, airflow signal output (analog and network) and individual sensor output (IR-interface).
g. The transmitter shall have startup firmware to facilitate setup of multiple fans and fan areas.
h. The transmitter shall be capable of providing a low and/or high airflow set point alarm.
i. The transmitter shall be capable of providing individual fan alarming on fan array configurations.
j. The transmitter shall be capable of identifying an AMD malfunction via the system status alarm and ignore any sensor node that is in a fault condition.
k. The transmitter shall be capable of field configuration, diagnostics and include Field Output Adjustment Wizard that allows for a one or two point field adjustment to factory calibration for installations that require adjustment.
l. The transmitter shall be provided with a 16-character, alpha-numeric, LCD display.
m. The transmitter shall be provided with two field selectable (0-5/0-10 VDC or 4-20mA), scalable, isolated and over-current protected analog output signals (AO1=airflow, AO2=temperature or alarm), in combination with:
   1) one isolated RS-485 (field selectable BACnet MS/TP or Modbus RTU) network connection;
n. Analog signal capability shall include two output terminals: the first (AO1), shall provide the total airflow rate; while the second output (AO2) shall be field configurable to provide one of the following:
   1) temperature
   2) low and/or high airflow user-defined set point alarm
   3) individual fan alarm; or
   4) system status alarm
o. The transmitter shall also be available with a single isolated LonWorks Free Topology network interface. Transmitters shall be available alternatively with one USB connection for thumb-drive data logging of sensor data. Neither of these options shall include analog output signals.
p. Network communications RS 485 (BACnet MS/TP or Modbus RTU) shall provide: the average airflow rate, temperature, hi and/or low airflow set point alarm, system status alarm, individual sensor node airflow rates and individual sensor node temperatures. Individual node airflow rates and temperatures shall be available via the network with Lon.
   1) The transmitter shall have an on-off power switch. Isolation transformers shall not be required.
   2) The transmitter shall be powered by 24 VAC (22.8 to 26.4 under load) @16 V-A maximum and use a switching power supply that is over-current and over-voltage protected.
   3) The transmitter shall use a “watchdog” timer circuit to ensure automatic reset after power disruption, transients and brown-outs.
   4) Each transmitter shall have an operating range of -20° F to 120° F (-28.9° C to 48.9° C) and humidity range of 5 to 95% RH.

5. Listings and Certifications
   a. The AMD shall be UL/cUL 873 Listed as an assembly.
   b. Devices claiming compliance with the UL Listing based on individual UL component listing are not acceptable.
6. All network-capable AMD models supplied with RS-485 interface and BACnet protocol shall be BTL Listed.

B. Small Duct Air Measuring Devices:

1. Airflow Measurement Device (AMD) with Temperature Output and Integral Airflow Alarming
   a. General
      1) Provide one AMD with an integral airflow alarm for each measurement location provided on the plans, schedules and/or control diagrams to determine the average airflow rate and temperature at each measurement location.
      2) Each AMD shall be provided with a remotely mounted microprocessor-based transmitter and one or two sensor probes.
         (a) Devices that have electronic signal processing components in the sensor probe are not acceptable.
      3) Airflow measurement shall determine the average actual airflow rate.
      4) Temperature measurement shall determine the velocity weighted average temperature by factory default or the arithmetic average by manual field selection.
   b. Sensor Probe Design
      1) Sensor probes shall be constructed of 6063 extruded aluminum alloy tube.
      2) Sensor probe mounting brackets shall be constructed of 304 stainless steel.
      3) Probe internal wiring between the connecting cable and sensor nodes shall be Kynar coated copper.
         (a) PVC jacketed internal wiring is not acceptable.
      4) Probe internal wiring connections shall consist of solder joints and spot welds.
         (a) Connectors of any type within the probe are not acceptable.
         (b) Printed circuit boards within the probe are not acceptable.
      5) Each sensor node shall be provided with two bead-in-glass, hermetically sealed thermistors potted in a marine grade waterproof epoxy.
         (a) Devices that use epoxy or glass encapsulated chip thermistors are not acceptable.
      6) Each thermistor shall be individually calibrated at a minimum of 3 temperatures to NIST-traceable temperature standards.
      7) Each sensor node shall be calibrated to volumetric standards at a minimum of 7 calibration points.
      8) The number of independent sensor nodes provided shall be as follows:
         (a) 4" diameter - 1 sensor node
         (b) greater than 4" diameter up to 16" diameter - 2 sensor nodes
      9) Probe to transmitter cables shall be FEP jacketed, plenum rated CMP/CL2P and UL/cUL Listed, -67° to 392° F (19.4° C to 200° C) and UV tolerant. Cables shall include a terminal plug for connection to the remotely mounted transmitter. PVC jacketed cables or PVC insulated conductors are not acceptable with ducted sensor probes.
   c. Transmitter
      1) An integral microprocessor-based transmitter shall be provided for each measurement location.
      2) All printed circuit board interconnects and test points shall be gold plated.
      3) All printed circuit boards shall be electroless nickel immersion gold (ENIG) plated.
      4) All integrated circuitry shall be temperature rated as ‘industrial-grade’. Submissions containing ‘commercial-grade’ integrated circuitry are not acceptable.
      5) The transmitter shall be capable of determining the average actual airflow rate and temperature of the sensor nodes in the array.

6) The transmitter shall be capable of identifying an AMD malfunction and ignore a sensor node that is in a fault condition, while simultaneously indicating a fault visually and over the network.
7) The transmitter shall be provided with one of the following:
   (a) Two scalable, protected and field selectable analog output signals (0-5 / 1-5 VDC or 0-10 / 2-10 VDC, choose one), or
   (b) One non-isolated RS-485 network connection (field selectable BACnet MS/TP or Modbus RTU protocol). Provide individual 24 VAC transformers at each network transmitter requiring isolated RS-485 connection.
8) One analog output shall be airflow (AO1), while the second output (AO2) shall be configurable as average temperature (default), adjustable airflow alarm or system alarm.
   (a) When the alarm is active, the alarm condition shall be indicated on the LCD display.
   (b) Alarm reset shall be manual or automatic.
   (c) Alarm set points shall be adjustable by type, tolerance, delay, disable/enable, and analog signal indication for AO2.
9) RS-485 network communications shall provide the average airflow rate, average temperature, system status alarm, Hi-Lo airflow alarm, individual sensor node airflow rates and individual sensor node temperatures.
10) Each transmitter shall provide one dry contact relay with onboard jumper to drive a remote LED. The relay shall be rated for no less than 30 VDC or 24 VAC @ 3 amp max and user configurable as N.O. or N.C. during set up.
11) The transmitter shall have a built-in field adjustment wizard for one or two point output adjustments to the factory calibration, when required.
12) The transmitter shall be powered by 24 VAC (22.8 to 26.4 under load) @8 V-A.
13) The transmitter shall provide an integral LCD display for display of airflow, temperature and alarms; and a pushbutton user interface for configuration and diagnostics.
14) The transmitter shall be mounted in an environment protected from direct contact with water.
15) The transmitter shall independently process the airflow and temperature of each sensor node prior to averaging and output.
16) The transmitter shall use a “watchdog” timer circuit to ensure continuous operation in the event of brown-out and/or power failure.

d. Performance and calibration
   1) Each sensing node shall have an airflow accuracy of ±3% of reading (typical) ±4% max. from 0 to 3,000 FPM (15.24 m/s) over a temperature range of 0° F to 160° F (-18° to 71° C). Airflow accuracy shall be maintained at lower operating temperatures of -20° F to 160° F (-29° C to 71° C) but the velocity range shall be limited to 0 - 2,000 FPM (10.2 m/s).
      (a) Accuracy shall include the combined uncertainty of the sensor nodes and transmitter.
      (b) Devices whose overall performance at the host controller input terminals is the combined accuracy of the transmitter and sensor probes shall demonstrate that the total accuracy meets the performance requirements of this specification throughout the measurement range.
   2) Each sensor node shall be factory calibrated at a minimum of 7 airflow rates including zero (still air), to to NIST Traceable standards.
   3) Each thermistor shall be individually calibrated at a minimum of 3 temperatures to standards that are traceable to the National Institute of Standards and Technology (NIST).

4) Each sensing node shall have a temperature accuracy of ± 0.15° F (± 0.08° C) over a calibrated range of -20° F to 160° F (-28.9° C to 71.1° C).
5) Minimum calibrated and operating temperature range for the sensor probes shall be -20° F to 160° F (-28.9° C to 71.1° C).
6) Operating temperature range for the transmitter shall be -20° F to 120° F (-28.9° C to 48.9° C).

e. Listings and Certifications
1) The AMD shall be UL 60730-1 and 60730-2-9 Listed as an assembly and subscribed to the UL Follow-up Services.
(a) Devices claiming compliance with the UL Listing based on individual UL component listings are not acceptable.

C. Large Ducts and Intakes Air Measuring Devices:
1. Airflow Measurement Devices (AMD) with Temperature Output and Airflow Alarming Capability
a. General
1) Provide one AMD for each measurement location provided on the plans, schedules and/or control diagrams to determine the average airflow rate and temperature at each measurement location.
2) Each AMD shall be provided with a microprocessor-based transmitter and one or more sensor probes.
(a) Devices that have electronic signal processing components on or in the sensor probe are not acceptable.
3) Airflow measurement shall be field configurable to determine the average Actual or Standard mass airflow rate.
(a) Actual airflow rate calculations shall have the capability of being corrected by the transmitter for altitudes other than sea level.
4) Temperature measurement shall be field configurable with velocity weighted average as the default, or manual selection of arithmetic average temperature.

b. Sensor Probes
1) Sensor probes shall be constructed of gold anodized, 6063 aluminum alloy tube.
2) Sensor probe mounting brackets shall be constructed of 304 stainless steel.
3) Probe internal wiring between the connecting cable and sensor nodes shall be Kynar coated copper.
(a) PVC jacketed internal wiring is not acceptable.
4) Probe internal wiring connections shall consist of solder joints and spot welds.
(a) Internal wiring connections shall be sealed and protected from the elements. They shall be capable of direct exposure to water without affecting instrument operation.
(b) Connectors of any type within the probe are not acceptable.
(c) Printed circuit boards within the probe are not acceptable.
5) Each sensor probe shall be provided with an integral, FEP jacket, plenum rated CMP/CL2P, UL/cUL Listed cable rated for exposures from -67° F to 392° F (-55° C to 200° C) and continuous and direct UV exposure.
(a) Plenum rated PVC jacket cables are not acceptable.
6) Each sensor probe cable shall be provided with a connector plug with gold plated pins for connection to the transmitter.
7) Each sensor probe shall contain one or more independently wired sensing nodes.
8) Sensor node airflow and temperature calibration data shall be stored in a serial memory chip in the cable connecting plug and not require matching or adjustments to the transmitter in the field.

9) Each sensor node shall be provided with two bead-in-glass, hermetically sealed thermistors potted in a marine grade waterproof epoxy with sensor housings constructed of glass-filled polypropylene. Upon request, the manufacture shall provide a written independent laboratory test result of 100% survival rate in a 30 day saltwater and acid vapor test.
   (a) Devices that use epoxy or glass encapsulated chip thermistors are not acceptable.
   (b) Devices with exposed leads are not acceptable.
10) Each thermistor shall be individually calibrated at a minimum of 3 temperatures to NIST-traceable temperature standards.
11) Each sensor node shall be individually calibrated at 16 measurement points to airflow standards directly calibrated at NIST to the NIST Laser Doppler Anemometer (LDA) primary velocity standard and have an accuracy of ±2% of reading over the entire calibrated airflow range of 0 to 5,000 FPM (25.4 m/s).
   (a) Upon request the manufacture shall submit for AMD approval a copy of the NIST report of calibration used for the reference standard used.
   (b) Devices claiming NIST traceability to third party laboratories and not directly to NIST are not acceptable
   (c) Devices calibrated against standards other than the NIST LDA are not acceptable.
12) Accuracy shall include the combined uncertainty of the sensor nodes and transmitter.
13) The installed airflow accuracy shall be:
   (a) Ducts - ±3% of reading when installed in accordance with the manufactures recommended placement guidelines.
   (b) Non-ducted Outdoor Air intakes - better than or equal to ±5% of reading when installed in accordance with the manufactures recommended placement guidelines.
14) Devices whose overall accuracy is based on individual accuracy specifications of the sensor probes and transmitter shall demonstrate compliance with this requirement over the entire operating range.
15) Each sensing node shall have a temperature accuracy of ±0.15° F (0.08° C) over an operating range of -20° F to 160° F. (-28.9° C to 71.1° C) and humidity range of 0 to 100% RH.
16) Sensor nodes provided shall be as follows:
   (a) The number of sensor housings provided for each location shall be as follows:
   (b) Area (sq.ft.) Sensors
   (c) 1 or less 2
   (d) > 1 to < 4 4
   (e) 4 to <8 6
   (f) 8 to <12 8
   (g) 12 to <16 12
   (h) 16 or more 16
   (i) A total of 4 probes shall be required for openings with an aspect ratio less than or equal to 1.5 and with an area greater than or equal to 25 ft2.
17) Fan Inlet Sensor Probe Assemblies
   (a) Sensor housings shall be mounted on 304 stainless steel blocks.
   (b) Mounting rods shall be field adjustable to fit the fan inlet and constructed of nickel plated steel.
   (c) Mounting feet shall be constructed of 304 stainless steel.

(d) The operating airflow range shall be 0 to 10,000 FPM unless otherwise indicated on the plans.

c. Transmitter
1) A remotely located microprocessor-based transmitter shall be provided for each measurement location.
2) The transmitter shall be comprised of a main circuit board and interchangeable interface card.
3) All printed circuit board interconnects, edge fingers, receptacle plug pins and PCB test points shall be gold plated.
4) All printed circuit boards shall be electroless nickel immersion gold (ENIG) plated.
5) All integrated circuitry shall be temperature rated as 'industrial-grade'. Submissions containing 'commercial-grade' integrated circuitry are not acceptable.
6) The transmitter shall be capable of determining the airflow rate and temperature average of all connected sensor nodes in an array for a single location.
(a) Separate integration buffers shall be provided for display airflow output, airflow signal output (analog and network) and individual sensor output (IR-interface).
7) The transmitter shall be capable of providing a high and/or low airflow alarm with user-defined set point and % of set point tolerance. Alarm shall be capable of being manually or automatically reset and low-limit cutoff value may be selected to disable the alarm. An alarm delay function shall also be field defined.
8) The transmitter shall be capable of identifying an AMD malfunction via the system status alarm and ignore any sensor node that is in a fault condition.
9) The transmitter shall be capable of field configuration, diagnostics and include Field Output Adjustment Wizard that allows for a one or two point field adjustment to factory calibration for installations that require adjustment.
10) The transmitter shall be provided with a 16-character, alpha-numeric, LCD display.
11) The transmitter shall be provided with two field selectable (0-5/0-10 VDC or 4-20mA), scalable, isolated and over-current protected analog output signals (AO1=airflow, AO2=temperature or alarm), in combination with:
(a) one isolated RS-485 (field selectable BACnet MS/TP or Modbus RTU) network connection
12) The analog signal capability shall include two output terminals: the first (AO1), shall provide the total airflow rate and the second output (AO2) shall be field configurable to provide one of the following:
(a) temperature
(b) low and/or high airflow user-defined set point alarm, or
(c) system status alarm
13) The transmitter shall also be available with a single isolated LonWorks Free Topology network interface. Transmitters shall be available alternatively with one USB connection for thumb-drive data logging of sensor data. Neither of these options shall include analog output signals.
14) The network communications RS-485 (BACnet MS/TP or Modbus RTU) or Ethernet (BACnet Ethernet or BACnet IP, Modbus TCP and TCP/IP) shall provide: the average airflow rate, temperature, hi and/or low airflow set point alarm, system status alarm, individual sensor node airflow rates and individual sensor node temperatures. Individual node airflow rates and temperatures shall NOT be available via the network with Lon.

15) The transmitter shall have an on-off power switch. Isolation transformers shall not be required.
16) The transmitter shall be powered by 24 VAC (22.8 to 26.4 under load) @20 V-A maximum and use a switching power supply that is over-current and over-voltage protected.
17) The transmitter shall use a “watchdog” timer circuit to ensure automatic reset after power disruption, transients and brown-outs.
18) Each transmitter shall have an operating temperature range of -20° F to 120° F (-28.9° C to 48.9° C) and humidity range of 5 to 95% RH.

d. Listings and Certifications
1) The AMD shall be UL/cUL 873 Listed as an assembly.
(a) Devices claiming compliance with the UL Listing based on individual UL component listing are not acceptable.
2) All network-capable AMD models supplied with RS-485 interface and BACnet protocol shall be BTL Listed.
3) The AMD shall be tested for compliance with the EMC Directive’s requirements and be certified to carry the CE Mark for European Union Shipments.

D. Rooftop Unit Outside Air Intake Measuring Devices:
1. Airflow Measurement Device (AMD) with Temperature Output and Integral Airflow Alarming
a. General
1) Provide one AMD with temperature output and an integral airflow alarm for each measurement location provided on the plans, schedules and/or control diagrams to determine the average airflow rate and temperature at each measurement location.
2) Each AMD shall be provided with a remotely mounted microprocessor-based transmitter and one or two sensor probes.
(a) Devices that have electronic signal processing components in the sensor probe are not acceptable.
3) Airflow measurement shall determine the average actual airflow rate.
4) Temperature measurement shall determine the velocity weighted average temperature (factory default) or the arithmetic average (field selection).

b. Sensor Probe Design
1) Sensor probes shall be constructed of 6063 extruded aluminum alloy tube.
2) Sensor probe mounting brackets shall be constructed of 304 stainless steel.
3) Probe internal wiring between the connecting cable and sensor nodes shall be Kynar coated copper.
(a) PVC jacketed internal wiring is not acceptable.
4) Probe internal wiring connections shall consist of solder joints and spot welds.
(a) Connectors of any type within the probe are not acceptable.
(b) Printed circuit boards within the probe are not acceptable.
5) Each sensor node shall contain one hermetically sealed ‘bead-in-glass’ thermistor sensor and one high performance parylene-coated chip thermistor, in a structural sensor housing. The airflow rate and temperature shall be independently determined at each measurement node prior to averaging.
6) Each preselected probe shall be adjustable insertion or stand-off bracket type, and choice of probes in lengths of 6, 8, or 16 in. [152.4, 203.2, or 406.4 mm]
7) The maximum number of independent sensor nodes/probe provided shall be 1 each x 2 probes total.
8) Probe to transmitter cables shall be FEP jacketed, plenum rated CMP/CL2P and UL/cUL Listed, -67° to 392° F (19.4° C to 200° C) and UV tolerant. Cables shall

include a terminal plug for connection to the remotely mounted transmitter. PVC jacketed cables or PVC insulated conductors are not acceptable with ducted sensor probes.

c. Transmitter
   1) An integral microprocessor-based transmitter shall be provided for each measurement location.
      (a) All printed circuit board interconnects and test points shall be gold plated.
      (b) All printed circuit boards shall be electroless nickel immersion gold (ENIG) plated.
   2) All integrated circuitry shall be temperature rated as 'industrial-grade'. Submissions containing 'commercial-grade' integrated circuitry are not acceptable.
   3) The transmitter shall be capable of determining the average airflow rate and temperature at each of the sensor nodes in the array.
   4) The transmitter shall be capable of identifying an AMD malfunction and ignore any sensor node that is in a fault condition.
   5) The transmitter shall be provided with one of the following:
      (a) Two scalable, protected and field selectable analog output signals (0-5 / 1-5 VDC or 0-10 / 2-10 VDC, choose one), or
      (b) One non-isolated RS-485 network connection (field selectable BACnet MS/TP or Modbus RTU).
   6) One analog output shall be airflow (AO1), while the second output (AO2) shall be configurable as airflow (independent of AO1 for dual outputs), average temperature (default), adjustable airflow alarm or system alarm.
      (a) When the alarm is active, the alarm condition shall be indicated on the LCD display.
      (b) Alarm reset shall be manual or automatic.
      (c) Alarm set points shall be adjustable by type, tolerance, delay, disable/enable, and analog signal indication for AO2.
   7) RS-485 network communications shall provide the average airflow rate, average temperature, Hi-Lo airflow alarm, system status alarm, individual sensor node airflow rates and individual sensor node temperatures.
   8) Each transmitter shall provide one dry contact relay with onboard jumper to drive a remote LED. The relay shall be rated for no less than 30 VDC or 24 VAC @ 3 amp max.
   9) The transmitter shall have a built-in field adjustment wizard for one or two point output adjustments to the factory calibration, when required.
   10) The transmitter shall be powered by 24 VAC (22.8 to 26.4 under load) @8 V-A.
   11) The transmitter shall provide an integral LCD for the display of airflow, temperature and alarms; and a pushbutton user interface for configuration and diagnostics.
   12) The transmitter shall be mounted in an environment protected from direct contact with water.
   13) The transmitter shall independently process the airflow and temperature of each sensor node prior to averaging and output.
   14) The transmitter shall use a "watchdog" timer circuit to ensure continuous operation in the event of brown-out and/or power failure.

d. Performance and Calibration
   1) Each sensing node shall have an airflow accuracy of ±3% of reading (typical) ±4% max. from 0 to 3,000 FPM (15.24 m/s) over a temperature range of 0° F to 160° F (-18° to 71° C). Airflow accuracy shall be maintained at lower operating

temperatures of -20° F to 160° F (-29° C to 71° C) but the velocity range shall be limited to 0 - 2,000 FPM (10.2 m/s)
(a) Accuracy shall include the combined uncertainty of the sensor nodes and transmitter.
(b) Devices whose overall performance at the host controller input terminals is the combined accuracy of the transmitter and sensor probes shall demonstrate that the total accuracy meets the performance requirements of this specification throughout the measurement range.

2) Each sensor node shall be individually calibrated at 7 measurement points to NIST traceable airflow standards.
(a) Submissions for AMD approval shall include a copy of the actual NIST report of calibration for the reference standard used.
(b) Devices claiming NIST traceability to third party laboratories and not directly to NIST are not acceptable
(c) Devices calibrated against standards other than the NIST LDA or against NIST temperature standards only are not acceptable.

3) Each sensing node shall have a temperature accuracy of ± 0.36° F (± 0.2° C) over a range of -20° F to 160° F (-28.9° C to 71.1° C).

4) Minimum calibrated and operating temperature range for the sensor probes shall be -20° F to 160° F (-29° C to 71° C).

5) Operating temperature range for the transmitter shall be -20° F to 120° F (-29° C to 49° C).

e. Listings and Certifications
1) The AMD shall be UL 60730-1 and 60730-2-9 Listed as an assembly and subscribe to the UL Follow-up Services.
(a) Devices claiming compliance with the UL Listing based on individual UL component listings are not acceptable.

2.12 AIR SUPPLY

A. Control and Instrumentation Tubing:
1. Copper Tube: ASTM B 819 Type K, or ASTM B 88 (ASTM B 88M) Type K, seamless, drawn or annealed.
a. Fittings: ASME B16.22, wrought copper.
b. Joints: Solder, lead free, ASTM B 32, HB alloy (95-5 tin-antimony), or tin and silver.
2. Polyethylene Tubing: Black, flame retardant, virgin polyethylene, resistant to environmental stress-cracking when tested in accordance with ASTM D 1693. All poly tubing shall be installed in conduit or NEMA 1 boxes. No poly tubing shall be run exposed.
a. Fittings: UL labeled, rod or forged brass rated to 200 psig at 100 degrees F.
b. Joints: Compression or barbed type.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that conditioned power supply is available to the control units and to the operator work station. Verify that field end devices, wiring, and pneumatic tubing is installed prior to installation proceeding.

3.2 INSTALLATION

A. Install control units and other hardware in position on permanent walls where not subject to excessive vibration.

B. Install software in control units and in operator work station. Implement all features of programs to specified requirements and appropriate to sequence of operation.

C. For all thermostats and temperature sensors shown to be installed on outside walls, provide insulated backs.

D. Install all thermostats, sensors and other wall mounted end device input control equipment at elevations in conformance with ADA requirements.

E. PROJECT MANAGEMENT
   1. Provide a designated project manager who will be responsible for the following:
      a. Construct and maintain project schedule
      b. On-site coordination with all applicable trades, subcontractors, and other integration vendors
      c. Authorized to accept and execute orders or instructions from owner/architect
      d. Attend project meetings as necessary to avoid conflicts and delays
      e. Make necessary field decisions relating to this scope of work
      f. Coordination/Single point of contact

3.3 ELECTRICAL WIRING AND MATERIALS

A. Install, connect and wire the items included under this Section. This work includes providing required conduit, wire, fittings, and related wiring accessories.

B. Provide wiring between thermostats, aqua-stats, and unit heater/cabinet unit heater motors.

C. Provide all control and alarm wiring for all control and alarm devices for this Section of the Specifications.

D. 120 Volt power provided to BMS Panels and Local Transformer Panels shall be included by BAS contractor.

E. Provide status function conduit and wiring for equipment covered under this Section.

F. Low voltage wiring exposed to view shall be installed in conduit, tray or metallic covering of a type consistent with other electrical services in that area. Low voltage wiring exposed to view within Mechanical rooms shall be installed in conduit or metallic covering of a type consistent with other electrical services in that area up to 8 feet – wiring above 8 feet can be open plenum rated cable. Open plenum rated cable is acceptable in concealed and/or accessible areas for low voltage wiring only. All wiring to be compliant to local building code and the NEC.

3.4 INSTALLATION OF SENSORS

A. General:
   1. Install sensors in accordance with the manufacturer's recommendations.
   2. Mount sensors rigidly and adequately for the environment within which the sensor operates.
   3. Room temperature sensors shall be installed on concealed junction boxes properly supported by the wall framing.
   4. All wires attached to sensors shall be air sealed in their raceways or in the wall to stop air transmitted from other areas affecting sensor readings.
   5. Sensors used in mixing plenums and hot and cold decks shall be of the averaging type.
   6. Low-limit sensors used in mixing plenums shall be installed in a serpentine manner horizontally across the full face of the coil.

7. All pipe-mounted temperature sensors shall be installed in wells. Install all liquid temperature sensors with heat-conducting fluid in thermal wells.
8. Install outdoor air temperature sensors on north wall, complete with sun shield at designated location.

B. Room Instrument Mounting
1. Room instruments, including but not limited to wall mounted thermostats and sensors located in occupied spaces shall be mounted 48 inches above the finished floor unless otherwise shown.

C. Instrumentation Installed in Piping Systems
1. Thermometers and temperature sensing elements installed in liquid systems shall be installed in thermowells.
2. Gauges in piping systems subject to pulsation shall have snubbers.

D. Duct Smoke Detectors
1. Duct smoke detectors will be provided by the Fire Alarm System Contractor in supply and return air ducts in accordance with Division 26
2. Contractor shall connect the DDC System to the auxiliary contacts provided on the Smoke Detector as required for system safeties and to provide alarms to the DDC system.

E. Temperature Limit Switch
1. A temperature limit switch (Low Temperature Detector) shall be provided to sense the temperature.
2. A sufficient number of temperature limit switches shall be installed to provide complete coverage of the duct section.
3. Manual reset limit switches shall be installed in approved, accessible locations where they can be reset easily.
4. The temperature limit switch sensing element shall be installed in a serpentine pattern and in accordance with the manufacturer's installation instructions.
5. Each bend shall be supported with a capillary clip. Provide 3 m of sensing element for each 1 m2 (1 ft of sensing element for each 1 ft2) of coil area.

F. Averaging Temperature Sensing Elements
1. Sensing elements shall be installed in a serpentine pattern.
2. Averaging sensors shall be installed in a serpentine manner vertically across the duct. Each bend shall be supported with a capillary clip.

G. Differential air static pressure.
1. Supply Duct Static Pressure: Pipe the high-pressure tap to the duct using a pitot tube. Pipe the low-pressure port to a tee in the high-pressure tap tubing of the corresponding building static pressure sensor (if applicable) or to the location of the duct high-pressure tap and leave open to the plenum.
2. Return/Exhaust Duct Static Pressure: Pipe the high-pressure tap to the duct using a pitot tube. Pipe the low-pressure port to a tee in the low-pressure tap tubing of the corresponding building static pressure sensor.
3. The piping to the pressure ports on all pressure transducers shall contain a capped test port located adjacent to the transducer.
4. All pressure transducers, other than those controlling VAV boxes, shall be located in field device panels, not on the equipment monitored or on ductwork.
5. Mount transducers in a location accessible for service without use of ladders or special equipment.

H. Relative Humidity Sensors
1. Relative humidity sensors in supply air ducts shall be installed at least 3m (10 feet) downstream of humidity injection elements.

3.5 ACTUATORS

A. Mount and link control damper actuators according to manufacturer's instructions.
   1. To compress seals when spring-return actuators are used on normally closed dampers, power actuator to approximately 5° open position, manually close the damper, and then tighten the linkage.
   2. Check operation of damper/actuator combination to confirm that actuator modulates damper smoothly throughout stroke to both open and closed positions.
   3. Provide all mounting hardware and linkages for actuator installation.

B. Electric/Electronic
   1. Dampers: Actuators shall be direct-mounted on damper shaft or jackshaft unless shown as a linkage installation. For low-leakage dampers with seals, the actuator shall be mounted with a minimum 5° available for tightening the damper seals. Actuators shall be mounted following manufacturer's recommendations.
   2. Valves: Actuators shall be connected to valves with adapters approved by the actuator manufacturer. Actuators and adapters shall be mounted following the actuator manufacturer's recommendations.

3.6 WARNING LABELS AND IDENTIFICATION TAGS

A. Permanent warning labels shall be affixed to all equipment that can be automatically started by the DDC system.
   1. Labels shall use white lettering (12-point type or larger) on a red background.
   2. Warning labels shall read as follows: “C A U T I O N This equipment is operating under automatic control and may start or stop at any time without warning. Switch disconnect to “Off” position before servicing.”

B. Permanent warning labels shall be affixed to all motor starters and all control panels that are connected to multiple power sources utilizing separate disconnects.
   1. Labels shall use white lettering (12-point type or larger) on a red background.
   2. Warning labels shall read as follows: “C A U T I O N This equipment is fed from more than one power source with separate disconnects. Disconnect all power sources before servicing.”

C. Equipment and Device labeling:
   1. Labels and tags shall be keyed to the unique identifiers shown on the As-Built drawings.
   2. All Enclosures and DDC Hardware shall be labeled.
   3. All sensors and actuators not in occupied areas shall be tagged.
   4. Airflow measurement arrays shall be tagged to show flow rate range for signal output range, duct size, and pitot tube AFMS flow coefficient.
   5. Duct static pressure taps shall be tagged at the location of the pressure tap.
   6. Tags shall be plastic or metal and shall be mechanically attached directly to each device or attached by a metal chain or wire.
   7. Labels exterior to protective enclosures shall be engraved plastic and mechanically attached to the enclosure or DDC Hardware.
   8. Labels inside protective enclosures may be attached using adhesive, but shall not be hand written.
   9. Identify all other control components with permanent labels. All plug-in components shall be labeled such that removal of the component does not remove the label.
   10. Identify room sensors relating to terminal box or valves with nameplates.
   11. Manufacturers' nameplates and UL or CSA labels are to be visible and legible after equipment is installed.

D. Identification of Tubing and Wiring

1. All wiring and cabling including that within factory-fabricated panels shall be labeled at each end within 5 cm (2 in.) of termination with the DDC address or termination number.
2. Permanently label or code each point of field terminal strips to show the instrument or item served.
3. All pneumatic tubing shall be labeled at each end within 5 cm (2 in.) of termination with a descriptive identifier.

3.7 IDENTIFICATION OF HARDWARE AND WIRING

A. All wiring and cabling, including that within factory-fabricated panels shall be labeled at each end within 5 cm (2 in.) of termination with the DDC address or termination number.

B. All pneumatic tubing shall be labeled at each end within 5 cm (2 in.) of termination with a descriptive identifier.

C. Permanently label or code each point of field terminal strips to show the instrument or item served.

D. Identify control panels with minimum 1 cm (½ in.) letters on laminated plastic nameplates.

E. Identify all other control components with permanent labels. All plug-in components shall be labeled such that removal of the component does not remove the label.

F. Identify room sensors relating to terminal box or valves with nameplates.

G. Manufacturers' nameplates and UL or CSA labels are to be visible and legible after equipment is installed.

H. Identifiers shall match record documents.

3.8 CONTROL SYSTEM DEMONSTRATION AND ACCEPTANCE

A. Demonstration
   1. Prior to acceptance, the control system shall undergo a series of performance tests to verify operation and compliance with this specification. These tests shall occur after the Contractor has completed the installation, started up the system, and performed his/her own tests.
   2. The tests described in this section are to be performed in addition to the tests that the contractor performs as a necessary part of the installation, start-up, and debugging process and as specified in the “Control System Checkout and Testing” article in Part 3 of this specification. The engineer will be present to observe and review these tests. The engineer shall be notified at least 10 days in advance of the start of the testing procedures.
   3. The demonstration process shall follow that approved in Part 1, “Submittals.” The approved checklists and forms shall be completed for all systems as part of the demonstration.
   4. The contractor shall provide at least two persons equipped with two-way communication and shall demonstrate actual field operation of each control and sensing point for all modes of operation including day, night, occupied, unoccupied, fire/smoke alarm, seasonal changeover, and power failure modes. The purpose is to demonstrate the calibration, response, and action of every point and system. Any test equipment required to prove the proper operation shall be provided by and operated by the contractor.
   5. As each control input and output is checked, a log shall be completed showing the date, technician's initials, and any corrective action taken or needed.
   6. Demonstrate compliance with Part 1, “System Performance.”
   7. Demonstrate compliance with sequences of operation through all modes of operation.
   8. Demonstrate complete operation of operator interface.
   9. Additionally, the following items shall be demonstrated:

a. DDC control loop response. The contractor shall supply trend data output in a graphical form showing the step response of each DDC control loop. The test shall show the loop's response to a change in set point, which represents a change of actuator position of at least 25% of its full range. The sampling rate of the trend shall be from 10 seconds to 3 minutes, depending on the speed of the loop. The trend data shall show for each sample the set point, actuator position, and controlled variable values. Any loop that yields unreasonably under-damped or over-damped control shall require further tuning by the Contractor.
b. Demand limiting. The contractor shall supply a trend data output showing the action of the demand-limiting algorithm. The data shall document the action on a minute-by-minute basis over at least a 30-minute period. Included in the trend shall be building kW, demand limiting set point, and the status of sheddable equipment outputs.
c. Optimum start/stop. The contractor shall supply a trend data output showing the capability of the algorithm. The change-of value or change-of-state trends shall include the output status of all optimally started and stopped equipment, as well as temperature sensor inputs of affected areas.
d. Interface to the building fire alarm system.
e. Operational logs for each system that indicate all set points, operating points, valve positions, mode, and equipment status shall be submitted to the architect/engineer. These logs shall cover three 48-hour periods and have a sample frequency of not more than 10 minutes. The logs shall be provided in both printed and electronic formats.

10. Any tests that fail to demonstrate the operation of the system shall be repeated at a later date. The contractor shall be responsible for any necessary repairs or revisions to the hardware or software to successfully complete all tests.

B. Acceptance
1. All tests described in this specification shall have been performed to the satisfaction of both the engineer and owner prior to the acceptance of the control system as meeting the requirements of completion. 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 engineer. Such tests shall then be performed as part of the warranty.
2. The system shall not be accepted until all forms and checklists completed as part of the demonstration are submitted and approved as required in Part 1, “Submittals.”

3.9 CLEANING

A. The contractor shall clean up all debris resulting from their activities daily. The contractor shall remove all cartons, containers, crates, etc., under his/her control as soon as their contents have been removed. Waste shall be collected and placed in a designated location.

B. At the completion of work in any area, the contractor shall clean all work, equipment, etc., keeping it free from dust, dirt, and debris, etc.

C. At the completion of work, all equipment furnished under this section shall be checked for paint damage, and any factory-finished paint that has been damaged shall be repaired to match the adjacent areas. Any cabinet or enclosure that has been deformed shall be replaced with new material and repainted to match the adjacent areas.

3.10 MANUFACTURER'S FIELD SERVICES

A. Start and commission systems. Allow sufficient time for start-up and commissioning prior to placing control systems in permanent operation.

3.11 TEMPERATURE CONTROL SEQUENCES

A. Rooftop Air Handling Unit RTU-HS-1:

1. Fan Operation: General: Start RTU through HOA switch located on RTU supply fan variable speed drive. In AUTO position, start unit operation when the EMCS schedule determines equipment to start. Start fan following contact closure for fire alarm shutdown, low temperature thermostat, return duct smoke detector. When RTU supply fan starts, interlock associated Exhaust Fan to start through HOA switch located on Exhaust Fan starter. Prove fan flow for Supply Fan and Exhaust Fan individually through current sensors.
2. Supply Fan Speed - Modulate the fan speed to maintain the following:
   a. Provide a static pressure sensor on the supply air system and the exhaust air system at locations shown on the drawings and the static pressure shall be adjusted based on the position of the supply VAV Box and exhaust VAV Box dampers serving the RTU. The EMCS shall reset the supply duct static pressure setpoint so that the supply VAV Box damper OR Exhaust VAV Box damper requiring the highest inlet pressure is 100% open and all supply and exhaust VAV Boxes are achieving their maximum design airflow values. The EMCS shall utilize the exhaust static pressure sensor as a monitoring point only.

3. Exhaust Fan Speed: A fan inlet airflow measuring station installed on the supply fan shall measure supply fan airflow. A similar fan inlet airflow measuring station installed on the exhaust fan shall measure exhaust fan airflow. The exhaust fan variable speed drive shall modulate to maintain exhaust fan airflow as a function of the position of the exhaust air variable air volume terminal units.

4. Discharge Air Setpoint Control: Discharge air temperature setpoint shall be reset according to space temperature sensors. The EMCS shall discriminate all space temperature sensors served by the RTU system to determine the space with the peak cooling requirement. As the space temperature sensor in the selected space increases above a setpoint of 76 degrees F (field adjustable through EMCS), the discharge air setpoint shall be reduced. As space temperature decreases, the discharge air setpoint shall be increased. The minimum discharge air temperature shall be 64 degrees F (field adjustable through EMCS).

5. Minimum Outside Air Ventilation: Normally Closed outside air damper shall move to the open position when RTU is in operation in occupied mode. In occupied mode, the RTU shall operate in 100% outdoor air mode with the outside air damper 100% open the recirculation/return damper closed.

   a. The outside air damper shall be closed and the exhaust fan off and associated gravity exhaust damper shall be closed when the RTU is in unoccupied mode unless the RTU is operating in economizer mode during morning cool down period. To meet unoccupied mode space setpoints, the RTU shall operate in 100% recirculation mode with the outside air damper closed and the recirculation damper 100% open.

6. Ventilation Rate Adjustment: The ventilation rate of the unit shall be determined by dividing the total outside air by the total unit supply CFM. The instantaneous ventilation rate of the unit shall be continuously updated to the EMCS head end for display to the system operator.

a. On dropping outside airflow ventilation rate, the outside airflow measuring station shall modulate the outside air damper open to maintain the outside airflow setpoint (adjustable).

7. Energy Recovery Wheel:
   a. The RTUs energy recovery wheel shall operate whenever the RTU is not operating in economizer mode.
   b. Frost Protection:
      1) The heat wheel shall run at 25% speed (adjustable) whenever:
         (a) Outside air temperature drops below 15°F (adjustable)
   c. Alarms shall be provided as follows:
      1) Heat Wheel Rotation Failure: Commanded on, but the status is off.
      2) Heat Wheel in Hand: Commanded off, but the status is on.
8. Economizer:
   a. The controller shall turn off the heat recovery wheel when economizer operation is engaged and open the energy recovery wheel bypass damper.
   b. The economizer shall be enabled whenever:
      1) Outside air temperature is less than 64°F (adjustable).
      2) AND the outside air temperature is less than the return air temperature.
      3) AND the discharge air temperature setpoint is less than the outside air temperature.
      4) AND the supply fan status is on.
   c. The economizer shall turn off whenever:
      1) Mixed air temperature drops from 45°F to 40°F (adjustable).
      2) OR on loss of supply fan status.
      3) OR low temperature thermostat is on.
9. DX Cooling and Hot Gas Reheat Coil:
   a. If the conditions for economizer cooling are unavailable and the discharge air temperature setpoint is calling for cooling, the DX Cooling coil compressors shall be staged as required to maintain the discharge air temperature setpoint in conjunction with the hot gas reheat reheat coil modulating control valve, while maintaining a minimum discharge air temperature of 64 degrees F and a maximum discharge air temperature of 78 degrees F in cooling mode.
10. Dehumidification controls: Should a space temperature sensor served by the RTU be below the cooling setpoint AND the relative humidity level is above 60% (adjustable), the unit shall be operated in cooling mode with hot gas reheat for the purposes of dehumidifying the space. In this mode, the discharge air temperature setpoint shall be 56 degrees F (adjustable) and the hot gas reheat coil shall reheat the air to maintain the space temperature sensor. If the space relative humidity is above 60% (adjustable), and the outside air relative humidity is below 50% (adjustable), the unit shall run in full economizer mode. This cycle shall also be triggered through a software switch in the DDC system triggered by the operators. Dehumidification shall continue until the relative humidity drops to 55% (adjustable). While performing economizer dehumidification, discharge air temperature shall be controlled through the in-duct heating coil to maintain discharge air at a minimum temperature of 70 degrees F (adjustable).
11. Heating Control via heating coil HC-HS-1: If the outside air temperature is 65 degrees F (adjustable) or below and the discharge air temperature setpoint is calling for heating, the heating coil's 3-way modulating control valve shall modulate to maintain the discharge air setpoint.
    a. Unoccupied heating mode: If a space served by RTU-HS-1 is also heated by hydronic heating radiant panels, the unoccupied heating setpoint (62 degrees, adjustable) shall utilize the radiant panels as the first stage of heat. If the radiant panels can’t meet

the unoccupied setpoint after 15 minutes OR the space is only heated via the RTU, then the RTU shall turn on in 100% recirculation mode with the VAV Box and EVAV Box in the space below setpoint 100% open with a 64 F degree discharge setpoint. Heating coil HC-HS-1 control valve shall modulate open to as required. The VAV Box reheat coil control valve shall then modulate open to meet the unoccupied space setpoint with a discharge air setpoint out of the VAV Box of 85 F. Should the RTU supply fan VFD be at its minimum speed, each VAV and EVAV box not below unoccupied setpoint shall open to minimum positions to maintain RTU supply fan speed above minimum levels.

12. Low Temperature Protection:
    a. When the mixed air temperature downstream of the Heating Coil HC-HS-1 is below 35 degrees F (adjustable) in any 12 inch long section of the low temperature thermostat capillary the following shall occur:
        1) Send an alarm to the BAS.
    b. The low temperature thermostat shall be automatically reset once the sensor temperature increases above 40 degrees F.
13. Filter Differential: Provide analog input to measure static pressure differential across filter and alarm through the EMCS when differential static pressure exceeds field adjustable setpoint (initial setpoint of 0.30" WC).
14. Smoke Detection: When the presence of smoke is detected at a duct smoke detector located in the return duct, then the fan starter circuit shall be de-energized and the EMCS shall be alarmed.
15. Fire Alarm Shutdown: When the fire alarm system is in an alarm condition as noted through contacts in the fire alarm panel, the unit shall be shut down and all dampers and valve actuators shall be placed in their normal positions.
16. The outside and exhaust air dampers shall close when the unit is off.

B. Supply Variable Air Volume (VAV) Box and Exhaust Variable Air Volume (EVAV) Box Control Sequences:
    1. Box Minimum Flow Setpoints: Supply VAV Boxes shall modulate between minimum and maximum airflow setpoints as scheduled to maintain the space temperature setpoint during occupied hours. The VAV Boxes associated exhaust air EVAV Box shall modulate in conjunction with the supply VAV Box to maintain a constant pressure relationship in the space based on the VAV and EVAV minimum and maximum setpoints.
    2. Should a fume hood exhaust fans be operating, the space's associated exhaust terminal EVAV Box shall reduce its airflow setpoint by 500 CFM to maintain the space's pressure differential.
        a. EVAV-HS-2 is associated with EF-HS-6
        b. EVAV-HS-1 is associated with EF-HS-2
        c. EVAV-HS-11 is associated with EF-HS-1
        d. EVAV-HS-6 is associated with EF-HS-4
        e. EVAV-HS-5 is associated with EF-HS-5
        f. EVAV-HS-14 is associated with EF-HS-3
    3. Supply VAV Box reheat coil: The VAV Box hot water reheat coil 3-way valves shall modulate as required to maintain the space temperature setpoint. Where a space is served by a VAV Box reheat coil and radiant panels, the radiant panels shall be the primary heating source and the VAV Box reheat coil the secondary heat source. The maximum discharge air setpoint out of the VAV Box reheat coils shall be 85 F.

C. Fume Hood Exhaust Fans:
    1. The fume hood exhaust fans shall be operated via a fan on/off switch on the fume hoods. The DDC system shall provide a relay to the exhaust fan to monitor on/off status of the fan.

D. Hydronic Heating Radiant Panels
   1. Open and close the two-way normally-open control valve to maintain space temperature at heating setpoint. Heating setpoint shall be 70 degrees F (adjustable) in occupied modes and 62 degrees F (adjustable) during unoccupied modes.
   2. When a space temperature sensor is serving a combination of a radiant panel system and and a Variable Air Volume Terminal Unit Box reheat coil OR a unit ventilator, the controls shall operate so that the radiant panel or panels is the primary heating source and the VAV Box reheat coil or unit ventilator heat source is the secondary heating source.

E. Miller Elementary School Exhaust Fans EF-MES-1, EF-MES-2, EF-MES-3:
   1. Fan Operation: Fans shall operate when the building DDC system determines that the building is occupied.
   2. Backdraft Damper: Open the motorized backdraft damper when the fan is started.
   3. Re-program the classroom relief air fans and cafeteria air handling unit AHU-1 minimum outside air rate as outlined on drawings ME-M104 ME-M105 based on the status of the exhaust fans and when the associated classroom unit ventilators are in normal, non-economizer ventilation mode or in economizer mode. Utilize the 0-10 VDC input points on the existing classroom relief air ECM fans as required to adjust the fan speeds to meet the airflow requirements outlined on the drawings.
   4. Should the unit ventilators within the spaces providing make-up air to the exhaust fans switch to occupied mode during un-occupied hours, the associated exhaust fan shall operate with the damper opening.
   5. Cafeteria air handling unit AHU-1: The DDC system shall interlock EF-MES-1 with the cafeteria air handling unit AHU-1 so that when the building is in occupied mode and EF-MES-1 is operating air handling unit AHU-1 shall operate with the outside air damper set to the minimum ventilation airflow as outlined on drawing ME M-105.
   6. Should the referenced exhaust fans be ON and operating, the transfer air motorized dampers outlined on the drawings shall be OPEN. Should the referenced exhaust fans be OFF, the transfer air motorized dampers outlined on the drawings shall be closed.

F. Barr Middle School STEAM Wing:
   1. With Cyclone Dust Collector DC-MS-1 OFF, in building occupied mode:
      a. Transfer air duct motorized damper fully closes to allow no airflow transfer from Tech Classroom into Fabrication Shop.
      b. Transfer air duct motorized damper fully closes to allow no airflow from Fabrication Classroom into Fabrication Shop.
      c. EF-MS-14 exhaust fan shall operate with the motorized damper open, the motorized damper on the EF-MS-14 exhaust ductwork branch serving the Fabrication Shop shall open, the Tech Classroom exhaust motorized damper shall open and the EF-MS-14 exhaust airflow shall modulate through its VFD based on the outside air damper position of existing Unit Ventilators UV-BMS-2 in Faculty Lounge 107 and UV-BMS-2 in the Tech Classroom. When the two UVs are in Economizer mode, the EF shall operate at full airflow 2,985 CFM. If the Faculty Lounge UV is operating in non-economizer ventilation mode, the EF shall reduce its airflow by 850 CFM. If the Tech Classroom UV is operating in non-economizer mode, the EF shall reduce its airflow by 700 CFM, with the minimum exhaust airflow through EF-MS-1 being 1,435 CFM.
      d. EF-MS-13 shall operate with the motorized damper open, the motorized damper on the EF-MS-13 exhaust ductwork branch serving the Fabrication Shop shall open, the motorized damper on the EF-MS-13 exhaust ductwork branch serving the CNC Room shall open, the motorized damper on the exhaust branch serving the Fabrication Classroom shall open and the EF-MS-13 exhaust airflow shall modulate through its VFD based on the outside air damper position of two existing Unit Ventilators UV-BMS-2 in Fabrication Classroom. When the two UVs are in

Economizer mode, the EF shall operate at full airflow 2,985 CFM. If the two UVs are operating in non-economizer mode, the EF shall reduce its airflow by 1,620 CFM, with the minimum exhaust airflow through EF-MS-13 being 1,365 CFM.

e. MAU-MS-1 shall open the outside air damper and modulate its variable speed drive to provide 900 CFM supply air. The space sensor serving MAU-MS-1 shall be utilized to adjust the MAU-MS-1 discharge air temperature. When calling for heat, the MAU shall modulate its gas heat exchanger as required to meet the discharge air setpoint, with a maximum discharge air setpoint of 90 degrees F (adjustable).

f. The existing unit ventilators shall monitor the space temperature sensors and open/close the existing, heating control valves to maintain space temperature. The Fabrication Classroom radiant panel control valves shall be tied to the Fabrication Classroom space temperature sensors and open/close based on the sensor setpoint.

2. In unoccupied mode, the dust collector DC-MS-1 shall be off, EF-MS-13 and EF-MS-14 shall be off, the UV outside air dampers shall close, and the unit ventilators shall cycle the supply fans on and off based on a heating setback temperature of 62 degrees F (adjustable). When the temperature falls below 62 F, the unit ventilator control valves shall open with the supply fans on, outside air dampers closed, to maintain the setback temperature. Also, the make-up air unit MAU-MS-1 shall be OFF in unoccupied mode unless the space sensor serving MAU-MS-1 falls below the unoccupied setpoint of 62 degrees F (adjustable) at which point the MAU-MS-1 supply fan shall operate at 900 CFM with a discharge air setpoint of 90 degrees F (adjustable). When MAU-MS-1 is operating in unoccupied mode, EF-MS-13 shall operate to exhaust 900 CFM with the motorized damper on the exhaust ductwork branch serving the Fabrication Shop shall open, the motorized damper on the exhaust ductwork branch serving the CNC Room shall open, the motorized damper on the exhaust branch serving the Fabrication Classroom shall close, with EF-MS-14 OFF.

3. With Cyclone Dust Collector DC-MS-1 ON, in building occupied mode:
   a. The DDC system shall provide a relay to the dust collector fan to provide fan on/off status of the dust collector.
   b. Transfer air duct motorized damper opens from Tech Classroom into Fabrication Shop.
   c. Transfer air duct motorized damper opens from Fabrication Classroom into Fabrication Shop.
   d. EF-MS-14 exhaust fan shall operate with the motorized damper open, the motorized damper on the EF-MS-14 exhaust ductwork branch serving the Fabrication Shop shall close, the motorized damper on the exhaust branch serving the Tech Classroom shall open and the EF-MS-14 exhaust airflow shall modulate through its VFD based on the outside air damper position of existing Unit Ventilators UV-BMS-2 in Faculty Lounge 107 and UV-BMS-2 in the Tech Classroom. When the two UVs are in Economizer mode, the EF shall operate at full airflow 1,950 CFM. If the Faculty Lounge UV is operating in non-economizer ventilation mode, the EF shall reduce its airflow by 850 CFM. If the Tech Classroom UV is operating in non-economizer mode, the motorized damper on the exhaust branch serving the Tech Classroom shall close, with the minimum exhaust airflow through EF-MS-14 being 400 CFM.
   e. EF-MS-13 shall operate, the motorized damper on the EF-MS-13 exhaust ductwork branch serving the Fabrication Shop shall close, the motorized damper on the EF-MS-13 exhaust ductwork branch serving the CNC Room shall close, and the EF-MS-13 exhaust airflow shall modulate through its VFD based on the outside air damper position of two existing Unit Ventilators UV-BMS-2 in Fabrication Classroom. When the two UVs are in Economizer mode, the EF shall operate at an airflow amount of 1,620 CFM with the motorized damper on the exhaust branch serving the Fabrication Classroom open. If the two UVs are operating in non-economizer mode, the EF shall

be off and the associated motorized damper closed, and the motorized damper on the exhaust branch serving the Fabrication Classroom shall be closed.

f. MAU-MS-1 shall open the outside air damper and modulate the fan speed to provide a total of 1,800 cfm supply air into the Fabrication Shop and CNC Room. The space sensor serving MAU-MS-1 shall be utilized to adjust the MAU-MS-1 discharge air temperature. When calling for heat, the MAU shall modulate its gas heat exchanger as required to meet the discharge air setpoint, with a maximum discharge air setpoint of 90 degrees F (adjustable).

g. The existing unit ventilators shall monitor the space temperatures and modulate the open/close the control valves to maintain space temperature. The Fabrication Classroom radiant panel control valves shall be tied to the Fabrication Classroom space temperature sensors and open/close based on the sensor setpoint.

4. Exhaust Fan EF-MS-12: shall operate with the motorized damper open whenever the building is in occupied mode. The fan shall be off and damper closed when the building is in unoccupied mode. The DDC shall monitor the fan speed of the EF.

G. The DDC system shall connect to each of the multi-zone heat pump system indoor fan coil units and each of the single zone heat pump system indoor fan coil unit's BACnet accessory devices and MONITOR the following points from EACH fan coil unit within the project:
1. FAULT CODE of fan coil unit
2. MODE STATE of fan coil unit
3. DRIVE OFF/ON STATE of fan coil unit
4. INLET TEMPERATURE of fan coil unit
5. For Barr Middle School fan coil unit FCU-MS-1 and for High School fan coil unit FCU-HS-2, the DDC system shall monitor the outside air temperature and shall lock the FCU controller from enabling heating when the outside air temperature is greater than 45 degrees F on these two fan coil units to comply with Part C403.4.1.4 of the Energy Conservation Construction Code of New York State.
6. The individual fan coil unit mode (heat, cool) and space setpoints shall be individually set at each fan coil unit controller.

3.12 TRAINING

A. The manufacturer shall provide training on new BAS installation and shall include a minimum of (2) hours of on-site system overviews when extending the existing Siemens APOGEE BAS. Training by a manufacturer providing different control components or software shall include 8 hours of project specific training and 40 additional hours of system operation training.
1. Provide training for Owner's designated operating personnel. Training shall include:
a. Explanation of drawings, operations and maintenance manuals
b. Walk-through of the job to locate control components
c. Operator workstation and peripherals
1) Include point and click instructions for viewing existing reports and generating and scheduling new reports
2) Include point and click definitions for scheduling reports and trend collections
d. DDC controller and ASC operation/function
e. Operator control functions including graphic generation and field panel programming

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SECTION 23 21 13 - HYDRONIC PIPING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Hydronic system requirements.
B. Heating water piping, above grade.
C. Heating water and glycol piping, above grade.
D. Condensate piping.
E. Pipe hangers and supports.
F. Unions, flanges, mechanical couplings, and dielectric connections.
G. Valves:
    1. Ball Valves
    2. Check Valves
    3. Calibrated Balance Valves

1.2 REFERENCE STANDARDS

A. ASME BPVC-IX - Boiler and Pressure Vessel Code, Section IX - Welding, Brazing, and Fusing Qualifications; 2015.
B. ASME B16.3 - Malleable Iron Threaded Fittings: Classes 150 and 300; 2011.
C. ASME B16.3 - Malleable Iron Threaded Fittings; The American Society of Mechanical Engineers; 1998 (R2006).
D. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings; 2012.
E. ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings; 2013.
F. ASME B31.9 - Building Services Piping; 2014.
G. ASME B31.9 - Building Services Piping; The American Society of Mechanical Engineers; 2008.
H. ASTM A234/A234M - Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service; 2015.
I. ASTM B32 - Standard Specification for Solder Metal; 2008 (Reapproved 2014).
J. ASTM B88 - Standard Specification for Seamless Copper Water Tube; 2014.
K. ASTM B88M - Standard Specification for Seamless Copper Water Tube (Metric); 2013.
L. ASTM D1785 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120; 2015.
M. ASTM D2241 - Standard Specification for Poly (Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series); 2015.
N. ASTM D2466 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40; 2013.
O. ASTM D2467 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80; 2006.
P. ASTM F708 - Standard Practice for Design and Installation of Rigid Pipe Hangers; 1992 (Reapproved 2008).
Q. AWS A5.8M/A5.8 - Specification for Filler Metals for Brazing and Braze Welding; 2011-AMD 1.
R. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015.

S. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation; 2009.

1.3 SUBMITTALS

A. Piping Schedule: Provide schedule of piping applications and materials, indicating piping and fittings.

B. Piping Shop Drawings: Provide drawings of piping installation, indicating dimensioned locations, equipment, critical dimensions, elevations, sizes, systems, and valve locations.

C. Welders Certificate: Include welders certification of compliance with ASME BPVC-IX.

D. Product Data:
   1. Include data on pipe materials, pipe fittings, valves, and accessories.
   2. Provide manufacturers catalog information.
   3. Indicate valve data and ratings.

E. Manufacturer's Installation Instructions: Indicate hanging and support methods, joining procedures.

F. Maintenance Data: Include installation instructions, spare parts lists, exploded assembly views.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section, with minimum three years of documented experience.

B. Installer Qualifications: Company specializing in performing work of the type specified in this section, with minimum three years of experience.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Accept valves on site in shipping containers with labeling in place. Inspect for damage.

B. Provide temporary protective coating on cast iron and steel valves.

C. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.

D. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

PART 2 PRODUCTS

2.1 HYDRONIC SYSTEM REQUIREMENTS

A. Comply with ASME B31.9 and applicable federal, state, and local regulations.

B. Piping: Provide piping, fittings, hangers, and supports as required, as indicated, and as follows:
   1. Where more than one piping system material is specified, provide joining fittings that are compatible with piping materials and ensure that the integrity of the system is not jeopardized.
   2. Use non-conducting dielectric connections whenever jointing dissimilar metals.
   3. Grooved mechanical joints are not permitted in any location.
   4. Provide pipe hangers and supports in accordance with ASME B31.9 or MSS SP-58 unless indicated otherwise.

C. Pipe-to-Valve and Pipe-to-Equipment Connections: Use flanges or unions to allow disconnection of components for servicing; do not use direct welded, soldered, or threaded connections.

D. Valves: Provide valves where indicated:
   1. Provide drain valves where indicated, and if not indicated provide at least at main and main branch shut-offs locations, low points of piping, bases of vertical risers, and at equipment. Use 3/4 inch ball valves with cap.
   2. For throttling, bypass, or manual flow control services, use ball or butterfly valves.
   3. For shut-off and to isolate parts of systems or vertical risers, use ball or butterfly valves.

2.2 HEATING WATER AND GLYCOL PIPING

A. Steel Pipe for sizes 3" and above: ASTM A53/A53M, Schedule 40, black:
   1. Welded Joints: ASTM A234/A234M, wrought steel welding type fittings; AWS D1.1/D1.1M welded.
   2. Fittings: ASTM B 16.3, malleable iron or ASTM A 234/A 234M, forged steel welding type fittings.

B. Copper Tube for piping sizes 3" and below: ASTM B88 (ASTM B88M), Type L (B), drawn, using one of the following joint types:
   1. Solder Joints: ASME B16.18 cast brass/bronze or ASME B16.22 solder wrought copper fittings.
      a. Solder: ASTM B32 lead-free solder, HB alloy (95-5 tin-antimony) or tin and silver.
      b. Braze: AWS A5.8M/A5.8 BCuP copper/silver alloy.
   2. Hydraulic Press Fitting for Copper Tubing.
      a. Acceptable Fittings:
         1) ProPress by Viega, 301 N. Main, Wichita, KS 67202, (877) 843-4262, www.viega.com. NO SUBSTITUTIONS SHALL BE PERMITTED.
      b. Operating Conditions:
         1) Maximum Operating Pressure: 200 psi.
         2) Operating Temperature Range: 0-250 degrees F.
         3) Maximum Test Pressure: 600 psi.
         4) Maximum Vacuum: 29.2 inches hg @ 68 degrees F.
      c. Features:
         1) Fittings: Copper and copper alloy conforming to material requirements of ASME B16.18 or ASME B16.22.
            (a) Stainless Steel Grip Ring: Adds strength to the joint without collapsing the interior passageway.
         2) No flame for soldering required for installation of fittings and valves.
         3) Unpressed connections identified during pressure testing when water flows past sealing element.
         4) Sealing Elements: Factory installed, EPDM.
         5) Fittings that have been pressed can be rotated. If rotated more than 5 degrees, the fitting must be repressed to restore its resistance to rotational movement.
         6) Extended fitting end lead allows for twice the retention grip surface, and assists with proper tube alignment.
         7) Soldered adapter fittings are not allowed.
   3. Tee Connections: Mechanically extracted collars with notched and dimpled branch tube.

2.3 CONDENSATE DRAIN PIPING SYSTEM

A. Copper Tube: ASTM B 88 (ASTM B 88M), Type L (B), hard drawn.
   1. Fittings: ASME B16.18, cast brass, or ASME B16.22, solder wrought copper.
   2. Tee Connections: Mechanically extracted collars with notched and dimpled branch tube.
   3. Joints: Solder, lead free, ASTM B 32, HB alloy (95-5 tin-antimony), or tin and silver.

B. PVC Pipe: ASTM D 1785, Schedule 40, or ASTM D 2241, SDR 21 or 26.

1. Fittings: ASTM D 2466 or D2467, PVC.
2. Joints: Solvent welded.

2.4 PIPE HANGERS AND SUPPORTS

A. Provide hangers and supports that comply with MSS SP-58.
   1. If type of hanger or support for a particular situation is not indicated, select appropriate type using MSS SP-58 recommendations.
B. Hangers for Pipe Sizes 1/2 to 1-1/2 Inches: Malleable iron, adjustable swivel, split ring.
C. Hangers for Cold Pipe Sizes 2 Inches and Greater: Carbon steel, adjustable, clevis.
D. Hangers for Hot Pipe Sizes 2 to 4 Inches: Carbon steel, adjustable, clevis.
E. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.
F. Wall Support for Pipe Sizes to 3 Inches: Cast iron hook.
G. Vertical Support: Steel riser clamp.
H. Floor Support for Cold Pipe: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
I. Floor Support for Hot Pipe Sizes to 4 Inches: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
J. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.
K. Hanger Rods: Mild steel threaded both ends, threaded one end, or continuous threaded.
L. Inserts: Malleable iron case of galvanized steel shell and expander plug for threaded connection with lateral adjustment, top slot for reinforcing rods, lugs for attaching to forms; size inserts to suit threaded hanger rods.

2.5 UNIONS, FLANGES, MECHANICAL COUPLINGS, AND DIELECTRIC CONNECTIONS

A. Unions for Pipe 2 Inches and Less:
   1. Copper Pipe: Bronze, soldered joints.
B. Flanges for Pipe 2 Inches and Greater:
   1. Ferrous Piping: 150 psig forged steel, slip-on.
   2. Copper Piping: Bronze.
   3. Gaskets: 1/16 inch thick, preformed neoprene.
C. Dielectric Connections:
   1. Flanges:
      a. Dielectric flanges with same pressure ratings as standard flanges.
      b. Water impervious insulation barrier capable of limiting galvanic current to 1 percent of short circuit current in a corresponding bimetallic joint.
      c. Dry insulation barrier able to withstand 600-volt breakdown test.
      d. Construct of galvanized steel with threaded end connections to match connecting piping.
      e. Suitable for the required operating pressures and temperatures.

2.6 BALL VALVES

A. 3-inch and smaller: 2-piece, full port:
   1. Class: 150 psi saturated steam, 600 psi wog.
   2. Body: ASTM B-584 Alloy 844 bronze.
   3. Body End Piece: ASTM B-584 Alloy 844 bronze.
   4. Ball: ASTM B-584 Alloy 844 bronze with hard chrome plate.
   5. Seat Ring: Reinforced TFE.

6. Threaded Packing Gland: ASTM B-16 Alloy 360 brass.
7. Stem: 316 stainless steel.
8. Ends: Threaded or Press Fittings.

B. Acceptable Manufacturers:
1. Nibco.
2. Apollo.
3. Viega.

2.7 CHECK VALVES

A. Swing Check: 2-Inch and smaller:
1. Class: 125
2. Body: ASTM B-62 bronze.
3. Disc: ASTM B-62 bronze.
4. Hinge : ASTM B-62 bronze.
5. Hinge Pin: ASTM B-16 brass.
6. Cap: ASTM B-62 bronze.
7. Ends: Threaded or soldered.
8. Acceptable Manufacturers:
a. Stockham
b. Nibco
c. Milwaukee

2.8 CALIBRATED BALANCE VALVES

A. Size 1/2 inch to 3 inch:
1. Bronze body with brass ball construction with glass and carbon filled TFE seat rings. Valves shall have differential pressure read-out ports across valve seat area. Read-out ports shall be fitted with internal EPT insert and check valve. Valve bodies shall have 1/4 inch NPT tapped drain/purge port. Valves shall have memory stop feature to allow valve to be closed for service and then reopened to set point without disturbing balance position. All valves shall have calibrated nameplate to assure specific valve setting. Valves shall be leak-tight at full rated working pressure.
2. Design Pressure/Temperature:
a. 1/2" to 3" NPT connections: 300 psi at 250 degrees F.
b. 1/2" to 2" sweat connections: 200 psi at 250 degrees F.

B. Design Pressure/Temperature: 175 psi at 250 degrees F.

C. Acceptable Manufacturers:
1. Oventrop Corp.
2. Bell and Gossett
3. Flow Design, Inc.

PART 3 EXECUTION

3.1 PREPARATION

A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.

B. Remove scale and dirt on inside and outside before assembly.

C. Prepare piping connections to equipment using jointing system specified.

D. Keep open ends of pipe free from scale and dirt. Protect open ends with temporary plugs or caps.

E. After completion, fill, clean, and treat systems. Refer to Section 232500 for additional requirements.

3.2 CALIBRATED BALANCE VALVE SELECTION

A. The contractor shall be responsible for selection of the appropriate size of all calibrated balance valves. Select valve size such that optimal accurace is achieved when balanced to the flow rate as indicated on contract documents. Provide all required increasers and reducers to mate the installed calibrated balance valves to the adjacent piping and equpment.

B. Balance Valve Sizing:

GPM	Balance Valve Size
Up to 2.5	1/2"
2.6 to 4.5	3/4"
4.6 to 9.0	1"
9.1 to 22.0	1-1/4"
22.1 to 35.0	1-1/2"
35.1 to 78.0	2"
78.1 to 120.0	2-1/2"
120.1 to 200.0	3"
200.1 to 400.0	4"
400.1 to 500.0	5"

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install heating water, piping to ASME B31.9 requirements.

C. Route piping in orderly manner, parallel to building structure, and maintain gradient.

D. Install piping to conserve building space and to avoid interference with use of space.

E. Group piping whenever practical at common elevations.

F. Sleeve pipe passing through partitions, walls, and floors.

G. Slope piping and arrange to drain at low points.

H. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment. Refer to Section 230516.

I. Inserts:
   1. Provide inserts for placement in concrete formwork.
   2. Provide inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.
   3. Where concrete slabs form finished ceiling, locate inserts flush with slab surface.
   4. Where inserts are omitted, drill through concrete slab from below and provide through-bolt with recessed square steel plate and nut above slab.

J. Pipe Hangers and Supports:
   1. Install in accordance with ASME B31.9, ASTM F708, or MSS SP-58.
   2. Support horizontal piping as scheduled.
   3. Install hangers to provide minimum 1/2-inch space between finished covering and adjacent work.
   4. Place hangers within 12 inches of each horizontal elbow.

5. Use hangers with 1-1/2 inches minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.
6. Support vertical piping at every floor. Support riser piping independently of connected horizontal piping.
7. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.
8. Provide copper plated hangers and supports for copper piping.

K. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings. Refer to Section 230719.

3.4 FIELD QUALITY CONTROL

A. Preparation for Testing: Prepare hydronic piping in accordance with ASME B 31.9 and as follows:
1. Leave joints, including welds, uninsulated and exposed for examination during the test.
2. Flush system with clean water. Clean strainers.
3. 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.

B. Testing: Test hydronic piping as follows:
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 the 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 in the system for complete removal of the test liquid.
3. Examine system to ensure that equipment and components that cannot withstand test pressures are properly isolated. Examine test equipment to ensure tight connection and that low pressure filling lines have been disconnected.
4. Subject piping system to a hydrostatic test pressure which at every point in the system is not less than 1.5 times the system design pressure, but not less than 100 psi. The test pressure shall not exceed the maximum pressure for any vessel, pump, valve, or other component in the system under testing. Make a check to verify that the stress due to pressure at the bottom of vertical runs does not exceed either 90% of specified yield strength, or 1.7 times the "SE" value in Appendix A of ASME B31.9, Code for Pressure Piping, Building Service Piping.
5. After the hydrostatic test pressure has been applied for at least 15 minutes, 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.

3.5 VALVE ENDS SELECTION

A. Select valves with the following ends or types of pipe/tube connections:
1. Copper Tube Size, 3-inch and Smaller: Press or Threaded ends.

3.6 VALVE INSTALLATIONS

A. General Application: Use ball valves for shut-off duty; ball for throttling duty. Refer to piping system specification sections for specific valve applications and arrangements.

B. Locate valves for easy access and provide separate support where necessary.

C. Install valves and unions for each item of equipment arranged to allow equipment removal without system shutdown. Unions are not required on flanged devices.

D. Install valves in horizontal piping with stem at or above the center of the pipe.

E. Install valves in a position to allow full stem movement.

3.7 SOLDER CONNECTIONS

A. Cut tube square and to exact lengths.

B. Clean end of tube to depth of valve socket with steel wool, sand cloth, or a steel wire brush to a bright finish. Clean valve socket in the same manner.

C. Apply a proper soldering flux in an even coat to inside of valve socket and outside of tube.

D. Insert tube into valve socket, making sure the end rests against the shoulder inside valve. Rotate valve or tube slightly to ensure even distribution of the flux.

E. Apply heat evenly to outside of valve around joint until solder will melt upon contact. Feed solder until it completely fills the joint around the tube. Avoid hot spots or overheating valve. Once the solder starts cooling, remove excess amounts around the joint with a cloth or brush.

3.8 PRESS FITTING CONNECTIONS

A. Press connections: Copper and copper alloy press connections shall be made in accordance with the manufacturer's installation instructions. The tubing shall be fully inserted into the fitting and the tubing marked at the shoulder of the fitting. The fitting alignment shall be checked against the mark on the tubing to assure the tubing is fully engaged (inserted) in the fitting. The joints shall be pressed using the tool(s) approved by the manufacturer.

3.9 FLANGED CONNECTIONS

A. Align flange surfaces parallel.

B. Assemble joints by sequencing bolt tightening to make initial contact of flanges and gaskets as flat and parallel as possible. Use suitable lubricants on bolt threads. Tighten bolts gradually and uniformly with a torque wrench.

3.10 SCHEDULES

A. Pipe Hanger Spacing:
   1. Copper Piping:
      a. 1-1/4 inch diameter and smaller: 6 feet maximum horizontal spacing, 10 feet maximum vertical spacing.
      b. 1-1/2 inch diameter and larger: 10 feet maximum horizontal spacing, 10 feet maximum vertical spacing.
   2. PVC Pipe or Tubing: 4 feet maximum horizontal spacing, 10 feet maximum vertical spacing.
   3. Steel Pipe: 12 feet maximum horizontal spacing, 15 feet maximum vertical spacing.

END OF SECTION 23 21 13

SECTION 23 21 14 - HYDRONIC SPECIALTIES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Air vents.

B. Strainers.

C. Condensate piping system cleanouts.

1.2 SUBMITTALS

A. Product Data: Provide product data for manufactured products and assemblies required for this project. Include component sizes, rough-in requirements, service sizes, and finishes. Include product description and model.

B. Manufacturer's Installation Instructions: Indicate hanging and support methods, joining procedures.

1.3 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

PART 2 PRODUCTS

2.1 AIR VENTS

A. Manual Type: Short vertical sections of 2-inch diameter pipe to form air chamber, with 1/8 inch brass needle valve at top of chamber.

B. Float Type:

1. Brass or semi-steel body, copper, polypropylene, or solid non-metallic float, stainless steel valve and valve seat; suitable for system operating temperature and pressure; with isolating valve.
2. Cast iron body and cover, float, bronze pilot valve mechanism suitable for system operating temperature and pressure; with isolating valve.

C. Maximum Fluid Pressure: 150 psi.

D. Maximum Fluid Temperature: 250 degrees F.

2.2 CLEANOUTS

A. Cleanouts:

1. Cast copper plugs.

2.3 STRAINERS

A. Size 2 inch and Under:

1. Screwed brass or iron body for 175 psi working pressure, Y pattern with 1/32 inch stainless steel perforated screen.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install specialties in accordance with manufacturer's instructions.

B. Provide manual air vents at system high points and as indicated.

C. Provide valved drain and hose connection on strainer blowdown connection.

END OF SECTION 23 21 14

SECTION 23 21 23 - HYDRONIC PUMPS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Coil Condensate Pumps

1.2 REFERENCE STANDARDS

A. NEMA MG 1 - Motors and Generators; 2014.

B. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

C. UL 778 - Standard for Motor-Operated Water Pumps; Current Edition, Including All Revisions.

1.3 SUBMITTALS

A. Product Data: Provide certified pump curves showing performance characteristics with pump and system operating point plotted. Include NPSH curve when applicable. Include electrical characteristics and connection requirements.

B. Manufacturer's Installation Instructions: Indicate hanging and support requirements and recommendations.

C. Operation and Maintenance Data: Include installation instructions, assembly views, lubrication instructions, and replacement parts list.

D. Hanging and support requirements should follow the recommendations in the manufacturer’s installation instructions.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacture, assembly, and field performance of pumps, with minimum three years of documented experience.

B. Provide motors in compliance with the requirements of the New York State Energy Conservation Construction Code, tested in accordance with IEEE Standard 112, test method B.

PART 2 PRODUCTS

2.1 COIL CONDENSATE PUMPS

A. Provide low profile vertical coil condensate pump, UL listed with thermal overload protection, located as shown on the drawings.

B. Construction:
   1. Discharge Connection: 3/8" OD barbed fitting with check valve.
   2. Motor Shaft: Stainless Steel.
   3. Maximum Liquid Temperature: Up to 140 degrees F.
   4. Reservoir: 1/2 gallon capacity.
   5. UL standard 2043 tested
   6. Plenum rated
   7. Auxilary safety switch
   8. Discharge Connection: 3/8" OD barbed fitting with check valve.

C. Features:

1. Designed for hardwire installation.
2. Discharge Static Pressure: 20 feet of shutoff head.

PART 3 EXECUTION

3.1 PREPARATION

A. Verify that electric power is available and of the correct characteristics.

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Provide access space around pumps for service. Provide no less than minimum space recommended by manufacturer.

C. Install equipment in accordance with manufacturer’s instructions.

END OF SECTION 23 21 23

SECTION 23 23 00 - REFRIGERANT PIPING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Piping.
B. Refrigerant.
C. Valves.
D. Filter-driers.
E. Flexible connections.

1.2 REFERENCE STANDARDS

A. AHRI 760 (I-P) - Performance Rating of Solenoid Valves for Use With Volatile Refrigerants; 2014.
B. ASHRAE Std 15 - Safety Standard for Refrigeration Systems; 2013.
C. ASHRAE Std 34 - Designation and Safety Classification of Refrigerants; 2013.
D. ASME BPVC-VIII-1 - Boiler and Pressure Vessel Code, Section VIII, Division 1 - Rules for Construction of Pressure Vessels; 2015.
E. ASME BPVC-IX - Boiler and Pressure Vessel Code, Section IX - Welding, Brazing, and Fusing Qualifications; 2015.
F. ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings; 2013.
G. ASME B16.26 - Cast Copper Alloy Fittings for Flared Copper Tubes; 2013.
H. ASME B31.5 - Refrigeration Piping and Heat Transfer Components; 2013.
I. ASME B31.9 - Building Services Piping; 2014.
J. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2015.
K. ASTM B88 - Standard Specification for Seamless Copper Water Tube; 2014.
L. ASTM B280 - Standard Specification for Seamless Copper Tube for Air Conditioning and Refrigeration Field Service; 2013.
M. AWS A5.8M/A5.8 - Specification for Filler Metals for Brazing and Braze Welding; 2011-AMD 1.
N. ICC (IMC)-2018 - International Mechanical Code; 2018.
O. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation; 2009.
P. UL 207 - Standard for Refrigerant-Containing Components and Accessories, Nonelectrical; Current Edition, Including All Revisions.

1.3 SYSTEM DESCRIPTION

A. Provide pipe hangers and supports in accordance with ASME B31.5 unless indicated otherwise.

1.4 SUBMITTALS

A. Product Data: Provide general assembly of specialties, including manufacturers catalogue information. Provide manufacturers catalog data including load capacity.

B. Piping Schedule: Provide schedule of piping applications and materials, indicating piping and fittings.

C. Piping Shop Drawings: Provide drawings of piping installation, indicating dimensioned locations, equipment, critical dimensions, elevations, sizes, systems, and valve locations.

D. Manufacturer Piping Sizing: Provide documentation from the manufacturer of the refrigeration equipment connected to the refrigerant piping and accessories establishing the required sizing of piping.

PART 2 PRODUCTS

2.1 SYSTEM DESCRIPTION

A. Provide pipe hangers and supports in accordance with ASME B31.5 unless indicated otherwise.

2.2 REGULATORY REQUIREMENTS

A. Comply with ASME B31.9 for installation of piping system.

2.3 PIPING

A. Copper Tube: ASTM B280, H58 hard drawn.
   1. Fittings: ASME B16.22 wrought copper.
   2. Joints: Braze, AWS A5.8M/A5.8 BCuP silver/phosphorus/copper alloy.
   3. Mechanical Press Sealed Fittings: Double pressed type complying with UL 207 and ICC (IMC)-2018.

B. Pipe Supports and Anchors:
   1. Provide hangers and supports that comply with MSS SP-58.
      a. If type of hanger or support for a particular situation is not indicated, select appropriate type using MSS SP-58 recommendations.
   2. Hangers for Pipe Sizes 2 Inches and Over: Carbon steel, adjustable, clevis.
   3. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.
   4. Wall Support for Pipe Sizes to 3 Inches: Cast iron hook.
   5. Vertical Support: Steel riser clamp.
   6. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.
   7. Hanger Rods: Mild steel threaded both ends, threaded one end, or continuous threaded.
   8. Inserts: Malleable iron case of galvanized steel shell and expander plug for threaded connection with lateral adjustment, top slot for reinforcing rods, lugs for attaching to forms; size inserts to suit threaded hanger rods.
   9. Rooftop Supports for Low-Slope Roofs: Steel pedestals with bases that rest on top of roofing membrane, not requiring any attachment to the roof structure and not penetrating the roofing assembly, with support fixtures as specified; and as follows:
      a. Bases: High density, UV tolerant, polypropylene or reinforced PVC.
      b. Base Sizes: As required to distribute load sufficiently to prevent indentation of roofing assembly.
      c. Steel Components: Stainless steel, or carbon steel hot-dip galvanized after fabrication in accordance with ASTM A123/A123M.
      d. Attachment/Support Fixtures: As recommended by manufacturer, same type as indicated for equivalent indoor hangers and supports; corrosion resistant material.
      e. Height: Provide minimum clearance of 6 inches under pipe to top of roofing.

2.4 REFRIGERANT

A. Refrigerant: R410A as defined in ASHRAE Std 34.

2.5 VALVES

A. Diaphragm Packless Valves:
   1. UL listed, globe or angle pattern, forged brass body and bonnet, phosphor bronze and stainless steel diaphragms, rising stem and handwheel, stainless steel spring, nylon seat disc, soldered or flared ends, with positive backseating; for maximum working pressure of 500 psi and maximum temperature of 275 degrees F.

B. Ball Valves:
   1. Two piece bolted forged brass body with teflon ball seals and copper tube extensions, brass bonnet and seal cap, chrome plated ball, stem with neoprene ring stem seals; for maximum working pressure of 500 psi and maximum temperature of 300 degrees F.

C. Service Valves:
   1. Forged brass body with copper stubs, brass caps, removable valve core, integral ball check valve, flared or soldered ends, for maximum pressure of 500 psi.

2.6 FILTER-DRIERS

A. Cores: Molded or loose-fill molecular sieve desiccant compatible with refrigerant, activated alumina, activated charcoal, and filtration to 40 microns, with secondary filtration to 20 microns; of construction that will not pass into refrigerant lines.

B. Construction: UL listed.
   1. Connections: As specified for applicable pipe type.

2.7 FLEXIBLE CONNECTORS

A. Corrugated stainless steel hose with single layer of stainless steel exterior braiding, minimum 9 inches long with copper tube ends; for maximum working pressure of 500 psi.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install refrigeration specialties in accordance with manufacturer's instructions.

B. Route piping in orderly manner, with plumbing parallel to building structure, and maintain gradient.

C. Install piping to conserve building space and avoid interference with use of space.

D. Group piping whenever practical at common elevations and locations. Slope piping one percent in direction of oil return.

E. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.

F. Inserts:
   1. Provide inserts for placement in concrete formwork.
   2. Provide inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.
   3. Provide hooked rod to concrete reinforcement section for inserts carrying pipe over 4 inches.
   4. Where concrete slabs form finished ceiling, locate inserts flush with slab surface.

5. Where inserts are omitted, drill through concrete slab from below and provide through-bolt with recessed square steel plate and nut above slab.

G. Pipe Hangers and Supports:
1. Install in accordance with ASME B31.5.
2. Support horizontal piping as indicated.
3. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work.
4. Place hangers within 12 inches of each horizontal elbow.
5. Support vertical piping at every floor. Support riser piping independently of connected horizontal piping.
6. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.
7. Provide copper plated hangers and supports for copper piping.

H. Flood piping system with nitrogen when brazing.

I. Fully charge completed system with refrigerant after testing.

3.2 SCHEDULES

A. Pipe Hanger Spacing:
1. Copper Piping:
a. 1-1/4 inch diameter and smaller: 6 feet maximum horizontal spacing, 10 feet maximum vertical spacing.
b. 1-1/2 inch diameter and larger: 10 feet maximum horizontal spacing, 10 feet maximum vertical spacing.

END OF SECTION 23 23 00

SECTION 23 25 00 - HVAC WATER TREATMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Materials.
   1. System cleaner.
   2. Closed system treatment (water).

1.2 SUBMITTALS

A. Product Data: Provide chemical treatment materials, chemicals, and equipment including electrical characteristics and connection requirements.

B. Manufacturer's Installation Instructions: Indicate placement of equipment in systems, piping configuration, and connection requirements.

C. Manufacturer's Field Reports: Indicate start-up of treatment systems when completed and operating properly. Indicate analysis of system water after cleaning and after treatment.

1.3 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience. Company shall have local representatives with water analysis laboratories and full time service personnel.

B. Installer Qualifications: Company specializing in performing the type of work specified in this section, with minimum 3 years of experience and approved by manufacturer.

1.4 REGULATORY REQUIREMENTS

A. Conform to applicable code for addition of non-potable chemicals to building mechanical systems and to public sewage systems.

B. Products Requiring Electrical Connection: Listed and classified by UL as suitable for the purpose specified and indicated.

PART 2 PRODUCTS

2.1 SYSTEM CLEANER FOR NEWLY INSTALLED PIPING SYSTEMS (HEATING WATER LOOPS)

A. Closed Loop Water System Cleaner/Conditioner: Provide industrial degreaser which is chemically engineered to include non-ionic as well as ionic surface-active compounds dispersed in dionized water.

B. Chemical Composition:
   1. Boiling Point: 212 Degrees F.
   2. Freezing Point: 30 Degrees F.
   3. Weight per Gallon at 68 Degrees F: 8.67 pounds.
   4. Coefficient of Expansion at 68 Degrees F: 0.00019.
   5. Coefficient of Expansion at 131 Degrees F: 0.00023.
   6. Flash Point PMCC/COC: None/None.
   7. Vapor Pressure, Reid Bomb at 100 Degrees F: 1.4 psia.
   8. Vapor Density (Air = 1): <1.
   9. Specific Gravity (water = 1): 1.04031.
   10. Evaporation Rate (Butyl Acetate = 1): <1.

11. Volitile % by Volume: 100%.
12. Solubility in Water: Complete.
13. Color: Amber.
14. pH: 7.2/8.2.

C. Manufacturer: Interclean DG-3, or approved equal.

2.2 SYSTEM CLEANER FOR RE-USED AND RETROFITTED SYSTEMS (HEATING WATER LOOPS)

A. Closed Loop Water System Cleaner/Conditioner: Provide industrial cleaner consisting of ammonia-neutralized chelating and sequetering agents to convert water insoluble compounds containing the elements of calcium, magnesium, iron, aluminum, copper, lead and zinc into water soluble compounds, allowing for removal of corrosion such as rust, line and other mineral scales.

B. Chemical Composition:
1. Boiling Point: 216 Degrees F.
2. Freezing Point: 18 Degrees F.
3. Weight per Gallon at 68 Degrees F: 9.37 pounds.
4. Coefficient of Expansion at 68 Degrees F: 0.00018.
5. Coefficient of Expansion at 131 Degrees F: 0.00018.
6. Flash Point PMCC/COC: None/None.
7. Vapor Pressure, Reid Bomb at 100 Degrees F: 1.2 psia.
8. Vapor Density (Air = 1): <1.
9. Specific Gravity (water = 1): 1.12425.
10. Evaporation Rate (Butyl Acetate = 1): <1.
11. Volitile % by Volume: 100%.
12. Solubility in Water: Complete.
13. Color: Blue Green.
14. pH: 7.2/8.2.

C. Manufacturer: Interclean MC-1, or approved equal.

PART 3 EXECUTION

3.1 PREPARATION

A. Systems shall be operational, filled, started, and vented prior to cleaning. Use water meter to record capacity in each system.

B. Place terminal control valves in open position during cleaning.

C. Verify that electric power is available and of the correct characteristics.

3.2 NEW PIPING CLEANING SEQUENCE

A. Concentration:
1. 1% by volume, verify with cleaner manufacturer.

B. Water Systems:
1. Fill the system with clear water with air bleeds open to completely vent air. Close air bleeds and circulate for 30 minutes.
2. Stop circulation and drain the entire system as quickly as possible through low point drains.
3. Fill the system with the required concentration clear water and system cleaner with air bleeds open to completely vent air. Close air bleeds.

4. Operate the system at as high a temperature as possible but do not exceed 190 degrees F. Continue to operate until pH is greater than 8.3. At 180 degrees F, this may take 8-12 hours. At ambient temperature, this may take 24-36 hours.
5. Stop circulation and drain the entire system as quickly as possible through low point drains.
6. Fill the system with clear water with air bleeds open to completely vent air. Close air bleeds and circulate for 30 minutes.
7. Stop circulation and drain the entire system as quickly as possible through low point drains.
8. Inspect piping condition at representative locations. If the system is not satisfactory, repeat steps 3-7.

3.3 EXISTING PIPING CLEANING SEQUENCE

A. Concentration:
   1. 10% by volume, verify with cleaner manufacturer.
B. Water Systems:
   1. Fill the system with clear water with air bleeds open to completely vent air. Close air bleeds and circulate for 30 minutes.
   2. Stop circulation and drain the entire system as quickly as possible through low point drains.
   3. Fill the system with the required concentration clear water and system cleaner with air bleeds open to completely vent air. Close air bleeds.
   4. Operate the system at as high a temperature as possible but do not exceed 190 degrees F. Continue to operate until pH is greater than 8.3. At 180 degrees F, this may take 8-12 hours. At ambient temperature, this may take 24-36 hours.
   5. Stop circulation and drain the entire system as quickly as possible through low point drains.
   6. Fill the system with clear water with air bleeds open to completely vent air. Close air bleeds and circulate for 30 minutes.
   7. Stop circulation and drain the entire system as quickly as possible through low point drains.
   8. Inspect piping condition at representative locations. If the system is not satisfactory, repeat steps 3-7.

3.4 CLEANING SEQUENCE

A. Concentration:
   1. As recommended by manufacturer.
B. Hot Water Heating Systems:
   1. Apply heat while circulating, slowly raising temperature to 160 degrees F and maintain for 12 hours minimum.
   2. Remove heat and circulate to 100 degrees F or less; drain systems as quickly as possible and refill with clean water.
   3. Circulate for 6 hours at design temperatures, then drain.
   4. Refill with clean water and repeat until system cleaner is removed.
C. Use neutralizer agents on recommendation of system cleaner supplier and approval of Engineer.
D. Remove, clean, and replace strainer screens.
E. Inspect, remove sludge, and flush low points with clean water after cleaning process is completed. Include disassembly of components as required.

3.5 INSTALLATION

A. Install in accordance with manufacturer's instructions.

END OF SECTION 23 25 00

SECTION 23 31 00 - HVAC DUCTS AND CASINGS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Metal ductwork.

B. Flexible ductwork.

C. Plenums.

D. Duct cleaning.

1.2 RELATED WORK SPECIFIED IN OTHER SECTIONS

A. This contract includes sheet metal ductwork which is to be fabricated with duct liner specified in Section 230713- DUCT INSULATION. Work of this section includes requirements for fabricating and insulating the ductwork. Net clear interior dimensions of lined ductwork shall be the duct sizes indicated on the drawings. Provide ductwork with sufficient dimensions such that final net clear interior sizes with the ductwork liner meets the drawings for sizing.

1.3 REFERENCES

A. ASTM A 36/A 36M - Standard Specification for Carbon Structural Steel; 1994.

B. ASTM A 569/A 569M - Standard Specification for Steel, Carbon (0.15 Maximum, Percent), Hot-Rolled Sheet and Strip, Commercial Quality; 1991a (Reapproved 1993).

C. ASTM A 653/A 653M - Standard Specification for Steel Sheets, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot Dip Process; 1995.

D. ASTM A 666 - Standard Specification for Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 1994a.

E. ASTM B 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 1995.

F. NFPA 90A - Installation of Air Conditioning and Ventilating Systems; 1993.

G. SMACNA (LEAK) - HVAC Air Duct Leakage Test Manual; 2012.

H. SMACNA (DCS) - HVAC Duct Construction Standards - Metal and Flexible;2005.

I. UL 181 - Factory-Made Air Ducts and Connectors; 1994.

1.4 PERFORMANCE REQUIREMENTS

A. No variation of duct configuration or sizes permitted except by written permission. Size round ducts installed in place of rectangular ducts in accordance with ASHRAE table of equivalent rectangular and round ducts.

1.5 SUBMITTALS

A. Product Data: Provide data for duct materials.

B. Shop Drawings: Indicate duct fittings, particulars such as gages, sizes, welds, and configuration prior to start of work for all ductwork systems.

C. Ductwork Shop Drawings: Provide drawings of ductwork installation, indicating dimensioned locations, equipment, critical dimensions, elevations, sizes, systems, and damper locations. Indicate duct fittings, particulars such as gages, sizes, welds, and configuration.

D. Coordination Shop Drawings:
   1. Prior to starting construction work submit coordination drawings.

2. Submit coordination drawings that show the layout and coordination within each building and all building systems including, but not limited to the following:
   a. Building structure
   b. Structural penetrations
   c. Reflected ceiling plan
   d. HVAC ductwork
   e. Diffusers, grilles and registers
   f. HVAC piping
   g. All HVAC equipment including heating coils, air handling units, rooftop units, exhaust fans, radiant ceiling panels, duct silencers, and VAV Boxes.
   h. sanitary drain
   i. sanitary vent
   j. storm drain
   k. domestic cold water, domestic hot water and domestic hot water recirculation
   l. electrical light fixtures
   m. electric panels
   n. electric conduit 2" and larger
   o. fire alarm devices
3. The contractor shall prepare as part of its costs, shop drawings in compatible format which will be used for incorporation into the coordination drawings.
4. The initial coordination drawings shall be produced by the contractor starting with the “Base” CAD background drawing. These backgrounds shall be updated and modified with integration and revision of CAD drawings for new construction to indicate conditions for approved final layouts for foundations, steel framing, concrete reinforcing, and access flooring approved rough-in layout plans. All building structural elements, walls, doors, windows, louvers, openings, ceiling layouts, access floor layouts and major equipment provided by the contractor and other significant elements shall be shown on designated layers. Scheduled heights for finished ceilings above finished floor, and height above finished floor of underside of concrete and metal decks and all beams and joists including provision for fireproofing and finished enclosures shall be indicated at all areas.
5. The contractor shall provide full size “CAD” files for each level, to be plotted at 3/8” or approved coordination scale.
6. All larger coordination drawings, broken up with match lines to correlate with phases and distinct plan areas with drawing designations.
7. All coordination drawings will have the location of plan view information the same.
8. Coordination drawings shall be prepared for the following areas:
   a. All areas (above ceiling).
   b. Separate coordination plans shall be prepared for the following areas:
      1) All Mechanical rooms.
      2) High School Roof.
9. The Contractor shall meet at a minimum weekly meetings to be held to review the status of the coordination process, and drawings which the foremen and/or Superintendent of each Contractor will be required to attend. The Contractor will be required to bring at least one color plot of all areas to be coordinate. Each affected Contractor shall review, sign and date each updated coordinated drawing which will indicate their agreement that the coordination drawing(s) has (have) been fully coordinated and are void of all conflicts at each stage. Final completed coordination drawings shall be signed off by the Contractor. Any work in place not in conformance with final approved coordination drawings will be required to be removed and relocated unless specific written approval with each contractor.

10. Any conflicts, etc., discovered in the coordination stages prior to contractor sign-off which cannot be resolved by the Contractors shall be brought to the attention of the Architect for resolution.
11. Any conflicts, etc., discovered after coordination sign-off and during the installation of the Work will be the responsibility of the Contractor to resolve with the review of the Architect.
12. A coordination drawing schedule will be developed by the contractor for tracking and reporting the status of coordination drawings with the overall project schedule to which the Contractor shall be responsible.
13. Work fabricated/installed prior to the completion of this process is performed at the Contractor's own risk, and compensation of time/costs for corrections will not be allowed.
14. The Contractor shall be responsible for timely updates to the coordination drawings to indicate as-built conditions for their own work. Updates are required to include all changes regardless of the source or reason for the change.

E. Test Reports: Indicate pressure tests performed. Include date, section tested, test pressure, and leakage rate, following SMACNA (LEAK) - HVAC Air Duct Leakage Test Manual.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

B. Installer Qualifications: Company specializing in performing the type of work specified in this section, with minimum 3 years of documented experience.

1.7 REGULATORY REQUIREMENTS

A. Construct ductwork to NFPA 90A standards.

1.8 ENVIRONMENTAL REQUIREMENTS

A. Do not install duct sealants when temperatures are less than those recommended by sealant manufacturers.

B. Maintain temperatures within acceptable range during and after installation of duct sealants.

PART 2 PRODUCTS

2.1 MATERIALS

A. Galvanized Steel Ducts: ASTM A 653/A 653M galvanized steel sheet, lock-forming quality, with G90/Z275 zinc coating.

B. Double Wall Galvanized Steel: Straight double wall duct shall be furnished with stiffening beads. Double wall duct shall be fabricated with either Snap Lock or Pittsburgh longitudinal seams. Double wall duct shall be manufactured completely assembled with transverse duct corners (TDC) installed. All sizes shall be listed using inside dimensions. Double wall ductwork shall be constructed of a solid shell surrounded by a layer of insulation (as specified in section 230713 - DUCT Insulation, rigid glass fiber duct liner) and covered by a solid outer shell. All double wall fittings shall be fabricated with stiffening beads on duct sizes 19” wide and larger which have more than 10 square feet of unbraced panel. This requirement is applicable to 20 gauge or less in thickness and 3” W.G. or less. Double wall fittings shall be fabricated with Pittsburgh seams. Double wall fittings shall be completely assembled with all accessories (TDC corners, vane & rail, etc) installed.

C. Stainless Steel Ducts:

1. Use minimum No. 16 gage for exhaust ducts connected to cooking equipment hoods. Use minimum No. 18 gage for exhaust ducts connected to other hoods.
   a. Use stainless steel reinforcing members for ducts in finished spaces and galvanized steel in unfinished spaces.
2. Fume Hood Exhaust Ductwork: Welded or duct joints made tight with lap joints having a minimum lap of 1 inch (25 mm), stainless steel Type 316L ductwork, 18 gage minimum.

D. Insulated Flexible Ducts:
   1. UL 181, Class 1, aluminum laminate and polyester film with latex adhesive supported by helically wound spring steel wire; fiberglass insulation; polyethylene vapor barrier film.
      a. Pressure Rating: 10 inches WG positive and 1.0 inches WG negative.
      b. Maximum Velocity: 4000 fpm.
      c. Temperature Range: -20 degrees F to 210 degrees F.

E. Hanger Rod: ASTM A 36/A 36M; steel, galvanized; threaded both ends, threaded one end, or continuously threaded.

2.2 DUCTWORK FABRICATION

A. Fabricate and support in accordance with SMACNA (DCS) - HVAC Duct Construction Standards - Metal and Flexible, and as indicated. Provide duct material, gages, reinforcing, and sealing for operating pressures indicated.

B. Construct T's, bends, and elbows with radius of not less than 1-1/2 times width of duct on centerline. Where not possible and where rectangular elbows are outlined on the drawings, provide air foil turning vanes. Where acoustical lining is indicated, provide turning vanes of perforated metal with glass fiber insulation.

C. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible; maximum 30 degrees divergence upstream of equipment and 45 degrees convergence downstream.

D. Fabricate continuously welded round and oval duct fittings two gages heavier than duct gages indicated in SMACNA Standard. Joints shall be minimum 4 inch cemented slip joint, brazed or electric welded. Prime coat welded joints.

E. Provide standard 45 degree lateral wye takeoffs unless otherwise indicated where 90 degree conical tee connections may be used.

F. Where ducts are connected to exterior wall louvers and duct outlet is smaller than louver frame, provide blank-out panels sealing louver area around duct. Use same material as duct, painted black on exterior side; seal to louver frame and duct.

2.3 SEALING MATERIALS

A. Joint and Seam Sealants, General: The term sealant used here is not limited to materials of adhesive or mastic nature, but also includes combinations of open weave fabric strips and mastics

B. Joint and Seam Tape: 2 inches wide, glass-fiber-fabric reinforced.

C. Tape Sealing System: Woven-fiber tape impregnated with a gypsum mineral compound and a modified acrylic/silicone activator to react exothermically with the tape to form a hard, durable, airtight seal.

D. Joint and Seam Sealant:
   1. Color: Grey
   2. Base: Water
   3. Chemical Family: Synthetic Latex
   4. Solids Content: 75 ± 2%

5. Viscosity: Approx. 300,000 - 400,000 CPS
6. Application Temperature: 40°F - 110°F
7. Service Temperature: -25°F - 200°F
8. Freeze/Thaw Stability: Through 5 cycles no deterioration (DPTM-20)
9. Flammability: Non-flammable
10. Wet or Dry Flash Point: No flash to boiling
11. Shelf Life: 2 Years (unopened containers)
12. Cure Time: 24 - 72 hours depending on humidity, temperature and application
13. Coverage: Dependent on application thickness, 80-100 sq. ft. at 20-30 wet mils.
14. Packaging: 1/12 gallon tubes, 1 gallon pails, 2 gallon pails, 5 gallon pails, 54 gallon drums
15. Pressure Classes: Meets all SMACNA pressure classes
16. Seal Classes: Meets all SMACNA seal classes

E. Flanged Joint Mastics: One-part, acid-curing, silicone elastomeric joint sealants, complying ASTM C920, Type S, Grade NS Class 25, Use O.

2.4 FIRE STOPPING

A. Provide fire-stopping of penetrations as work of this contract.

2.5 HANGERS AND SUPPORTS

A. Building Attachments: Concrete inserts, powder actuated fasteners, or structural steel fasteners appropriate for building materials. Do not use powder actuated concrete fasteners for lightweight aggregate concretes or for slabs less than 4 inches thick.

B. Hangers: Galvanized sheet steel, or round, uncoated steel, threaded rod.
   1. Straps and Rod sizes: Conform with Table 4-1 in SMACNA HVAC Duct Construction Standards, 1985 Edition, for sheet steel width and gage and steel rod diameters

C. Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.

D. Trapeze and Riser Supports: Steel shapes conforming to ASTM-A36.
   1. Where galvanized steel ducts are installed, provide hot-dipped galvanized steel shapes and plates.

E. Rooftop Duct Supports: Dual bases supporting "H" frame strut assembly to support duct.
   1. Strut Material: Hot-dip galvanized steel.
   2. Stainless steel bases and hot-dip galvanized steel struts.
   3. Base Material: Polycarbonate resin, stainless steel or hot-dip galvanized

2.6 RECTANGULAR DUCT FABRICATION

A. General: Except as otherwise indicated, fabricate rectangular ducts with galvanized sheet steel, in accordance with SMACNA "HVAC Duct Construction Standards", Tables 1-3 through 1-19, including their associated details. Conform to the requirements in the referenced standard for metal thickness, reinforcing types and intervals, tie rod applications, and joint types and intervals.
   1. Fabricate rectangular ducts in lengths appropriate to reinforcement and rigidity class required for pressure classification
   2. Provide materials that are free from visual imperfections such as pitting, seam marks, roller marks, stains and discolorations.

B. Static Pressure Classifications: Unless otherwise noted, construct all ductwork in this contract to 4 inch water gage static pressure class, for both supply, exhaust and return ductwork.

C. Longitudinal joints shall be Pittsburgh Lock L-1.

D. Transverse joints shall be T-12 Standing S as a minimum, or shall be made using Ductmate, WDCI and Ductlock slide-on connector systems. For ductwork rated at 3" w.g. and above, the transverse joints shall be made with the Ductmate, Ward, or Nexus ductwork connection system. Formed-on connector systems and slip and drive joints (SMACNA Type T-1 through T-14) shall not be permitted.

E. Fabricate duct fittings to match adjoining ducts and to comply with duct requirements as applicable to fittings. Except as otherwise indicated, fabricate elbows with centerline radius equal to 1.5 times associated duct width. Limit angular tapers to 30 degrees for contracting tapers, and 20 degrees for expanding tapers.

F. Fabricate ductwork with accessories installed during fabrication to the greatest extend possible. Refer to Division 23 section "Ductwork Accessories" for accessory requirements.

G. Fabricate plenums of galvanized sheet steel complying with ASTM A527, with G90 zinc coating in accordance with ASTM A525. Gages, construction, reinforcing and bracing shall comply with Section VI of SMACNA "HVAC Duct Construction Standards, Metal and Flexible".

H. Provide structural steel channels for support of plenums; provide structural angles and hanger rods.

2.7 RECTANGULAR DUCT FITTINGS

A. Fabricate elbows, transitions, offsets, branch connections and other duct construction in accordance with SMACNA "HVAC Metal Duct Construction Standard," 1985 Edition, Figures 2-1 through 2-10.

B. All branch takesoffs shall be made with 45 degree entry fittings; splitter dampers and extractors shall not be permitted.

2.8 ROUND DUCT FABRICATION

A. Round Ducts: Fabricate round supply ducts with spiral lockseam construction. Comply with SMACNA "HVAC Duct Construction Standards," Table 3 2 for galvanized steel gages.
   1. Duct thickness shall be a minimum of 26 gauge.

B. Round Ducts: Fabricate round supply ducts using seam types identified in SMACNA "HVAC Duct Construction Standards," 1985 Edition, Figure 3-1, RL-Standards, " Table 3-2 for galvanized steel gages.
   1. Drawband and crimp type transverse joints (RT-3 and RT-5 respectively) shall not be permitted.
   2. Pleated, adjustable, and mitered elbows shall not be permitted, and segmented elbows shall be constructed with five segments, minimum.

2.9 ROUND SUPPLY AND RETURN FITTINGS FABRICATION

A. Conical Tees: Fabricate to conform to SMACNA "HVAC Duct Construction Standards", 1985 Edition, Figures 3-4 and 3-5 and with metal thicknesses specified for longitudinal seam straight duct.

B. Elbows: Fabricate in die-formed, gored or pleated construction. Fabricate the bend radius of die-formed, gored and pleated elbows 1.5 times the elbow diameter. Unless elbow construction type is indicated, provide elbows meeting the following requirements:
   1. Round Elbows - 8 inches and Smaller: Die-formed elbows for 45- and 90- degree elbows and pleated elbows for 30, 45, 60, and 90 degrees only.
   2. Round Elbows - 9 inches through 14 inches: Gored or pleated elbows for 30, 45, 60, and 90 degrees.
   3. Round Elbows - Larger Than 14 Inches: Gored elbows

4. Die-Formed Elbows for Sizes Through 8 inches: 20 gage with 2-piece welded construction.
5. Round Gored Elbows Gages: Same as for non-elbow fittings specified above
6. Pleated Elbows Sizes Through 14 inches: 26 gage

C. High Efficiency Round Taps to Rectangular Duct Mains:
1. High-Efficiency Takeoff shall be utilized with a rectangular opening and an approximate 45° slope on the body. A flange shall be turned out on all four sides with each corner being filled. The flange shall also have pre-punched holes for easy installation. There shall be a closed cell neoprene gasket (3/4" X 1/4") applied to the flange to assure a tight seal. High-Efficiency Takeoffs shall be fabricated from 24 gauge galvanized steel.

2.10 MANUFACTURED METAL DUCTWORK AND FITTINGS

A. Manufacture in accordance with SMACNA (DCS) - HVAC Duct Construction Standards - Metal and Flexible, and as indicated. Provide duct material, gages,reinforcing, and sealing for operating pressures indicated.

B. Flat Oval Ducts:
1. Machine made from round spiral lockseam duct with light reinforcing corrugations; fittings manufactured of at least two gages heavier metal than duct.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Duct sizes indicated are inside clear dimensions.

C. Install and seal metal and flexible ducts in accordance with SMACNA (DCS) - HVAC Duct Construction Standards - Metal and Flexible.

D. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.

E. Use crimp joints with or without bead for joining round duct sizes 8 inch and smaller with crimp in direction of air flow.

F. Use double nuts and lock washers on threaded rod supports.

G. Connect terminal units to supply ducts directly.

H. Connect ceiling diffusers to low pressure ducts directly or with 3 feet maximum length of flexible duct held in place with strap or clamp.
1. Floor and wall mounted displacement diffusers shall be connected with hard duct connections only.

I. Connect flexible ducts to metal ducts with adhesive.

J. During construction provide temporary closures of metal or taped polyethylene on open ductwork to prevent construction dust from entering ductwork system.

3.2 CLEANING

A. Clean newly installed duct systems with high power vacuum machines. Protect equipment which may be harmed by excessive dirt with filters, or bypass during cleaning. Provide adequate access into ductwork for cleaning purposes.

3.3 SCHEDULES

A. Ductwork Material:
   1. Supply/Return/Relief (interior): Galvanized Steel.
   2. Supply (EXTERIOR): 2" thick Double-wall Galvanized Steel with field applied weather proofing jacket.
   3. Return, Relief and Exhaust ductwork (EXTERIOR): 1" thick Double-wall galvanized steel with field applied weather proofing jacket.
   4. General Exhaust (interior): Galvanized Steel.
   5. Air Transfer Ductwork: Galvanized Steel.
   6. Fume Hood Exhaust: Stainless Steel.
   7. Outside Air Intake: Galvanized Steel.

B. Ductwork Pressure Class:
   1. High School/Middle School/Elementary School:
      a. Rooftop Unit RTU-HS-1 Supply Air ductwork (upstream of VAV Boxes) and Make-up Air Unit MUA-MS-1 supply air ductwork: 3 inches
         1) Duct Sealant: Class A.
      b. Rooftop Unit RTU-HS-1 Return Air ductwork: 2 inches.
         1) Duct Sealant: Class A.
      c. Rooftop Unit RTU-HS-1 Supply ductwork (downstream of VAV Boxes): 1 inch.
         1) Duct Sealant: Class A.
      d. Exhaust Fans: 2 inches.
         1) Duct Sealant: Class A.
      e. Outside Air Intake: 2 inches.
         1) Duct Sealant: Class A.
      f. Air Transfer Ductwork: 1 inch
         1) Duct Sealant: Class A.

C. Ductwork Leakage Class:
   1. Rectangular ductwork: Class 6
   2. Round/Oval ductwork: Class 3
   3. Air Leakage Testing: All ductwork systems shall be leak tested to the ductwork leakage classes specified. For supply air systems, measured leakage shall not exceed 3% of the total supply fan air volume. For exhaust and return air systems, measured leakage shall not exceed 5% of the total exhaust/return air volume per exhaust/return air fan system. Results of leakage testing shall be submitted to engineer for review.

END OF SECTION 23 31 00

SECTION 23 33 00 - AIR DUCT ACCESSORIES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Air turning devices.
B. Backdraft dampers - metal.
C. Combination fire and smoke dampers.
D. Duct access doors.
E. Duct test holes.
F. Fire dampers.
G. Flexible duct connectors.
H. Thermally broken low leakage motorized dampers.
I. Smoke dampers.
J. Volume control dampers.

1.2 REFERENCE STANDARDS

A. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2015.
B. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2005.
C. UL 33 - Safety Heat Responsive Links for Fire-Protection Service; Current Edition, Including All Revisions.
D. UL 555 - Standard for Fire Dampers; Current Edition, Including All Revisions.
E. UL 555S - Standard for Smoke Dampers; Current Edition, Including All Revisions.

1.3 SUBMITTALS

A. Product Data: Provide for shop fabricated assemblies including volume control dampers, duct access doors, duct test holes, and hardware used. Include electrical characteristics and connection requirements.
B. Shop Drawings: Indicate for shop fabricated assemblies including volume control dampers and duct access doors.
C. Provide Mock-Up of each type of combination fire/smoke damper, each type of smoke damper and each type of fire damper installation including fire/smoke dampers installed vertically through floors, horizontally through walls, and all other installation types.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.
B. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.
C. Factory Tests: Factory cycle fire dampers to assure proper operation.

PART 2 PRODUCTS

2.1 AIR TURNING DEVICES

A. Turning Vanes
   1. Provide single width airfoil type fabricated turning vanes and vane runners constructed in accordance with SMACNA "HVAC Duct Construction Standards".
   2. Manufactured turning vanes: Provide single width airfoil type turning vanes constructed of 1-1/2 inch wide curved blades set at 3/4 inches on center, supported with bars perpendicular to blades set at 2 inches on center, and set into side strips suitable for mounting in ductwork.

2.2 BACKDRAFT DAMPERS - METAL

A. Multi-Blade, Parallel Action Gravity Balanced Backdraft Dampers: Galvanized steel, with center pivoted blades of maximum 6 inch width, with felt or flexible vinyl sealed edges, linked together in rattle-free manner with 90 degree stop, steel ball bearings, and plated steel pivot pin; adjustment device to permit setting for varying differential static pressure.

2.3 COMBINATION FIRE AND SMOKE DAMPERS

A. Fabricate in accordance with NFPA 90A, UL 555, UL 555S, and as indicated.

B. Provide factory sleeve and collar for each damper.

C. Multiple Blade Dampers: Fabricate with 16 gage, 0.0598 inch galvanized steel frame and blades, oil-impregnated bronze or stainless steel sleeve bearings and plated steel axles, stainless steel jamb seals, 1/8 by 1/2 inch plated steel concealed linkage, stainless steel closure spring, blade stops, and lock, and 1/2 inch actuator shaft.

D. Operators: UL listed and labelled spring return electric type suitable for 120 volts, single phase, 60 Hz. Provide end switches to indicate damper position. Locate damper operator on exterior of duct and link to damper operating shaft.

E. Combination fire and smoke dampers shall be provided with Belimo Aircontrols FSAF (133 in-#) actuators or equal. Actuator timing shall meet local codes - 15 seconds.
   1. Actuator shall carry a manufacturer's 5-year warranty and be manufactured under ISO 9001 quality control.
   2. Actuator shall have microcontroller based motor controller providing:
      a. Electronic cut off at full open so that no noise can be generated while holding open. Holding noise level shall be inaudible.
      b. Overload protection. Shall be incapable of burning out if stalled before reaching full rotation.
   3. Housing shall be steel and gears shall be permanently lubricated.
   4. The actuators shall be direct coupled and employ a steel-toothed cold-weld clamp for connecting to damper shafts. Aluminum clamps or set-screw attachment shall not be acceptable.
   5. Actuator shall have UL555S Listing by the damper manufacturer for 250°F.
   6. Dampers shall be installed straight and true, level in all planes, and square in all dimensions. Dampers shall move freely without undue stress due to twisting, racking, bowing, or other installation error. Do not install in area where moisture can penetrate damper or actuator nor where actuator temperature continuously exceeds 120°F.

F. Provide each combination fire/smoke damper with a position indicator package, which operates as a function of the damper blade position. The position indicator shall allow remote indication of damper blade position with two single pole, double throw switches and provides a positive open or closed signal.

G. Normally Open Smoke Responsive Fire Dampers: Curtain type, closing upon actuation of electro thermal link, flexible stainless steel blade edge seals to provide constant sealing pressure, stainless steel springs with locking devices to ensure positive closure for units mounted horizontally.

H. Electro Thermal Link: Fusible link melting at 165 degrees F; 120 volts, single phase, 60 Hz; UL listed and labeled.

2.4 DUCT ACCESS DOORS

A. Fabrication: Rigid and close-fitting of galvanized steel with sealing gaskets and quick fastening locking devices. For insulated ducts, install minimum 1 inch thick insulation with sheet metal cover.
   1. Less Than 12 inches Square: Secure with sash locks.
   2. Up to 18 inches Square: Provide two hinges and two sash locks.
   3. Up to 24 by 48 inches: Three hinges and two compression latches with outside and inside handles.
   4. Larger Sizes: Provide an additional hinge.

B. Access doors with sheet metal screw fasteners are not acceptable.

2.5 DUCT TEST HOLES

A. Temporary Test Holes: Cut or drill in ducts as required. Cap with neat patches, neoprene plugs, threaded plugs, or threaded or twist-on metal caps.

B. Permanent Test Holes: Factory fabricated, air tight flanged fittings with screw cap. Provide extended neck fittings to clear insulation.

2.6 DYNAMIC FIRE DAMPERS

A. Dynamic Fire Dampers - Fabrication:
   1. Fire Rating: UL 555 classified and labeled as a 1-1/2 hour fire damper.
   2. Air Flow Rating: UL approved for dual directional air flow.
   3. Frame: 5 inches x minimum 16 gage (127 x minimum 1.6 mm) roll formed, galvanized steel hat-shaped channel, reinforced at corners. Structurally equivalent to 13 gage (2.3 mm) U-channel.
   4. Blades:
      a. Style: Airfoil-shaped, single-piece.
      b. Action: Opposed, spring closure upon fusible link release.
      c. Material: Minimum 14 gage (2.0 mm) equivalent thickness, galvanized steel.
      d. Width: Maximum 6 inches (152 mm).
   5. Bearings: Self-lubricating stainless steel sleeve, turning in extruded hole in frame.
   6. Blade Seals: Galvanized steel for flame seal to 1,900 degrees F (1,038 degrees C). Mechanically attached to blade edge.
   7. Linkage: Concealed in frame.
   8. Axles: Minimum 1/2 inch (13 mm) diameter plated steel, hex-shaped, mechanically attached to blade.
   9. Mounting: Vertical or Horizontal.
   10. Temperature Release Device:
      a. Fusible link, 165 degrees F (74 degrees C).
   11. Finish: Mill galvanized.
   12. Assembly: Factory assemble damper and accessories and furnish as a single unit conforming to UL 555.

B. Performance Data:

1. Temperature Qualified: Damper qualified in accordance with UL 555 as a 1-1/2 hour fire damper.
2. Capacity: Demonstrate capacity of damper to close in HVAC system operating conditions.
   a. Maximum Pressure: 4 inches w.g. (1 kPa).
   b. Maximum Air Velocity: 4,000 feet per minute (1,219 m/min).
3. Pressure Drop: Maximum 0.07 inches w.g. (0.02 kPa) at 2,000 feet per minute (610 m/min) through 24 x 24 inch (610 x 610 mm) damper.

C. Accessories:
1. Jamb Seals: Stainless steel, flexible metal compression type.
2. Duct Transition Connection: Round, Oval or Rectangular depending on the duct connection type on inlet and outlet of the fire damper.
3. Picture Frame Mounting Angles:
   a. One-piece, roll formed retaining angles 1-1/2 x 1-1/2 inches (38 x 38 mm)
   b. Factory matched and shipped on individual damper.
   c. Factory prepunched screw holes.
   d. Requires factory sleeve.
   e. Factory Sleeve: Minimum 20 gage (1.0 mm) thickness, minimum 12 inches (305 mm) length.
   f. Steel Mullions: For dampers in oversized masonry wall openings.
   g. Breakaway Connection: Ductmate.

2.7 STATIC FIRE DAMPERS

A. Fire Rating: UL 555 classified and labeled as a 1-1/2 hour static fire damper.

B. Air Flow Rating: UL approved for dual directional air flow.

C. Frame: Maximum 2-1/8 inches (54 mm) with no flanges x minimum 20 gage (0.9 mm) roll formed, galvanized steel.

D. Blades:
1. Style: Curtain type, in airstream.
2. Action: Spring or gravity closure upon fusible link release.
3. Orientation: Horizontal.
4. Material: Minimum 24 gage (0.6 mm) roll formed, galvanized steel.

E. Closure Springs: Type 301 stainless steel, constant force type, if required.

F. Temperature Release Device:
1. Fusible link, 165 degrees F (74 degrees C).

G. Mounting: Vertical.

H. Finish: Mill galvanized.

I. Assembly: Factory assemble damper and accessories and furnish as a single unit conforming to UL 555.

J. Performance Data:
1. Temperature Qualified: Damper qualified in accordance with UL 555 as a 1-1/2 hour fire damper.
2. Pressure Drop: Maximum 0.08 inch w.g. (0.02 kPa) at 1,000 feet per minute (305 m/min) through 40 x 48 inch (1,016 x 1,219 mm) damper.

K. ACCESSORIES
1. Picture Frame Mounting Angles:
   a. One-piece, roll formed retaining angles 1-1/2 x 1-1/2 inches (38 x 38 mm).
   b. Factory matched and shipped on individual damper.

c. Factory prepunched screw holes.
d. Requires factory sleeve.
2. Factory Sleeve: Minimum 20 gage (1.0 mm) thickness.
3. Steel Mullions: For dampers in oversized masonry wall openings.

2.8 OUT-OF-WALL DYNAMIC FIRE DAMPERS (WHERE FIRE DAMPER TERMINATES WITH A GRILLE OR REGISTER)

A. Fabrication:
1. Fire Rating: UL 555 classified and labeled as a 1-1/2 hour fire damper.
2. Air Flow Rating: UL approved for dual directional air flow.
3. Frame: 5 inches x minimum 16 gage (127 x minimum 1.6 mm) roll formed, galvanized steel hat-shaped channel, reinforced at corners. Structurally equivalent to 13 gage (2.3 mm) U-channel.
4. Blades:
a. Style: Airfoil-shaped, single-piece.
b. Action: Parallel, spring closure upon fusible link release.
c. Orientation: Vertical.
d. Material: Minimum 14 gage (2.0 mm) equivalent thickness, galvanized steel.
e. Width: Maximum 6 inches (152 mm).
5. Bearings: Self-lubricating stainless steel sleeve, turning in extruded hole in frame.
6. Blade Seals: Galvanized steel for flame seal to 1,900 degrees F (1,038 degrees C). Mechanically attached to blade edge.
7. Linkage: Concealed in frame.
8. Axles: Minimum 1/2 inch (13 mm) diameter plated steel, hex-shaped, mechanically attached to blade.
9. Mounting: Vertical.
10. Temperature Release Device:
a. Fusible link, 165 degrees F.
b. ETL, 24 VAC/VDC, 165 degrees F (74 degrees C).
11. Finish: Mill galvanized.
12. Assembly: Factory assemble damper and accessories and furnish as a single unit conforming to UL 555.

B. Performance Data:
1. Temperature Qualified: Damper qualified in accordance with UL 555 as a 1-1/2 hour fire damper.
2. Capacity: Demonstrate capacity of damper to close in HVAC system operating conditions.
a. Maximum Pressure: 4 inches w.g. (1 kPa).
b. Maximum Air Velocity: 4,000 feet per minute (1,219 m/min).
3. Pressure Drop: Maximum 0.07 inches w.g. (0.02 kPa) at 2,000 feet per minute (610 m/min) through 24 x 24 inch (610 x 610 mm) damper.

C. Accessories:
1. Jamb Seals: Stainless steel, flexible metal compression type.
2. Duct Transition Connection: Rectangular or round.

D. Damper to be utilized for "out of wall or floor" applications with integral sleeve dynamic curtain type fire damper specifically designed for supply, exhaust or return ducts that terminate at a grille or register.

2.9 FLEXIBLE DUCT CONNECTORS

A. Fabricate in accordance with SMACNA (DCS) and as indicated.

B. Flexible Duct Connections: Fabric crimped into metal edging strip.

1. Fabric: UL listed fire-retardant neoprene coated woven glass fiber fabric to NFPA 90A, minimum density 30 oz per sq yd.
   a. Net Fabric Width: Approximately 2 inches wide.
2. Metal: 3 inches wide, 24 gage, 0.0239 inch thick galvanized steel.

2.10 SMOKE DAMPERS

A. Ratings:
   1. Smoke Rating: Leakage Class III Smoke Damper in accordance with UL555S. A Class lll smoke damper leaks no more than 80 cubic feet per minute (2.27 m3/min) at 4 in. wg. (1 kPa.) differential pressure.
   2. Elevated Temperature Rating: 250 degree F (121 degree C).
   3. Air Flow Rating: 2000 fpm.
   4. Pressure Rating: 4 inches wg.

B. Construction:
   1. Frame: 5 inches x minimum 16 gage (127 mm x minimum 1.6 mm) roll formed press brake steel hat-shaped channel, reinforced at corners. Structurally equivalent to 13 gage (2.3 mm) U-channel type frame.
      a. Material: Galvanized steel.
   2. Blades:
      a. Style: Single skin with 3 longitudinal grooves. Flat blades shall not be acceptable.
      b. Action: Opposed.
      c. Orientation: Horizontal.
      d. Material: Minimum 16 gage (1.6 mm) galvanized steel.
      e. Width: Maximum 6 inches (152 mm).
   3. Bearings: Self-lubricating stainless steel sleeve, turning in extruded hole in frame.
   4. Seals: Stainless steel, flexible metal compression type jamb seals.
   5. Linkage: Concealed in frame.
   6. Axles: Minimum 1/2 inch (13 mm) diameter plated steel, hex-shaped, mechanically attached to blade.
   7. Mounting: Vertical and/or Horizontal.
   8. Actuator:
      a. Type: Electric 120 V, 60 Hz, two-position, fail close.
      b. Mounting: External (out of air stream).
   9. Finish: Mill galvanized.

C. ACCESSORIES
   1. Indicator or Auxiliary Switch Package: Two position indicator switches linked directly to damper blade to remotely indicate damper blade position.
      a. Actuator with internal switches: Damper “open”, damper “closed”. Switches mounted internal to actuator.
   2. Factory Sleeve:
      a. Minimum 20 gage (1.0 mm) thickness.
      b. Minimum 12 inches (305 mm) long.
   3. Provide sleeve transition connections for connection to round or oval ductwork systems as outlined on the drawings.

2.11 LOW LEAK THERMALLY-BROKEN MOTORIZED DAMPERS

A. General: Provide thermally-broken motorized dampers with insulated blades for all outside air intake dampers. Basis of design: Tamco Series 9000.

B. Construction:

1. Frame: Extruded aluminum (6063T5), with thickness of 0.80 inches, 4 inches deep, insulated with styrofoam on four sides. Entire frame shall be thermally broken by means of polyurethane resin pockets complete with thermal cuts
2. Blades: Blades shall be extruded aluminum (6063T5, internally insulated with expanded polyurethane foam and thermally broken. Complete blade shall have an insulating factor of R-2.29 and a temperature index of 55.
3. Seals: Blade and frame seals shall be extruded silicone and secured in an integral slot within the aluminum extrusions.
4. Bearings: Bearings shall be composed of a celcon inner bearing fixed to a 7 /16 inch aluminum hexagon blade pin rotating within a polycarbonate outer bearing inserted in the frame, resulting in no metal-to-metal or metal-to-plastic contact.
5. Normal Position: Closed.
6. Blade Operation: Parallel.
7. Performance: Tested in accordance with AMCA Test Standard 500 D: Leakage: 4.12 CFM/square foot with 4 inches differential pressure, as tested through 48x48 louver.

2.12 VOLUME CONTROL DAMPERS

A. Fabricate in accordance with SMACNA (DCS) and as indicated.

B. Single Blade Dampers:
   1. Fabricate for duct sizes up to 6 by 30 inch.
   2. Blade: 24 gage, 0.0239 inch, minimum.

C. Multi-Blade Damper: Fabricate of opposed blade pattern with maximum blade sizes 8 by 72 inch. Assemble center and edge crimped blades in prime coated or galvanized channel frame with suitable hardware.
   1. Blade: 18 gage, 0.0478 inch, minimum.

D. End Bearings: Except in round ducts 12 inches and smaller, provide end bearings. On multiple blade dampers, provide oil-impregnated nylon or sintered bronze bearings.

E. Quadrants:
   1. Provide locking, indicating quadrant regulators on single and multi-blade dampers.
   2. On insulated ducts mount quadrant regulators on stand-off mounting brackets, bases, or adapters.
   3. Where rod lengths exceed 30 inches provide regulator at both ends.

PART 3 EXECUTION

3.1 PREPARATION

A. Verify that electric power is available and of the correct characteristics.

3.2 INSTALLATION

A. Install accessories in accordance with manufacturer's instructions, NFPA 90A, and follow SMACNA (DCS). Refer to Section 233100 for duct construction and pressure class.

B. Provide backdraft dampers on exhaust fans or exhaust ducts nearest to outside and where indicated.

C. Provide duct access doors for inspection and cleaning before and after filters, coils, fans, automatic dampers, at fire dampers, smoke dampers, combination fire and smoke dampers, and elsewhere as indicated. Provide minimum 8 x 8 inch size for hand access, 16" x 16" size for shoulder access, and as indicated. Provide 4 x 4 inch for balancing dampers only. Review locations prior to fabrication.

D. Provide duct test holes where indicated and required for testing and balancing purposes.

E. Provide fire dampers, combination fire and smoke dampers, and smoke dampers at locations indicated, where ducts and outlets pass through fire rated components, and where required by Authorities Having Jurisdiction. Install with required perimeter mounting angles, sleeves, breakaway duct connections, corrosion resistant springs, bearings, bushings and hinges.

F. Install combination smoke and fire dampers in accordance with NFPA 92.

G. Demonstrate re-setting of fire dampers to Nanuet Union Free School District's representative.

H. At fans and motorized equipment associated with ducts, provide flexible duct connections immediately adjacent to the equipment.

I. Smoke Dampers:
   1. Handle dampers using the sleeve or frame. Do not lift or move damper using blades, actuator, jackshaft or any other accessory supplied with the damper.
   2. Install dampers in accordance with manufacturer’s UL Installation Instructions, product labeling and NFPA 90A at locations indicated on the Drawings. Any damper installation that is not in accordance with the manufacturer’s UL Installation Instructions shall be approved prior to installation.
   3. Install dampers square and free from racking with blades orientation as scheduled or required.
   4. Do not compress or stretch damper frame into duct or opening.
   5. The installing contractor shall install bracing for multiple section assemblies to support assembly weight and to hold against system pressure.
   6. Attach multiple damper section assemblies together in accordance with manufacturer’s instructions.
   7. Install connections to actuators as required by other technical specification sections.
   8. Dampers shall be accessible to facilitate code required inspection, adjustment and like for like replacement of components. Sheet metal contractor shall furnish access doors located in ductwork or plenums required to provide access. The Contractor shall furnish access doors required in walls, finished ceilings and general building construction to gain access to dampers and mechanical access panels.
   9. Contractor shall coordinate post installation inspection and cycle test of each damper as required by IFC, NFPA and local codes. Final inspection and test report shall be furnished to building Owner for its records.
   10. Install bracing for multiple section assemblies to support assembly weight and to hold against system pressure. Install bracing as needed.

J. Fire Dampers:
   1. Provide dynamic fire dampers at locations where dampers are installed in duct systems connected to fans systems. Provide static fire dampers at locations where fire dampers are installed in air transfer duct systems not connected to fans.
   2. Install dampers at locations indicated on the drawings and in accordance with manufacturer's UL approved installation instructions.
   3. Install dampers square and free from racking with blades running horizontally.
   4. Do not compress or stretch damper frame into duct or opening.
   5. Handle damper using sleeve or frame. Do not lift damper using blades or jackshaft.
   6. Install bracing for multiple section assemblies to support assembly weight and to hold against system pressure. Install bracing as needed.

K. Combination Fire/Smoke Dampers:
   1. Install dampers at locations indicated on the drawings and in accordance with manufacturer's UL approved installation instructions.
   2. Install dampers square and free from racking with blades running horizontally.
   3. Do not compress or stretch damper frame into duct or opening.

4. Handle damper using sleeve or frame. Do not lift damper using blades, actuator, or jackshaft.
5. Install bracing for multiple section assemblies to support assembly weight and to hold against system pressure. Install bracing as needed.

L. At equipment supported by vibration isolators and at connections to air handling units, rooftop units, fume hood exhaust fans, provide flexible duct connections immediately adjacent to the equipment.

M. Provide balancing dampers at points on supply, return, and exhaust systems where branches are taken from larger ducts as required for air balancing. Install minimum 2 duct widths from duct take-off.

N. Volume Control Balancing Dampers: Provide multi-blade opposed blade dampers for ductwork 12" high and larger and single blade dampers for ductwork sizes 10" and smaller.

O. Provide balancing dampers on duct take-off to active terminal units, diffusers, grilles, and registers, regardless of whether dampers are specified as part of the diffuser, grille, or register assembly.

END OF SECTION 23 33 00

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SECTION 23 33 19 - DUCT SILENCERS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Duct silencers.
   1. Absorptive silencers.

1.2 REFERENCE STANDARDS

A. AABC MN-1 - AABC National Standards for Total System Balance; 2002.

B. AHRI 575 - Method of Measuring Machinery Sound Within an Equipment Space; 2008.

C. AMCA 300 - Reverberant Room Method for Sound Testing of Fans; 2014.

D. AMCA 301 - Methods for Calculating Fan Sound Ratings from Laboratory Test Data; 2014.

E. AMCA 302 - Application of Sone Ratings for Non-Ducted Air Moving Devices; 1973 (Reaffirmed 2012).

F. AMCA 303 - Application of Sound Power Level Ratings for Fans; 1979 (Reaffirmed 2012).

G. ANSI S1.13 - American National Standard Measurement of Sound Pressure Levels in Air; 2005 (R2010).

H. ASHRAE Std 68 - Laboratory Method of Testing to Determine the Sound Power in a Duct; 1997.

I. ASHRAE (HVACA) - ASHRAE Handbook - HVAC Applications; 2015.

J. ASTM E477 - Standard Test Method for Measuring Acoustical and Airflow Performance of Duct Liner Materials and Prefabricated Silencers; 2013.

K. ASTM E596 - Standard Test Method for Laboratory Measurement of Noise Reduction of Sound-Isolating Enclosures; 1996 (Reapproved 2009).

1.3 SUBMITTALS

A. Product Data: Provide catalog information indicating, materials, dimensional data, pressure losses, and acoustical performance.
   1. Silencer manufacturer to provide submittal drawings detailing all duct silencer data specified in the mechanical drawing schedule.
   2. Silencer manufacturer shall submit certified laboratory performance obtained using ASTM E477-13. The laboratory must be NVLAP accredited for the ASTM E477-13 test standard and a copy of the accreditation certificate must be included with submittals. Data from non-NVLAP accredited test facilities is not acceptable.
   3. Submitted silencer pressure drops should not exceed those listed in the silencer schedule unless approved by project engineer. Silencer pressure drop measurements shall be made in accordance with ASTM E477-13.
   4. Submitted silencer dynamic insertion loss and self-noise data should satisfy values listed in the silencer schedule at the project's air distribution system airflow requirements. ASTM E-477-13 tests to obtain this data shall be conducted in the same facility and utilize the same silencer.
   5. Silencer dynamic insertion loss shall not be less than that listed in the silencer schedule unless approved by the project engineer.
   6. Silencer manufacturer shall provide test data for silencer(s) as indicated in the silencer schedule if requested by the project engineer that complies with project criteria.

B. Shop Drawings: Indicate assembly, materials, thicknesses, dimensional data, pressure losses, acoustical performance, layout, and connection details.

C. Test Reports: Indicate dynamic insertion loss and noise generation values of silencers.

D. Manufacturer's Installation Instructions: Indicate installation procedures necessary to maintain integrity of sound isolation.

E. Manufacturer's Field Reports: Indicate installation is complete and in accordance with instructions.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

B. Perform Work in accordance with AHRI 575, AMCA 300, or ANSI S1.13 standards and recommendations of ASHRAE Std 68.

C. Silencers shall be installed in accordance with NFPA 90A and with NFPA 90B.

D. Silencer performance must have been substantiated in a duct-to-reverberant room test facility in accordance with ASTM E477-13. The test facility must provide airflow in both directions through the test silencer. The test set-up shall eliminate effects due to flanking, directivity, end reflection, standing waves and reverberation room absorption. The aero-acoustic laboratory must be currently NVLAP accredited for ASTM E477-13. Test facilities and reports shall be open to inspection from project engineer.

E. Silencer manufacturer must have a minimum ten (10) years of industry experience.

PART 2 PRODUCTS

2.1 DUCT SILENCERS

A. Acceptable Manufacturers:
   1. Price (basis of design)
   2. Industrial Acoustics
   3. Vibro Acoustics

B. General:
   1. Silencers shall be of the size, configuration, capacity and acoustic performance as scheduled on the drawings. Silencers shall be fabricated by the same manufacturer.
   2. Silencer inlet and outlet connection dimensions must be equal to the duct sizes shown on the drawings. Duct transitions at silencers are not permitted unless shown on the contract drawings or approved by the project engineer.

C. Construction:
   1. Silencers shall be constructed in accordance with ASHRAE and SMACNA Standards for the pressure and velocity classification specified for the air distribution system in which it is installed.
   2. Casing seams and joints shall be lock-formed and sealed or stitch welded and sealed except as noted, to provide leakage-resistant construction.
   3. Airtight construction shall be achieved by use of a duct-sealing compound supplied and installed by the contractor at the jobsite.
   4. Perforated steel shall be adequately stiffened to insure flatness and form. Spot welds shall be painted as required.
   5. Fire-Performance Characteristics:

a. Silencer assemblies, including acoustic media fill, natural cotton fiber, sealants and acoustical spacers shall have Class 1 flame-spread index not exceeding 25 and smoke-developed index not exceeding 50 when tested according to ASTM E84, NFPA 255 or UL 723.

6. Material gauge thickness:
   a. Material gauges noted in other sections are minimums and shall increase as required for the system pressure and velocity classification.
   b. The silencers shall not fail structurally when subjected to a differential air pressure of 8 inches water gauge.

D. Outer casing shall be ASTM A 653/A 653M, G90 galvanized sheet steel, gauge as listed below
   1. Rectangular Silencers, including STC-rated models: 16 gauge

E. Inner perforated metal liner shall be supplied in accordance with ASTM A 653/A 653M, G90 galvanized sheet steel in the following gauge thicknesses according to silencer type or connection size:
   1. Rectangular Silencers: 22 gauge

F. Acceptable methods of fastening include Pittsburgh lock. Screws or other types of mechanical fasteners shall not be acceptable.

G. Silencer Connection Method: Bolted through gasketed flanges.

H. Principal Sound-Absorbing Mechanism:
   1. Absorptive (Dissipative) and Film Lined Silencers:
      a. Standard Acoustic media:
         1) Media shall be of acoustic quality, shot-free glass fiber insulation with long, resilient fibers bonded with a thermosetting resin. Glass fiber density and compression shall be as required to insure conformance with laboratory test data.
         2) Media shall be packed with a minimum of 15% compression during silencer assembly.
         3) Media shall be resilient such that it will not pull apart during normal applications, and shall resist settling, breakdown, and sagging from vibration. Media shall not rot, mildew, or otherwise deteriorate, and shall have sufficient flexibility to readily form around corners and curved surfaces.
         4) Media shall not cause or accelerate corrosion of aluminum or steel.

I. Media Protection:
   1. Dissipative silencers:
      a. Media shall be encapsulated in glass fiber cloth to help prevent shedding, erosion and impregnation of the glass fiber.
   2. HTL Casings:
      a. Silencers shall have high transmission loss (HTL) walls externally applied and completely sealed to the silencer casing by the silencer manufacturer.
      b. If requested by the project engineer, relevant breakout noise calculations shall be provided to ensure compliance with the relevant room noise criteria that are based on the sound power levels of the specified equipment.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Support duct silencers independent of ducts. Refer to Section 233100 and Section 233300.

END OF SECTION 23 33 19

SECTION 23 34 16 - CENTRIFUGAL HVAC FANS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Fume Hood Tubular Inline centrifugal fans.

B. Bearings and drives.

1.2 REFERENCE STANDARDS

A. ABMA STD 9 - Load Ratings and Fatigue Life for Ball Bearings; 2015.

B. ABMA STD 11 - Load Ratings and Fatigue Life for Roller Bearings; 1990 (Reapproved 2008).

C. AMCA 99 - Standards Handbook; 2010.

D. AMCA 210 - Laboratory Methods of Testing Fans for Certified Aerodynamic Performance Rating; 2007.

E. AMCA 300 - Reverberant Room Method for Sound Testing of Fans; 2014.

F. AMCA 301 - Methods for Calculating Fan Sound Ratings from Laboratory Test Data; 2014.

G. NEMA MG 1 - Motors and Generators; 2014.

H. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2005.

I. UL – Underwriters Laboratories.

J. National Electrical Code.

1.3 SUBMITTALS

A. Product Data: Provide data on centrifugal fans and accessories including fan curves with specified operating point clearly plotted, power, RPM, sound power levels for both fan inlet and outlet at rated capacity, and electrical characteristics and connection requirements.

B. Shop Drawings: Indicate assembly of centrifugal fans and accessories including fan curves with specified operating point clearly plotted, sound power levels for both fan inlet and outlet at rated capacity, and electrical characteristics and connection requirements.

C. Manufacturer's Instructions: Include complete installation instructions.

D. Maintenance Data: Include instructions for lubrication, motor and drive replacement, spare parts list, and wiring diagrams.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

B. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Protect motors, shafts, and bearings from weather and construction dust.

1.6 FIELD CONDITIONS

A. Permanent fans may be used for ventilation during construction only after ductwork is clean, filters are in place, bearings have been lubricated, and fan has been test run under observation.

PART 2 PRODUCTS

2.1 FUME HOOD EXHAUST TUBULAR INLINE CENTRIFUGAL

A. GENERAL
1. Fan performance data shall follow AMCA Standard Conditions of 0 Ft elevation and 70 Deg F. (Air Density shall be 0.075 lb/ft)
2. Fans selected shall allow for +/- 15% variation of scheduled static pressure and airflow.
3. Fan shall be AMCA Arrangement 9, Belt Drive, Upblast Inline Centrifugal Blower as dictated on the plans and specifications.
4. Fan systems shall incorporate integral lifting lugs for ease of installation.

B. FAN HOUSING AND CONSTRUCTION
1. Fan housing shall be a minimum 12 gauge steel construction.
2. Adjustable motor plate, where applicable shall utilize threaded studs for positive belt tensioning.
3. Fan shall be constructed with an integral housing drain to alleviate rainwater.
4. Fan shall contain a bolted and gasketed access door. Access door shall allow for the removal of wheel, shaft and bearings without the removal of the fan from the laboratory exhaust system.
5. Belt driven fan shafts shall be stainless steel and accurately turned, ground and polished. Shafting shall be sized for a critical speed of at least 125% of maximum fan RPM.
6. Unit fasteners exposed to corrosive airstream shall be of stainless steel construction.
7. Unit components fabricated of steel shall be coated with an electrostatically applied, baked epoxy powder coating with an ultraviolet protective topcoat. Finish color shall be dark gray. Coating thickness shall be 5.0 mils.
8. Coating shall be salt spray tested per ASTM B117 for in excess of 1000 hours without failure, humidity resistance tested per ASTM D2247 for in excess of 1000 hours without failure, and impact resistance tested per ASTM D2794 and shall pass a minimum of 100 in-lbs.
9. Unit shall bear an engraved aluminum nameplate. Nameplate shall indicate design CFM, static pressure, and maximum fan RPM.
10. Units specified as Spark Resistant Construction shall be constructed to the AMCA Spark Resistant Construction level as dictated on the plans and specifications.
11. Unit shall be shipped in ISTA Certified Transit Tested Packaging.

C. HIGH PLUME DISCHARGE NOZZLE
1. Fans shall incorporate a conical discharge nozzle supplied by the fan manufacturer.
2. Discharge nozzle shall be constructed and designed to efficiently handle up to 6000 feet per minute outlet velocity. Nozzle shall not utilize a stack cap nor hinged cover and shall be matched to project specific requirements as noted on the contract drawings.

D. CENTRIFUGAL FAN IMPELLER
1. Fan impeller shall be non-overloading, steel centrifugal, backward inclined, flat-blade type. Blades shall be continuously welded to the backplate and deep spun inlet wheel shroud.
2. Fan impeller hub shall be keyed and securely attached to the fan shaft.
3. Fan impeller shall be statically and dynamically balanced in accordance with AMCA Standard 204-96, “Balance Quality and Vibration Levels for Fans.”
4. Fan impeller shall be coated with a finish to match the fan housing.
5. Fan impeller shall be balanced utilizing weights which are welded and coated with chemical resistant coating. Balancing by means of bolts and washers shall not be acceptable.
6. Belt driven fan bearings shall be designed and tested specifically for use in air handling applications. Construction shall be heavy duty regreaseable ball or roller type in a cast iron pillow block housing utilizing concentric mounting locking collars.

7. Belt driven fan bearings shall be selected for a minimum L50 life of not less than 200,000 hours.
8. Belt driven fan units shall have stainless steel lube lines installed from the fan bearings with Zerk fittings to allow for easy lubrication.

E. FAN MOTORS AND DRIVES
1. Fan motors shall be premium efficiency, NEMA frame, nominal 1800 or 3600 RPM Totally Enclosed Fan Cooled (TEFC) with a 1.15 service factor.
2. Belt driven fan drive belts shall be oil and heat resistant, non-static type. Fixed drives shall be sized for a minimum 1.5 service factor (150% of the motor horsepower) and shall be readily and easily accessible for service, if required.
3. Belt driven fans shall utilize precision machined cast iron type sheaves, keyed and securely attached to the wheel and motor shafts.

F. ROOF CURB
1. 12 INCH high coated steel, 12 gauge thickness, lab exhaust curb.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install fans with resilient mountings and flexible electrical leads. Refer to Section 230548.

C. Install flexible connections between fan inlet and discharge ductwork; refer to Section 233300. Ensure metal bands of connectors are parallel with minimum one inch flex between ductwork and fan while running.

END OF SECTION 23 34 16

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SECTION 23 34 23 - HVAC POWER VENTILATORS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Roof exhausters.

1.2 REFERENCE STANDARDS

A. AMCA (DIR) - [Directory of] Products Licensed Under AMCA International Certified Ratings Program; http://www.amca.org/certified/search/company.aspx.

B. AMCA 99 - Standards Handbook; 2010.

C. AMCA 204 - Balance Quality and Vibration Levels for Fans; 2005.

D. AMCA 210 - Laboratory Methods of Testing Fans for Certified Aerodynamic Performance Rating; 2007.

E. AMCA 300 - Reverberant Room Method for Sound Testing of Fans; 2014.

F. AMCA 301 - Methods for Calculating Fan Sound Ratings from Laboratory Test Data; 2014.

G. NEMA MG 1 - Motors and Generators; 2014.

H. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2014.

I. UL 705 - Power Ventilators; Current Edition, Including All Revisions.

1.3 SUBMITTALS

A. Product Data: Provide data on fans and accessories including fan curves with specified operating point clearly plotted, power, RPM, sound power levels at rated capacity, and electrical characteristics and connection requirements.

B. Manufacturer's Instructions: Indicate installation instructions.

C. Maintenance Data: Include instructions for lubrication, motor and drive replacement, spare parts list, and wiring diagrams.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

1.5 FIELD CONDITIONS

A. Permanent ventilators may not be used for ventilation during construction.

PART 2 PRODUCTS

2.1 POWER VENTILATORS - GENERAL

A. Static and Dynamically Balanced: Comply with AMCA 204.

B. Performance Ratings: Comply with AMCA 210, bearing certified rating seal.

C. Sound Ratings: Comply with AMCA 301, tested to AMCA 300, bearing certified sound ratings seal.

D. Fabrication: Comply with AMCA 99.

E. UL Compliance: UL listed and labeled, designed, manufactured, and tested in accordance with UL 705.

F. Electrical Components: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

G. Enclosed Safety Switches: Comply with NEMA 250.

2.2 CENTRIFUGAL ROOF EXHAUSTERS

A. Roof Curb: 16 inch high self-flashing of aluminum with continuously welded seams, built-in cant strips, insulation and curb bottom, and factory installed nailer strip.

B. Backdraft Damper: Motor actuated via 24 volt control power, aluminum multiple blade construction, felt edged with offset hinge pin, nylon bearings, blades linked.

C. Description: Fan shall be a spun aluminum, roof mounted, direct driven, downblast centrifugal exhaust ventilator.

D. Certifications: Fan shall be manufactured at an ISO 9001 certified facility. Fan shall be listed by Underwriters Laboratories (UL 705). Fan shall bear the AMCA certified ratings seal for sound and air performance.

E. Construction: The fan shall be of bolted and welded construction utilizing corrosion resistant fasteners. The spun aluminum structural components shall be constructed of minimum 16 gauge marine alloy aluminum, bolted to a rigid aluminum support structure. The aluminum base shall have continuously welded curb cap corners for maximum leak protection. The discharge baffle shall have a rolled bead for added strength. An integral conduit chase shall be provided through the curb cap and into the motor compartment to facilitate wiring connections. The motor shall be enclosed in a weather-tight compartment, separated from the exhaust airstream. Unit shall bear an engraved aluminum nameplate. Nameplate shall indicate design CFM and static pressure. Unit shall be shipped in ISTA certified transit tested packaging.

F. Wheel: Wheel shall be centrifugal backward inclined, constructed of 100% aluminum, including a precision machined cast aluminum hub. An aerodynamic aluminum inlet cone shall be provided for maximum performance and efficiency. Wheel shall be balanced in accordance with AMCA Standard 204-05,Balance Quality and Vibration Levels for Fans.

G. Motor (for three phase direct drive fans): Motor shall be NEMA design B with a minimum of class B insulation rated for continuous duty and furnished at the specified voltage, phase and enclosure, and inverter duty rated.

H. Motor (for motors connected to fans with electronically commutated motors): Motor shall be an electronically commutated (EC) motor rated for continuous duty and furnished with internally mounted potentiometer speed controller.
   1. Provide each EC motor with an air balance kit:
      a. Provides a point to set the speed range over which the motor will operate
      b. Shall contain an integral 24 Volt control transformer
      c. Shall incorporate a speed control to facilitate field air balancing as well as a Hand-Stop-Auto control that allows selection of operating modes from 'stopped,' to manual, to fully automatic control
      d. Shall provide convenient terminals for landing motors and controls as well as auxiliary control of motor operated dampers
      e. Shall Provide a means for remote on/off control
      f. Status indicated by a tricolor LED light

I. Provide with NEMA-3R disconnect switch to be mounted under the fan shroud.

J. Roof Curbs:
   1. 16 inch high self-flashing of galvanized steel with continuously welded seams, built-in cant strips, insulation and curb bottom, and factory installed nailer strip.

K. Roof Curb Adapter:
   1. Roof Curb Adapter and Extension:
      a. Used to connect a new roof fan to an existing roof curb
      b. Roof Products and Systems (RPS) model CA-2 or equal
      c. Construction:
         1) 18 gauge galvanized steel
         2) 1-1/2", 3 LB. density fiberglass insulation
         3) Unitized construction
         4) Continuous welded corner seams
         5) 16 inch height
      d. Field measure existing roof curb dimensions as required to provide curb adapter size to match replacement fan inlet dimensions.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Extend ducts to roof exhausters into roof curb. Counterflash duct to roof opening.

END OF SECTION 23 34 23

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SECTION 23 35 13 - DUST COLLECTION SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Ductwork and duct fittings.

B. Dust elimination and collection devices.

C. Laser Fume Extractors.

D. Accessories.

1.2 REFERENCES

A. ACGIH (IV) - Industrial Ventilation, A Manual of Recommended Practice; American Council of Governmental Industrial Hygienists; 2007, 26th edition.

B. AMCA 99 - Standards Handbook; Air Movement and Control Association International, Inc.; 2003.

C. AMCA 210 - Laboratory Methods of Testing Fans for Aerodynamic Performance Rating; Air Movement and Control Association International, Inc.; 1999.

D. AMCA 300 - Reverberant Room Method for Sound Testing of Fans; Air Movement and Control Association International, Inc.; 2005.

E. AMCA 301 - Methods for Calculating Fan Sound Ratings from Laboratory Test Data; Air Movement and Control Association International, Inc.; 2006.

F. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2005a.

G. ASTM A 1011/A 1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability; 2005a.

H. AWS D9.1M/D9.1 - Sheet Metal Welding Code; American Welding Society; 2006.

I. NFPA 91 - Standard for Exhaust Systems for Air Conveying of Vapors, Gases, Mists, and Noncombustible Particulate Solids; National Fire Protection Association; 2004.

J. NFPA 664 - Standard for the Prevention of Fires and Explosions in Wood Processing and Woodworking Facilities: 2020.

K. NFPA 69 - Standard on Explosion Prevention Systems: 2019.

L. SMACNA (DCS) - HVAC Duct Construction Standards - Metal and Flexible; Sheet Metal and Air Conditioning Contractors' National Association; 2005.

M. SMACNA (ROUND) - Round Industrial Duct Construction Standards; Sheet Metal and Air Conditioning Contractors' National Association; 1999.

N. SMACNA (RIDC) - Rectangular Industrial Duct Construction Standards; Sheet Metal and Air Conditioning Contractors' National Association; 2004.

O. UL 181 - Standard for Factory-Made Air Ducts and Air Connectors; Underwriters Laboratories Inc.; 2005.

P. NFPA 652 - Standard on the Fundamentals of Combustible Dust

1.3 SUBMITTALS

A. Shop Drawings: Indicate dimensions, sizes, weights and point loadings, material thickness, and locations and sizes of field connections. Submit construction layout and details for inlet fittings.

B. Product Data: Provide manufacturers literature and data indicating rated capacities, dimensions, weights and point loadings, accessories, electrical characteristics and connection requirements, wiring diagrams, and location and sizes of field connections.

C. Provide fan curves with specified operating point clearly plotted.

D. Submit sound power levels for both fan inlet and outlet at rated capacity.

E. Manufacturer's Installation Instructions: Indicate assembly and installation instructions.

F. Operation and Maintenance Data: Include instructions for lubrication, motor and drive replacement, spare parts list, and wiring diagrams.

1.4 QUALITY ASSURANCE

A. Fans:
   1. Performance Ratings: Conform to AMCA 210 and bear the AMCA Certified Rating Seal.
   2. Sound Ratings: AMCA 301, tested to AMCA 300, and bear AMCA Certified Sound Rating Seal.
   3. Fabrication: Confirm to AMCA 99.

B. Products Requiring Electrical Connection: Listed and classified by Underwriters' Laboratories Inc., as suitable for the purpose specified and indicated.

PART 2 PRODUCTS

2.1 DUCTWORK AND DUCT ACCESSORIES

A. The dust collection systems shall be designed in accordance with good dust collection practices, in order for the dust collector to operate at its maximum possible efficiency. The Industrial Ventilation Manual of the American Conference of Governmental Industrial Hygienists, SHALL BE the guide to proper duct system installation.

B. Duct system conveying velocities shall conform to a nominal design conveying velocity of 4,000 feet per minute in all main and branch ducts.

C. The inlet ducting shall include an IEP IsoFlap flow-actuated flap valve where shown on the drawings meeting the requirements of NFPA 69, 2019 Edition section 12.2. An IEP interface module with process interlock outputs shall be provided for use with the IEP IsoFlap. Installation shall follow the IEP IsoFlap installation requirements including minimum and maximum location placement distances from the expected ignition source and shut down for the dust collector power.
   1. The supplier shall provide a flow-actuated flap valve meeting the requirements of NFPA 69, 2019 Edition section 12.2.
   2. The technique of deflagration isolation by using a flow-actuated flap valve shall be used for interruption or mitigation of flame, deflagration pressures, pressure piling, and flame-jet ignition on the inlet duct to a dust collector.
   3. The flap valve shall be mounted on the inlet conveying duct of a protected vessel and open in the direction of process flow.
   4. The anticipated differential pressure across the valve during deflagration, as determined by the valve manufacturer, shall be greater than the flap valve closing pressure.

5. Upon actuation from a deflagration pressure wave, the flap plate shall close and remain sealed via a locking mechanism to prevent flame and burning material propagation. The locking mechanism shall be designed to latch only upon deflagration conditions, and not from normal process airflow shutdown.
6. The flap valve shall have an inspection door to allow periodic inspection of the flap plate and seal.
7. Upon activation, the flap valve shall initiate an immediate, automatic shutdown of the protected process.
8. A continuous signal shall be provided to ensure that valve operation is not compromised by the accumulation of a dust layer on the bottom interior of the valve.
9. The conveying ductwork between the protected vessel and the flap valve shall be of sufficient strength to withstand the expected peak pressure during a vented or suppressed deflagration.
10. An interface module with process interlock outputs shall be provided. The interface module shall have LED indicators for a visual output indicating Normal, Closed and Trouble from product accumulation.
11. Design Certification:
    a. The flow-actuated flap valve deflagration isolation system design methodology and application range shall be supported by appropriate testing and certified by a recognized testing organization acceptable to the authority having jurisdiction.
    b. The performance characteristics of the flap valve shall be determined through testing, and the valve will only be applied within these tested limits. These include:
        1) Minimum and maximum location placement distances from the expected ignition source
        2) Minimum and maximum Kst
        3) Minimum material auto-ignition temperature the valve is approved for
        4) Maximum number of flow direction changes
        5) Maximum dust loading
        6) Maximum air velocity
        7) Range of allowable Pred within the protected enclosure where the ignition might occur
    c. The system manufacturer shall provide to the owner or operator documentation supporting that the design is in compliance with the manufacturer’s independent third-party approval, including application limitations, and is suitable for the hazard to be protected.
12. Component Requirements - Flap Valve:
    a. The flap valve blade shall be able to be swung out of the valve for cleaning / inspection.
    b. Non housing piercing bearing shaft which minimizes potential for dust deposits affecting operation.
    c. Installation staging feet to be part of the flap valve body, for externally supporting the weight of the valve.
    d. Shall be furnished fully assembled including NFPA-required sensors.
    e. Lifting points for transport and installation.
    f. Cylindrical construction to reduce product build up.
    g. Testing performed under explosive conditions.
    h. No minimum auto-ignition or MIE restriction.
    i. Allowable dust concentration in ducting up to 200 g/m3.
13. Interface Module
    a. The panel shall include an integrated intrinsically safe barrier.
    b. 3 keyed connections on the bottom of the module – 1 for power cable / 1 for output cable / 1 for sensor cable.

c. To supply a 3 to 5 second accumulation sensor delay.
d. The module shall monitor operational conditions via integrated sensors in the flap valve, to improve reliability and allow longer intervals between inspections.
e. The module shall have indicator lights on the front to provide system status.

D. Exhaust system ductwork shall be constructed with materials suitable for the conditions of service and installed in a permanent and workmanlike manner.

E. All duct system pipe and elbows shall be galvanized. All fittings, such as branch pipes, hoods, and floor sweeps, shall be painted with a rust resistant finish. All exhaust system ducting shall be round. The interior of all duct shall be smooth and free from obstructions, especially at joints.

F. Ducting shall be the clamp-together type as manufactured by Nordfab, or approved equal. Spiral ducting, hammer lock duct or slip fit ducting is not acceptable.

G. All sheet metal pipe shall be constructed of the following minimum gauges: 3”-8” diameter – 24 GA; 9”-17” diameter – 22 GA; 18”-24” diameter – 20 GA.

H. Elbows shall have a minimum centerline radius of 1½ times the pipe diameter in sizes 3” to 12”, and 2 times the pipe diameter in sizes 13” and larger unless noted on drawings. Elbows of either one piece or multiple gore construction are acceptable.

I. All branches shall enter the main at the large end of the transition at an angle not to exceed 30º. Branch connections should be to the side or top of the main with no two branches entering directly opposite each other. “T” type branches are unacceptable.

J. All pipe joints shall be lapped in the direction of airflow. The joints shall be riveted and sealed by means of either duct tope or solder. Additionally, longitudinal lock seam joints shall be sealed.

K. All ductwork shall be rigidly supported, such that there shall be no unsupported span of ductwork greater than 10 feet. Additionally, all branch drops to machine connections shall be rigidly supported.

L. Cleanouts shall be provided on horizontal runs of ducts carrying dust-laden air. Proper spacing of cleanouts shall be every 12 feet. Clean-outs are not required where clamp-together ducting is used except as indicated on drawings.

M. A heavy duty gravity back-draft damper shall be provided on the suction duct near cyclone dust collector inlets to provide air flow isolation when the fan is off. The damper shall be constructed of galvanized steel, minimum 16 gage.

N. Sound Attenuators:
1. Collars: Caulked and painted.
2. Outer Tube: On 16” diameter pipe and all smaller sizes, longitudinal seam shall be laser welded.

O. Flexible hose shall be used for the last 1 to 2 feet of duct run to the woodworking machine connections. All flex hose shall be wire reinforced, clear polyurethane hose, anti-static, minimum 20 mil thickness as manufactured by High Tech Hose Inc. or equal.

P. Where reinforced flexible hose is required, the section should be kept as straight as possible and the overall length kept to a minimum.

Q. Adequate clearances shall be provided between ductwork and ceilings, walls, lights, and utilities so as not to hinder installation, maintenance, or lighting quality.

R. All machine connections shall incorporate manual cut-off (blast) gates.

S. All duct collection hoods shall be efficiently designed to effect proper dust collection.

T. All ducting shall be installed and supported per SMACNA code.

U. Exterior Duct Supports: Dual bases supporting "H" frame strut assembly to support duct.

1. Strut Material: Hot-dip galvanized steel.
2. Stainless steel bases and hot-dip galvanized steel struts.
3. Base Material: Polycarbonate resin, stainless steel or hot-dip galvanized

V. Blast Gates: Half collar of steel, with galvanized steel slide, set screw.

2.2 CYCLONE DUST COLLECTORS

A. Dust collection system exhaust ventilation requirement shall be 3,800 CFM at 16" w.c. E.S.P.

B. Cyclone unit dust collector shall be a DUSTKOP Model # 80SN70-D2-SP, as manufactured by AGET Manufacturing Company, Adrian, Michigan, or approved equal.

C. The cyclone unit fan shall be located on the "clean air side" of the cyclone. The fan wheel shall be a backward inclined high efficiency design and shall rotate at a nominal speed of 3600 RPM in a direct drive configuration. The fan assembly shall be an AMCA arrangement #4HM and AMCA Class III Type 'B' wheel construction (spark-resistant aluminum). The fan scroll shall include a quick opening inspection door.

D. The cyclone unit fan shall be driven by a 20 HP, TEFC, 3600 RPM continuous duty inverter ready premium efficiency motor. The motor shall include a weather cap assembly to protect it from rain, sleet, ice and snow. The motor shall be rated to operate on 480/60/3 power, shall include a minimum 3 year manufacturer's warranty, and shall comply with EISA 2007 motor efficiency standards.

E. The cyclone shall be a high efficiency design, measuring 36" in diameter. Additionally, the cyclone shall be constructed in a component bolt-together design of AISI 1010 CQ cold rolled steel.

F. The cyclone unit shall incorporate a supporting angle iron framework, lending support at the base of the cone and base of the cylinder. The unit frame shall be constructed of 2½" x 2½" x ¼" angle, ASTM spec. A36, minimum.

G. The cyclone unit shall be mounted on a welded structural steel support stand. The stand shall be constructed of 3" x 3" x 5/16" angle, ASTM spec. A36, minimum.

H. Collected dust shall be deposited into two (2) standard steel DOT type 55-gallon drums for storage, and shall be supplied with the collector. Storage capacity shall be 7.3 cu. ft. per drum, or 14.6 cu. ft. total.

I. The drum cover assemblies shall be of a clamp-on, positive sealing design. Those held/sealed in place by fan suction only shall be unacceptable for this service.

J. The cyclone unit dust collector shall be finished with a minimum of (1) coat of Sherwin-Williams Powdura RAL series super durable polyester TGIC-free powder coating, RAL 7015 GL.

K. The inlet duct to the cyclone unit dust collector shall be fit-up with an explosion isolation device (explosion backdraft damper), to prevent the pressure wave from an explosion in the dust collector from traveling back through the system ductwork into the shop. The basis for design shall be an IEP-14 inlet isolation damper.

L. After-Filter Unit:
1. After-Filter unit dust collector shall be a DUSTKOP Model # FT64-SP, manufactured by AGET Manufacturing Company, Adrian, Michigan, or approved equal.
2. The After-Filter shall contain 612 sq. ft. of filter area in the form of 10.1 oz. high efficiency cotton sateen filter media. The DUSTKOP Model # FT64-SP shall contain 64 five inch diameter filter tubes, open at both top and bottom.
3. Air-to-filter ratio (CFM/SQ. FT.) shall not exceed 6.2/1, based on a design exhaust rate of 3,800 CFM.
4. The After-Filter unit shall be structurally self-supporting, incorporating angle iron support legs.

5. The After-Filter shall be provided with a shaker mechanism, which is to be operated electrically. The motorized shaker shall be driven by a 1/2 HP, TEFC, 1800 RPM motor, capable of operating on 480/60/3 power.
6. The motorized shaker shall be controlled automatically by shaker timing relays in the system electrical control panel.
7. Collected dust shall be deposited into two (2) dust bin drawers, each containing 6.4 cu. ft. dust storage capacity. Dust storage in the filter bags is unacceptable.
8. The after-filter shall be finished with a minimum of (1) coat of Sherwin Williams Powdura RAL series super durable polyester TGIC-free powder coating, RAL 7015 GL.

M. Electrical:
1. All electrical controls and wiring shall conform to NFPA 70, the National Electrical Code, Article #430– motors, motor circuits, and controllers, and/or appropriate local codes.
2. All electrical controls shall be located indoors, and shall comply with NFPA 70, the National Electrical Code, Article #500-7, Class III locations, necessitating NEMA type ‘12’ enclosures (dust-tight), unless otherwise specified.
3. All electrical controls shall be contained in a pre-wired control panel for single point wiring. The control panel shall include a disconnect, fuse blocks, fuses, variable frequency drive with touchpad display mounted on enclosure door, start and stop pushbuttons, spark detection system and isolation damper interlocks, and UL508 certification. Variable frequency drive (fan motor control shall be Yaskawa HV600. Motor starter shall be NEMA size and rating. IEC spec. motor controls shall be unacceptable.
4. Control panel enclosure shall include a cooling fan with filter and grille, sized for all controls mounted in the enclosure.
5. Non-fusible disconnect(s) outdoors shall require minimum NEMA type ‘3R’ enclosures (watertight).
6. The system power supply shall be 480/60/3. All control circuit wiring shall be 120/60/1.

2.3 LASER FUME EXTRACTOR

A. BOFA MODEL ad 500 iQ or equal

B. Dimensions: 47.44" x 24.21" x 31.10"

C. Cabinet Construction: Brushed stainless steel/powder coated mild steel

D. Airflow: 324 CFM

E. Electrical: 115 volt, 14.8 full load amps, 1.1 kW

F. Noise level: <60 dBA

G. Weight: 292 pounds

H. UL approved

I. Pre-Filter:
1. Surface media area: 322.8 square feet
2. Filter media: Borosilicate
3. Filter media construction: Maxi pleat construction with glue bead spacers
4. Filter housing: Zintec mild steel
5. Filter efficiency: 95% @ 0.9 microns
6. Inlet size: 0.41 feet
7. Dropout chamber size: 58 liters
8. Filter media pleat size: 0.65 feet

J. Combined HEPA/gas filter:
1. Surface media area: 80.7 square feet
2. Filter media: Borosilicate

3. Filter media construction: Maxi pleat construction with glue bead spacers
4. Filter housing: Zintec mild steel
5. Filter efficiency: 99.997% @ 0.3 microns
6. Treat activated carbon: 74.8 pounds

K. Provide extractor with combined HEPA/gas filter, real time airflow reading, high contrast display, filter change/system fail signal, automatic flow control system, independent filter condition monitorin, display and warnings.

PART 3 EXECUTION

3.1 FIELD MEASUREMENTS

A. Verify that field measurements are as instructed by the manufacturer.

3.2 INSTALLATION

A. Install equipment in accordance with manufacturer's instructions.

B. Install in accordance with NFPA 91 except as indicated.

C. Do not operate fans for any purpose until ductwork is clean, filters are in place, bearings lubricated, and fan has been test run under observation.

D. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.

E. Install dust collection system in accordance with NFPA 652.

END OF SECTION 23 35 13

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SECTION 23 36 00 - AIR TERMINAL UNITS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Single-duct terminal units.
   1. Single-duct, variable-volume units.

B. Integral controls.

1.2 REFERENCE STANDARDS

A. AHRI 410 - Standard for Forced-Circulation Air-Cooling and Air-Heating Coils; 2001 (R2011).

B. AHRI 880 (I-P) - Performance Rating of Air Terminals; 2011 with Addendum 1.

C. AHRI 885 - Procedure for Estimating Occupied Space Sound Levels in the Application of Air Terminals and Air Outlets; 2008 with Addendum 1.

D. ASHRAE Std 130 - Methods of Testing Air Terminal Units; 2008 (R2014).

E. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.

F. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2014.

G. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

H. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2015.

I. SMACNA (SRM) - Seismic Restraint Manual Guidelines for Mechanical Systems; Sheet Metal and Air Conditioning Contractors' National Association; 2008.

J. UL 181 - Standard for Factory-Made Air Ducts and Air Connectors; current edition, including all revisions.

1.3 SUBMITTALS

A. Product Data: Provide data indicating configuration, general assembly, and materials used in fabrication. Include catalog performance ratings that indicate air flow, static pressure, and NC designation. Include electrical characteristics and connection requirements.

B. Shop Drawings: Indicate configuration, general assembly, and materials used in fabrication, and electrical characteristics and connection requirements.
   1. Include schedules listing discharge and radiated sound power level for each of second through sixth octave bands at inlet static pressures of 1 to 4 inch wg.

C. Certificates: Certify that coils are tested and rated in accordance with AHRI 410.

D. Manufacturer's Installation Instructions: Indicate support and hanging details, installation instructions, recommendations, and service clearances required.

E. Project Record Documents: Record actual locations of units and locations of access doors required for access of valving.

F. Operation and Maintenance Data: Include manufacturer's descriptive literature, operating instructions, maintenance and repair data, and parts lists. Include directions for resetting constant-volume regulators.

G. Warranty: Submit manufacturer warranty and ensure forms have been completed in Nanuet Union Free School District's name and registered with manufacturer.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

B. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

C. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

1.5 WARRANTY

A. Provide five year manufacturer warranty for air terminal units.

PART 2 PRODUCTS

2.1 SINGLE-DUCT, VARIABLE-VOLUME SUPPLY UNITS

A. The assemblies shall be pressure independent and shall reset to any air flow between zero and the maximum cataloged air volume.

B. At an inlet velocity of 2,000 fpm, the minimum operating pressure for any unit shall not exceed 0.04 w.g.

C. The assemblies shall consist of Three foot long silencer/sound attenuators supplied as a separate piece (where scheduled) that matches the terminal discharge area configuration and performance, as described on the plans and/or air distribution schedules. The attenuators have slip and drive connections for easy installation.

D. Performance characteristics including pressure drop and sound data for the terminal/silencer assembly shall have been attained through lab testing in accordance to ASHRAE 130-2008 and AHRI 880-2008. Sound ratings of air distribution per the levels indicated on the drawing schedules.

E. Performance of the complete VAV terminal and silencer assembly (where scheduled) shall be AHRI certified.

F. The air flow sensor shall be of a cross configuration located at the inlet of the assembly. The sensor shall have twelve total pressure sensing ports and a center averaging chamber designed to accurately average the flow across the inlet of the assembly. Sensor shall provide accuracy within 5% with 90° sheet metal elbow directly at the inlet of the assembly. The air flow sensor shall amplify the sensed air flow signal.

G. The primary air valve damper shall be heavy gauge metal, with peripheral gasket and solid steel shaft, pivoted in self-lubricating bearings. In the full closed position, air leakage past the closed damper shall not exceed 2% of the nominal catalog rating at 3 in. w.g. inlet static pressure, when tested in accordance to ASHRAE 130.

H. The entire valve/damper assembly shall be tested to 1.25 million cycles without failure.

I. Low Leakage Construction:
   1. The terminals shall be provided with factory certified low leakage construction up to four inches water gauge internal pressure.
   2. Inlet dampers shall exhibit leakage rates of less than:
      a. 0.75% of maximum nominal catalog airflow for CLL4
   3. Single duct casings shall exhibit external leakage rates of less than:
      a. 1% of maximum nominal catalog airflow for CLL4
   4. Terminals shall include the following design features:

a. Access door shall be supplied with compression style gasketing and quarter turn latches.
b. The unit casing shall be flanged and gasketed at all external casing seams.
c. All production units shall be individually factory tested to ensure compliance with project specific leakage requirements.
d. Leakage test results shall be documented on a label affixed to each certified low leakage unit.

J. Fiber-Free Foam Insulation .
1. Insulation shall comply with the requirements of UL 181 (erosion, mold growth and humidity) and ASHRAE 62.1, and shall have a maximum flame/smoke spread of 25/50 for both the insulation and the adhesive when tested in accordance with ASTM E84.
2. The insulation shall be secured with adhesive.
3. Insulation thickness shall be:
a. 1/2 inch thick, R-value of 2.0.

K. Control: Actuator shall be supplied and installed by the Temperature Controls provider. Box shall be set up for pressure independent operation with air flow sensor and tubing provided and installed by the box manufacturer.

L. Access Door: Provide ultra-low leakage, premium quality and performance, flat oval design, 1/2" insulated double wall, access door. Door shall be formed 24 gauge, galvanized steel flanged frame and door panel. Door shall have positive bulb door seal, (foam gaskets are not acceptable). The unit should include camp lock design fasteners for easy removal and box inspection.

M. Hot Water Heating Coil:
1. The hot water coil casing shall be constructed from a minimum 22 gauge, 0.032 inch galvanized steel, factory-installed on the terminal discharge with slip-and drive attachment for downstream ductwork.
a. A gasketed access door shall be provided, located on bottom of unit.
b. Coil handing shall be specified as right hand or left hand when looking into the coil inlet in the direction of airflow.
c. The water coil shall be supplied with an access door located:
1) Upstream of the water coil in the terminal casing.
d. The water coil access door shall be secured to the casing with:
1) Quarter turn sash latches.
2. The water coil fins shall be 0.0045 inch aluminum fins, mechanically-bonded to seamless 0.50 by 0.016 inch copper tubes.
a. Fins shall be formed in a high heat transfer sine wave configuration.
3. The water coil shall be leak tested to a minimum 390 pounds per square inch, with a minimum burst pressure of 1800 pounds per square inch.
4. The water coil shall be certified in accordance with AHRI 410 and units shall bear an AHRI 410 label.

N. Accessories: Hanger brackets, NEMA 1 control box with 24 power connection and disconnect switch.

O. Factory mount and wire controls. Mount electrical components in control box with removable cover. Incorporate 24 volt, low voltage single point electrical connection to power source.

2.2 SINGLE DUCT EXHAUST TERMINAL UNITS

A. Unit Casing:
1. The unit casing shall be constructed of a minimum 22-gauge, 0.032-inch galvanized steel.
a. The casing shall be assembled with longitudinal lock seam construction.
2. The terminal unit shall have a rectangular inlet with slip-and-drive connections.

3. The terminal unit shall have a rectangular discharge with slip-and-drive connections.

B. Liners:
   1. Insulated Liners:
      a. Fiber-Free Foam Insulation - FF.
         1) Insulation shall comply with the requirements of UL 181 (erosion, mold growth and humidity) and ASHRAE 62.1, and shall have a maximum flame/smoke spread of 25/50 for both the insulation and the adhesive when tested in accordance with ASTM E84.
         2) The insulation shall be secured with adhesive.
         3) Insulation thickness shall be (select one):
            (a) 1/2 inch thick, R-value of 2.0.

C. Air Damper Assembly:
   1. The damper assembly shall be heavy-gauge, galvanized steel with a solid shaft rotating in bearings.
   2. The damper shaft shall incorporate a visual position indicator etched into the end of the damper shaft to clearly indicate damper position over the full range of 90 degrees.
   3. The damper shaft shall be mounted on the left or right of the damper when looking in the direction of airflow.
   4. The 18 gauge damper assembly shall incorporate a peripheral gasket on the damper blades for tight airflow shutoff.
   5. Air leakage past the closed damper shall not exceed 2 percent of the unit maximum rated airflow at 3.0 inch water gauge inlet static pressure, tested in accordance with ASHRAE 130.
   6. The damper, seal, and bearing system shall be tested to 1.25 million cycles, or the equivalent of 100 full open/closures per day for 35 years, with no visible signs of wear, tear, or failure of the damper assembly after such testing.

D. Airflow Sensor:
   1. The airflow sensor shall be a differential pressure airflow device measuring total and static pressures, and mounted to the inlet valve.
   2. Plastic parts shall be fire-resistant, complying with UL 94.
   3. The airflow sensor shall be RoHS (Restriction of Hazardous Substances) compliant. Material containing polybrominated compounds shall not be acceptable.
   4. Control tubing shall be protected by grommets at the wall of the airflow sensor's housing.
   5. The airflow sensor shall be furnished with twelve total pressure sensing ports and four static pressure sensing ports, and shall include a center averaging chamber that amplifies the sensed airflow signal.
   6. After balancing, the airflow sensor signal accuracy shall be plus or minus five percent throughout terminal operating range.

E. Inlet Valve - Standard:
   1. The inlet valve shall include a 1/8 inch raised single bead weld for added strength.
   2. The gasket seal shall be a low leakage continuous piece with a peripheral gasket for tight airflow shutoff.
   3. The inlet valve shall include two heavy duty stop pins to accurately position the damper in the closed and open positions.

F. Electrical Requirements:
   1. Single duct terminal units shall be provided with single-point power connection.
   2. The terminal unit equipment wiring shall comply with the requirements of NFPA 70.
   3. The controllers on the Exhaust VAV terminal units shall be provided with 24-volt power connections.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Support units individually from structure with wire rope complying with ASTM A492 and ASTM A603 in accordance with SMACNA 1981..

C. Do not support from ductwork.

D. Connect to ductwork in accordance with Section 233100.

E. Install the terminal units in accordance with the manufacturer's instructions.

F. See drawings for the size(s) and duct location(s) of the air terminal units.

G. Provide ceiling access doors or locate units above easily removable ceiling components.
   1. Provide access doors where air terminal units are to be installed above gypsum board ceilings, sized 16"x16". Refer to architectural specifications for access door requirements within gypsum board ceiling systems.

H. Support the terminal units individually from the structure in accordance with manufacturer’s recommendations.

I. Embed anchors in concrete in accordance with ASTM E488/E488M.

J. Do not support the terminal units from the ductwork.

K. Verify that electric power is available and of the correct characteristics.

3.2 ADJUSTING

A. Ensure the damper operator attached to the assembly allows full modulation of flow range from 100 percent of design flow to zero.

3.3 FIELD QUALITY CONTROL

A. Provide manufacturer's field representative to test, inspect, instruct, and observe field-assembled components and equipment installation, including connections and to assist in field testing. Report results in writing.
   1. Leak Test:
      a. After installation, fill water coils and test for leaks.
      b. Repair leaks and retest until no leaks exist.
   2. Operational Test:
      a. After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
      b. Test and adjust controls and safeties.
      c. Replace damaged and malfunctioning controls and other equipment.
      d. Remove and replace malfunctioning units and retest as specified above.

3.4 CLEANING

A. Vacuum clean coils and inside of units.

END OF SECTION 23 36 00

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SECTION 23 37 00 - AIR OUTLETS AND INLETS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Diffusers.

B. Displacement Ventilation Diffusers.

C. Registers/grilles.

1.2 REFERENCE STANDARDS

A. ASHRAE Std 70 - Method of Testing the Performance of Air Outlets and Inlets; 2006 (R2011).

B. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2015.

C. SMACNA (ASMM) - Architectural Sheet Metal Manual; 2012.

D. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2005.

1.3 SUBMITTALS

A. Product Data: Provide data for equipment required for this project. Review outlets and inlets as to size, finish, and type of mounting prior to submission. Submit schedule of outlets and inlets showing type, size, location, application, and noise level.

B. Project Record Documents: Record actual locations of air outlets and inlets.

1.4 QUALITY ASSURANCE

A. Test and rate air outlet and inlet performance in accordance with ASHRAE Std 70.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

PART 2 PRODUCTS

2.1 ONE WAY IN-WALL DISPLACEMENT SUPPLY DIFFUSER

A. Approved Manufacturers:
   1. Price Model DF1W (basis of design)
   2. Titus
   3. Nailor

B. Construction: The 1 way flat faced in-wall displacement diffuser shall be constructed with an equalization baffle behind the operative diffuser face for uniform, low velocity, distribution of supply air. Both the equalization baffle and face shall be securely retained in the diffuser frames. Plastic nozzle arrays or any plastic components are unacceptable. The diffuser frames shall be constructed of 20 gauge steel for rigidity and protection of the operative face. The operative face shall be constructed of painted 18 gauge perforated steel, and the frame shall be provided in painted 20 gauge steel. The plenum shall be 24 gauge steel. The internal baffling elements shall be constructed of aluminum. The diffuser shall be available for duct connection at the top. The paint shall be powder coat polyester. Epoxies and their derivatives are unacceptable. Visible non-metallic components are unacceptable.

C. Mounting/Fastening: The diffuser front panel shall be bolted to the plenum through the wall with factory provided fasteners.

D. Performance: Air shall be delivered to the space at low noise levels and low velocities that are even across the diffuser face, in all ducting configurations and without the use of nozzles.

E. Mounting Height: Bottom of diffuser no greater than 6 inches above finished floor.

F. Diffuser Manufacturer shall provide sound and pressure drop data derived from tests in accordance with ASHRAE Standard 70-2006. Performance data for Draft Rate (%DR) shall be provided based on tests in accordance with ASHRAE Standard 55-2004.

2.2 QUARTER ROUND HORIZONTAL 90° DISPLACEMENT DIFFUSERS

A. General:
1. Furnish and install quarter round horizontal displacement diffuser with the sizes, capacities, and options as indicated on the plans and air outlet schedule.
2. The displacement diffuser shall deliver air to the occupied space at low noise levels, with uniform, low velocity distribution of supply air.

B. Construction:
1. The displacement diffuser shall be constructed with an equalization baffle behind the operative diffuser face for uniform, low velocity distribution of supply air. Plastic nozzle arrays or any plastic components shall be unacceptable.
2. The equalization baffle and the diffuser face shall be securely retained in the diffuser frame.
3. The operative face shall be 18 gauge painted steel, and top and bottom panels shall be 20 gauge painted steel. The diffuser frame shall be extruded aluminum construction for rigidity and protection of the operative face and side panels. The internal baffling shall be aluminum construction.
4. There shall be no visible fasteners on the front or side panels.
5. The diffuser shall allow duct connection at the top, rear or side of the diffuser with a factory or field cut inlet.

C. Mounting/Fastening:
1. The diffuser shall fasten to the wall and ceiling via a rail mounting system. The rail mounting system shall not require puncturing the diffuser for installation.
2. The rail mounting system shall include metal cover strips to conceal all visible fasteners.

D. Finish:
1. All steel components shall have B12 White baked-on powder coat finish. Epoxies and their derivatives shall not be acceptable. Visible non-metallic components shall not be acceptable.
   a. The paint finish shall demonstrate no degradation when tested in accordance with ASTM D1308 (covered and spot immersion) and ASTM D4752 (MEK double rub) paint durability tests.
   b. The paint film thickness shall be a minimum of 2.0 mils.
   c. The finish shall have a hardness of 2H.
   d. The finish shall withstand a minimum salt spray exposure of 500 hours with no measurable creep in accordance with ASTM D1654, and 1000 hours of exposure with no rusting or blistering as per ASTM D610 and ASTM D714.
   e. The finish shall have an impact resistance of 80 inch-pounds.

E. Options:
1. Duct Cover:

a. The diffuser shall be supplied with a duct cover with 18 gauge solid steel panels. The frames shall be aluminum extrusion construction for rigidity and protection of the face and side panels.
b. The duct cover shall be supplied with a rail mounting system with metal cover strips to conceal all fasteners.
c. The duct cover shall be manufactured by the diffuser manufacturer, factory assembled, and shipped complete with the associated diffuser.
d. There shall be no visible fasteners on the duct cover panels. Visible non-metallic components shall not be acceptable.
e. The duct covers shall have a finish to match the associated diffuser, or as selected by the architect.

2.3 RECTANGULAR FLOOR MOUNTED ONE-WAY DISPLACEMENT DIFFUSER

A. Approved Manufacturers:
1. Price model DF1 (basis of design)
2. Titus
3. Nailor

B. Construction: The 1 way flat faced Displacement diffuser shall be constructed with an equalization baffle behind the operative diffuser face for uniform, low velocity, distribution of supply air. Both the equalization baffle and face shall be securely retained in the diffuser frames. Plastic nozzle arrays or any plastic components are unacceptable. The diffuser frames shall be constructed of high strength aluminum extrusion for rigidity and protection of the operative face and side panels. There shall be no visible fasteners on the front or side panels. The operative face shall be constructed of painted 16 gauge perforated steel, rear side and end panels shall be provided in painted 20 gauge steel. The frame and internal baffling elements shall be constructed of Aluminum. The diffuser shall be available for duct connection at the top, bottom, side or rear of the diffuser with a factory or field cut inlet. The paint shall be powder coat polyester. Epoxies and their derivatives are unacceptable. Visible non-metallic component sare unacceptable. The diffuser shall be supplied with a rail mounting system that does not require puncturing the diffuser to install.

C. Mounting/Fastening: The diffuser shall fasten to the wall via a rail mounting system. The rail mounting system with metal cover strips to conceal all visible fasteners.

D. Performance: Air shall be delivered to the space at low noise levels and low velocities that are even across the diffuser face, in all ducting configurations and without the use of nozzles. Diffuser Manufacturer shall provide sound and pressure drop data derived from tests in accordance with ASHRAE Standard 70-2006. Performance data for Draft Rate (%DR) shall be provided based on tests in accordance with ASHRAE Standard 55-2004. A software program that allows room comfort evaluation for specific operating conditions and diffuser locations shall be available to aid in performance assessment. If such a computer program is not available from the manufacturer, the manufacturer shall supply, free of charge, a CFD model of the representative spaces completed by a modeling contractor who has demonstrable qualifications to model such spaces. These shall include no less than 10 years of experience in the modeling of displacement ventilation systems, thorough validation of the code through comparison to empirical data as well as a list of references.

E. Diffuser manufacturer shall provide duct covers available for all inlet locations. The duct covers shall be manufactured by the diffuser manufacturer. The duct cover face shall be constructed of painted 18 gauge solid steel. The duct cover frames shall be constructed of high strength aluminum extrusion for rigidity and protection of the face and side panels. The duct cover shall be supplied with a rail mounting system with metal cover strips to conceal all fasteners. All duct covers shall be factory assembled and shipped complete with the associated diffuser. There shall be no visible fasteners on the duct cover panels. The paint shall be powder coat polyester

to match the diffuser or as selected by the architect. Epoxies and their derivatives are unacceptable. Visible non-metallic components are unacceptable. The paint shall be powder coat polyester to match the diffuser or as selected by the architect.

2.4 1-WAY LAY-IN DIFFUSER WITH HEAT-COOL CHANGEOVER

A. General:
   1. Furnish and install one-way lay-in heat/cool displacement diffuser with the sizes, capacities, and options as indicated on the plans and air outlet schedule.
   2. The displacement diffuser shall deliver air to the occupied space at low noise levels, with uniform, low velocity across the diffuser face in all ducting configurations without the use of nozzles.

B. Construction:
   1. The one way lay-in heat/cool displacement diffuser shall be constructed with two separate plenums, one for heating operating and one for cooling operation.
   2. The cooling section of the diffuser shall be constructed with an aluminum equalization baffle behind the perforated diffuser face for uniform, low velocity distribution of supply air. Both the equalization baffle and the face shall be securely retained in the diffuser frames.
   3. The heating section of the diffuser shall be a linear slot diffuser, and shall utilize heavy wall extruded aluminum air deflectors. The steel air pattern controllers shall be fully adjustable to allow movement from side to side to create various air pattern configurations. The heating section shall be fully adjustable to allow shut-off without adding any blank-off devices.
   4. The diffuser plenum shall be 24 gauge steel, and the frame shall be 20 gauge steel for rigidity and protection of the perforated face and side panels. The perforated front panel shall be constructed of coated 18 gauge perforated steel.
   5. The diffuser shall not have visible fasteners on the front or side panels.
   6. The diffuser inlet shall be available for duct connection at the side with a factory installed inlet.
   7. Plastic nozzle arrays or any plastic components shall be unacceptable.
   8. The diffuser shall be available in the following module sizes:
      a. 24 x 24 inches with 12 x 6 inch inlet
      b. 24 x 48 inches with 24 x 6 inch inlet

C. Diffuser finish shall be:
   1. All steel components shall have B12 White baked-on powder coat finish. Epoxies and their derivatives shall not be acceptable. Visible non-metallic components shall not be acceptable.
      a. The paint finish must demonstrate no degradation when tested in accordance with ASTM D1308 (covered and spot immersion) and ASTM D4752 (MEK double rub) paint durability tests.
      b. The paint film thickness shall be a minimum of 2.0 mils.
      c. The finish shall have a hardness of 2H.
      d. The finish shall withstand a minimum salt spray exposure of 500 hours with no measurable creep in accordance with ASTM D1654, and 1000 hours of exposure with no rusting or blistering as per ASTM D610 and ASTM D714.
      e. The finish shall have an impact resistance of 80 inch-pounds.

D. Mounting/Fastening:
   1. The diffuser shall integrate into a standard T-bar ceiling and shall have no visible fasteners.

E. Options:
   1. Insulation:

a. The diffuser shall be externally insulated with ½ inch fiberglass with foil/scrim vapor barrier which meets the requirements of UL 181 and NFPA 90A.

2. Adjustable Flow Sensing Device (AFSD):
   a. The diffuser shall be supplied with an AFSD which features both a manually adjustable damper for volume control and a multipoint sensor to for accurate pressure measurement.
   b. The AFSD shall be provided with gauge taps for flow measurement.
   c. The AFSD shall include a damper locking mechanism to ensure quick and accurate balancing of each diffuser during the balancing process.
3. Actuator:
   a. Thermal Actuator: The diffuser shall be supplied with a factory mounted wax thermal actuator (TA). In full cooling mode, the TA shall require a cooling supply air temperature less than 70 degrees Fahrenheit. In full heating mode, the TA shall require a heating supply air temperature greater than 80 degrees Fahrenheit. Changeover time between full cooling and full heating modes shall be approximately 10 minutes.

2.5 LOUVERED RETURN/EXHAUST REGISTERS

A. Furnish and install steel or aluminum exhaust/return registers of the sizes and mounting types indicated on the plans and outlet schedule. Registers shall be 45 degree deflection fixed louver type with blades spaced 3/4 in. on center. The blades shall run parallel to the long dimension of the register. The register shall be finished in B12 White Powder Coat. Paint finish shall pass 500 hours of salt spray exposure with no measurable creep in accordance with ASTM D1654 and 1000 hours with no rusting or blistering as per ASTM D610 and ASTM D714.

B. Paint Specification:
   1. Paint finish shall be:
      a. All components shall have a baked-on powder coat finish.
         1) The paint finish must demonstrate no degradation when tested in accordance with ASTM D1308 (covered and spot immersion) and ASTM D4752 (MEK double rub) paint durability tests.
         2) The paint film thickness shall be a minimum of 2.0 mils.
         3) The finish shall have a hardness of 2H.
         4) The finish shall withstand a minimum salt spray exposure of 1000 hours with no measurable creep in accordance with ASTM D1654, and 1000 hours of exposure with no rusting or blistering as per ASTM D610 and ASTM D714.
         5) The finish shall have an impact resistance of 80 inch-pounds.

C. Options:
   1. Opposed Blade Damper:
      a. The register shall be supplied with a coated steel opposed blade damper. The damper shall be operable from the register face.
   2. Border Style:
      a. The grille shall be suitable for surface mounting, complete with a border in the following style :
         1) Surface Mount with 1-1/4 inch flat border. [required for spiral duct mount]
   3. Mounting Frames:
      a. The grille shall be supplied with:
         1) 3/8 inch flat border mounting frame.
   4. Fastening:
      a. The grille shall be supplied with the following fastening method:
         1) Concealed bracket.

2.6 SQUARE PLAQUE DIFFUSERS

A. Construction:
   1. Diffusers shall be steel construction, and shall consist of a seamless, one-piece, precision formed backpan that incorporates a round inlet collar of sufficient length for connecting rigid or flexible duct.
   2. An inner plaque assembly shall be incorporated and shall drop no more than ¼ inch below the ceiling plane to assure proper air distribution performance.
   3. The inner plaque assembly shall be completely removable from the room side to allow for full access to any dampers or other ductwork components located near the diffuser neck.
   4. The diffuser shall integrate with all duct sizes shown on the plans without affecting the face size and appearance of the unit.
   5. The face panel shall have smooth edges and rounded corners to blend with the back cone.
   6. The diffuser ceiling module size shall be (select one):
      a. 24 x 24 inches (600 x 600 millimeters)

B. Paint Specification:
   1. Paint finish shall be:
      a. All components shall have a baked-on powder coat finish.
         1) The paint finish shall demonstrate no degradation when tested in accordance with ASTM D1308 (covered and spot immersion) and ASTM D4752 (MEK double rub) paint durability tests.
         2) The paint film thickness shall be a minimum of 2.0 mils.
         3) The finish shall have a hardness of 2H.
         4) The finish shall withstand a minimum salt spray exposure of 500 hours with no measurable creep in accordance with ASTM D1654, and 1000 hours of exposure with no rusting or blistering as per ASTM D610 and ASTM D714.
         5) The finish shall have an impact resistance of 80 inch-pounds.
      b. All components shall have a custom finish in a color to match a customer supplied sample.

2.7 EGG CRATE REGISTERS

A. Description:
   1. Furnish and install egg crate grilles and registers of sizes and mounting types designated by the plans and air distribution schedule.

B. Construction:
   1. Grilles shall be aluminum construction, consisting of an extruded aluminum border and:
      a. An aluminum ½ x ½ x ½ inch grid egg crate core.
   2. The minimum grille size shall be six inches by four inches. The maximum one-piece grille size without a mullion shall be 48 inches x 24 inches. The maximum size grille size with a mullion is 96 x 48 inches.

C. Paint Specification:
   1. Paint finish shall be:
      a. All components shall have a baked-on powder coat finish.
         1) The paint finish must demonstrate no degradation when tested in accordance with ASTM D1308 (covered and spot immersion) and ASTM D4752 (MEK double rub) paint durability tests.
         2) The paint film thickness shall be a minimum of 2.0 mils.
         3) The finish shall have a hardness of 2H.

4) The finish shall withstand a minimum salt spray exposure of 500 hours with no measurable creep in accordance with ASTM D1654, and 1000 hours of exposure with no rusting or blistering as per ASTM D610 and ASTM D714.
5) The finish shall have an impact resistance of 80 inch-pounds.

D. Options:
1. Border Style:
a. The grille shall be suitable for sidewall, exposed duct, or T-bar lay-in mounting, complete with a border in the following style (select one):
1) One inch narrow face border for surface mount applications.
2) Channel border (no flange) for 15/16 inch T-bar applications to maximize free area.
3) Exposed duct border for mounting directly to exposed ducts.
2. Mounting Frames:
a. The grille shall be supplied with a 3/8 inch flat border mounting frame.

2.8 AIRFOIL SUPPLY REGISTERS

A. Description:
1. Furnish and install single deflection airfoil supply grilles and registers of sizes and mounting types designated by the plans and air distribution schedule.

B. Construction:
1. The grille material shall be aluminum.
2. The grille shall have precision mitered corners.
3. The adjustable airfoil blades shall be secured in place by a stainless steel tensioning wire.
4. The grilles front blade orientation shall be:
a. Parallel to the long dimension.
5. The single deflection cores shall have:
a. One set of blades with ¾ inch on center blade spacing (Model 21)
6. The minimum grille size shall be 6 x 4 inches.
7. The grille shall be supplied with a mullion when nominal grille dimensions exceed 20 inches.

C. Paint Specification:
1. Paint finish shall be:
a. All components shall have a baked-on powder coat finish.
1) The paint finish must demonstrate no degradation when tested in accordance with ASTM D1308 (covered and spot immersion) and ASTM D4752 (MEK double rub) paint durability tests.
2) The paint film thickness shall be a minimum of 2.0 mils.
3) The finish shall have a hardness of 2H.
4) The finish shall withstand a minimum salt spray exposure of 1000 hours with no measurable creep in accordance with ASTM D1654, and 1000 hours of exposure with no rusting or blistering as per ASTM D610 and ASTM D714.
5) The finish shall have an impact resistance of 80 inch-pounds.

D. Options:
1. Border Style:
a. The grille shall be suitable for sidewall mounting or T-bar lay-in mounting, complete with a border in the following style:
1) Exposed duct with 13/16 border.

2.9 SPIRAL DUCT GRILLE

A. Approved Manufacturers:

1. Price SDG (basis of design)
2. Titus
3. Nailor

B. Construction:
   1. The supply grille frame and blades shall be steel construction.
   2. Supply grilles shall be supplied with double deflection blades with 3/4 inch spacing, and the front set blade orientation shall be parallel to the short dimension.
   3. The mounting frame shall be supplied with countersunk screw holes for aesthetic appeal.
   4. Open cell foam insulation gasket shall be provided around the grille neck to provide a tight seal around openings in the duct. A closed cell foam end gasket shall be supplied to reduce leakage along the duct diameter.
   5. Nominal lengths for single piece construction shall be available in one inch increments.

C. Paint Specification:
   1. Steel components shall be supplied with a baked-on powder coat finish.
      a. The paint finish shall demonstrate no degradation when tested in accordance with ASTM D1308 (covered and spot immersion) and ASTM D4752 (MEK double rub) paint durability tests.
      b. The paint film thickness shall be a minimum of 2.0 mils.
      c. The finish shall have a hardness of 2H.
      d. The finish shall withstand a minimum salt spray exposure of 500 hours with no measurable creep in accordance with ASTM D1654, and 1000 hours of exposure with no rusting or blistering as per ASTM D610 and ASTM D714.
      e. The finish shall have an impact resistance of 80 inch-pounds.
      f. Color shall be B15 grey aluminum.

D. Options:
   1. Opposed Blade Damper:
      a. The heavy duty, opposed blade balancing damper shall be constructed of a minimum 18 gauge coated, cold rolled steel. The damper frame corners shall overlap and be of welded construction for added strength.
      b. The damper shall be operable from the register face.
      c. The damper shall be supplied fitted with a face accessible screw-type blade locking mechanism.

2.10 LOUVERED FACE SUPPLY REGISTERS/TRANSFER REGISTERS

A. Furnish and install steel or aluminum supply registers of the sizes and mounting types indicated on the plans and outlet schedule. Registers shall be 45 degree deflection fixed louver type with blades spaced 3/4 in. on center. The blades shall run parallel to the long dimension of the register. The register shall be finished in B12 White Powder Coat. Paint finish shall pass 500 hours of salt spray exposure with no measurable creep in accordance with ASTM D1654 and 1000 hours with no rusting or blistering as per ASTM D610 and ASTM D714.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Comply with SMACNA (ASMM) for flashing/counter-flashing of roof penetrations and supports for roof curbs and roof mounted equipment.

C. Check location of outlets and inlets and make necessary adjustments in position to comply with architectural features, symmetry, and lighting arrangement.

D. Install diffusers to ductwork with air tight connection.

E. Provide balancing dampers on duct take-off to diffusers, and grilles and registers, despite whether dampers are specified as part of the diffuser, or grille and register assembly.

END OF SECTION 23 37 00

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SECTION 23 74 13 - PACKAGED ROOF TOP UNITS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Packaged roof top units.

1.2 REFERENCE STANDARDS

A. AHRI 210/240 - Standard for Performance Rating of Unitary Air-Conditioning and Air-Source Heat Pump Equipment; 2008.

B. AHRI 270 - Sound Performance Rating of Outdoor Unitary Equipment; 2008.

C. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2015.

1.3 SUBMITTALS

A. Product Data: Provide capacity and dimensions of manufactured products and assemblies required for this project. Indicate electrical service with electrical characteristics and connection requirements, and duct connections.
   1. Literature shall be provided that indicates dimensions, operating and shipping weights, capacities, ratings, fan performance, filter information, factory supplied accessories,electrical characteristics and connection requirements. Installation, Operation, and Maintenance manual with startup requirements shall be provided.

B. Sustainable Design Documentation: Submit manufacturer's product data on refrigerant used, showing compliance with specified requirements.

C. Shop Drawings:
   1. Indicate capacity and dimensions of manufactured products and assemblies required for this project. Indicate electrical service with electrical characteristics and connection requirements, and duct connections.
   2. Manufacturer of packaged rooftop equipment shall provide indoor and outdoor sound power level data across all major octave band center frequencies for cataloged operating range of unit at gross cooling capacity range. Data shall be obtained in conformance with ANSI S1.32-1980, American National Standard Methods for the Determination of Sound Power Levels of Discrete Frequency and Narrow Band Noise Sources in Reverberation Rooms and per AMCA Standard 300-85 test code "Sound Rating Air Moving Devices".
   3. Unit drawings shall be provided that indicate assembly, unit dimensions, construction details, clearances and connection details. Computer generated fan curves for each fan shall be submitted with specificdesign operation point noted. Wiring diagram shall be provided with details for both power and control systems and differentiate between factory installed and field installed wiring.

D. Manufacturer's Instructions: Indicate assembly, support details, connection requirements, and include start-up instructions.

E. Operation and Maintenance Data: Include manufacturer's descriptive literature, operating instructions, installation instructions, maintenance and repair data, and parts listing.

F. Maintenance Materials: Furnish the following for Nanuet Union Free School District's use in maintenance of project.
   1. Extra Filters: One set for each unit.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

B. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Protect units from physical damage by storing off site until roof mounting curbs are in place, ready for immediate installation of units.

1.6 WARRANTY

A. Provide a five year warranty to include coverage for refrigeration compressors.

PART 2 PRODUCTS

2.1 ROOPTOP UNIT INSTALLATION

A. Rooftop unit shall be pre-purchased by the school district. The Mechanical Contractor is responsible for all installation work associated with the rooftop unit, including the hoisting/rigging/mounting of the unit on the rooftop dunnage.

2.2 PACKAGED ROOFTOP UNITS

A. RTU

1. General Description
   a. Packaged rooftop unit shall include compressors, evaporator coils, filters, supply fans, dampers, air-cooled condenser coils, condenser fans, reheat coil, exhaust fans, and unit controls.
   b. Unit shall be factory assembled and tested including leak testing of the DX coils, pressure testing of the refrigeration circuit, and run testing of the completed unit. Run test report shall be supplied with the unit in the service compartment's literature pocket.
   c. Unit shall have decals and tags to indicate lifting and rigging, service areas and caution areas for safety and to assist service personnel.
   d. Unit components shall be labeled, including refrigeration system components, and electrical and controls components.
   e. Estimated sound power levels (dB) shall be shown on the unit ratings sheet.
   f. Installation, Operation, and Maintenance manual shall be supplied within the unit.
   g. Laminated color-coded wiring diagram shall match factory installed wiring and shall be affixed to the interior of the control compartment's hinged access door.
   h. Unit nameplate shall be provided in two locations on the unit, affixed to the exterior of the unit and affixed to the interior of the control compartment's hinged access door.
2. Construction
   a. All cabinet walls, access doors, and roof shall be fabricated of double wall, impact resistant, rigid polyurethane foam panels.
   b. Unit insulation shall have a minimum thermal resistance R-value of 13. Foam insulation shall have a minimum density of 2 pounds/cubic foot and shall be tested in accordance with ASTM D1929-11 for a minimum flash ignition temperature of 610°F.
   c. Unit construction shall be double wall with G90 galvanized steel on both sides and a thermal break. Double wall construction with a thermal break prevents moisture

accumulation on the insulation, provides a cleanable interior, reduces heat transfer through the panel, and prevents exterior condensation on the panel.

d. Unit shall be designed to reduce air leakage and infiltration through the cabinet. Cabinet leakage shall not exceed 1% of total airflow when tested at 3 times the minimum external static pressure provided in AHRI Standard 340/360. Panel deflection shall not exceed L/240 ratio at 125% of design static pressure, at a maximum 8 inches of positive or negative static pressure, to reduce air leakage. Deflection shall be measured at the midpoint of the panel height and width. Continuous sealing shall be included between panels and between access doors and openings to reduce air leakage. Piping and electrical conduit through cabinet panels shall include sealing to reduce air leakage.
e. Roof of the air tunnel shall be sloped to provide complete drainage. Cabinet shall have rain break overhangs above access doors.
f. Unit shall include an energy recovery wheel box and Class I motorized outdoor air damper.
g. Access to filters, dampers, cooling coils, reheat coil, compressors, and electrical and controls components shall be through hinged access doors with quarter turn, zinc cast, lockable handles. Full length stainless steel piano hinges shall be included on the doors.
h. Exterior paint finish shall be capable of withstanding at least 2,500 hours, with no visible corrosive effects, when tested in a salt spray and fog atmosphere in accordance with ASTM B 117-95 test procedure.
i. Units with cooling coils shall include double sloped 304 stainless steel drain pans.
j. Unit shall be provided with BOTTOM discharge and return air openings.
k. Unit shall include lifting lugs on the top of the unit.
l. Unit base shall be fabricated of 1 inch thick double wall, impact resistant, rigid polyurethane foam panels.

3. Electrical
   a. Unit shall have a 5kAIC SCCR.
   b. Unit shall be provided with factory installed and factory wired, non-fused disconnect switch.
   c. Unit shall be provided with a factory installed and factory wired 115V, 12 amp GFI outlet disconnect switch in the unit control panel.
   d. Unit shall be provided with phase and brown out protection which shuts down all motors in the unit if the electrical phases are more than 10% out of balance on voltage, the voltage is more than 10% under design voltage or on phase reversal.
4. Supply Fans
   a. Unit shall include direct drive, unhoused, backward curved, plenum supply fans.
   b. Blowers and motors shall be dynamically balance and mounted on rubber isolators.
   c. Motors shall be premium efficiency ODP with ball bearings rated for 200,000 hours service with external lubrication points.
   d. Variable frequency drives shall be factory wired and mounted in the unit.
5. Exhaust Fans
   a. Exhaust dampers shall be sized for 100% relief.
   b. Fans and motors shall be dynamically balanced.
   c. Unit shall include barometric relief dampers.
   d. Motors shall be premium efficiency ODP with ball bearings rated for 200,000 hours service with external lubrication points.
   e. Access to exhaust fans shall be through double wall, hinged access doors with quarter turn lockable handles.
   f. Unit shall include belt driven, unhoused, backward curved, plenum exhaust fans.
   g. Variable frequency drives shall be factory wired and mounted in the unit.

6. Cooling Coils
    a. Evaporator Coils
        1) Coils shall be designed for use with R-410A refrigerant and constructed of copper tubes with aluminum fins mechanically bonded to the tubes and galvanized steel end casings. Fin design shall be sine wave rippled.
        2) Coils shall have interlaced circuitry and shall be 6 row high capacity.
        3) Coils shall be hydrogen or helium leak tested.
        4) Coils shall be furnished with factory installed expansion valves.
7. Refrigeration System
    a. Unit shall be factory charged with R-410A refrigerant with 1 Variable Capacity Tandem Compressor and 1 On/Off Tandem Compressor.
    b. Compressors shall be scroll type with thermal overload protection and carry a 5 year non-prorated warranty, from the date of original equipment shipment from the factory.
    c. Compressors shall be mounted in an isolated service compartment which can be accessed without affecting unit operation. Lockable hinged compressor access doors shall be fabricated of double wall, rigid polyurethane foam injected panels to prevent the transmission of noise outside the cabinet.
    d. Compressors shall be isolated from the base pan with the compressor manufacturer's recommended rubber vibration isolators, to reduce any transmission of noise from the compressors into the building area.
    e. Each refrigeration circuit shall be equipped with expansion valve type refrigerant flow control.
    f. Each refrigeration circuit shall be equipped with automatic reset low pressure and manual reset high pressure refrigerant safety controls, Schrader type service fittings on both the high pressure and low pressure sides and a factory installed liquid line filter driers.
    g. Unit shall include a variable capacity tandem scroll compressor on the lead refrigeration circuit which shall be capable of modulation from 10-100% of its capacity and a tandem staged compressor on the lag circuit.
    h. Unit shall include factory provided and installed compressor sound jackets on all compressors.
    i. All refrigeration circuits shall be provided with hot gas reheat coil, modulating valves, electronic controller, supply air temperature sensor and a control signal terminal which allow the unit to have a dehumidification mode of operation, which includes supply air temperature control to prevent supply air temperature swings and overcooling of the space.
    j. Reheat coils shall be multi-pass and fabricated from aluminum microchannel tubes. The reheat coils shall be piped in parallel with the condensing unit.
    k. Each refrigeration circuit shall be equipped with a liquid line sight glass.
    l. Unit shall be provided with a fixed 55F compressor lockout.
8. Condensers
    a. Air-Cooled Condenser
        1) Condenser fans shall be a vertical discharge, axial flow, direct drive fans.
        2) Coils shall be designed for use with R-410A refrigerant. Coils shall be multi-pass and fabricated from aluminum microchannel tubes.
        3) Coils shall be designed for a minimum of 10°F of refrigerant sub-cooling.
        4) Coils shall be hydrogen or helium leak tested.
        5) Condenser fans shall be high efficiency electrically commutated motor driven with factory installed head pressure control module. Condenser airflow shall continuously modulate based on head pressure and cooling operation shall be allowed down to 35°F with adjustable compressor lockout.
9. Filters

a. Unit shall include 4 inch thick, pleated panel filters with an ASHRAE MERV rating of 14, upstream of the cooling coil. Unit shall also include 2 inch thick, pleated panel pre filters with an ASHRAE MERV rating of 8, upstream of the 4 inch standard filters.
b. Unit shall include a clogged filter switch.
c. Unit shall include a Magnehelic gauge mounted in the controls compartment.

10. Accessories
    a. Unit shall be provided with a safety shutdown terminal block for field installation of a smoke detector which shuts off the unit's control circuit.
11. Energy Recovery
    a. The rooftop unit shall be provided with an AHRI certified rotary wheel air-to-air heat exchanger in a cassette frame complete with seals, drive motor and drive belt. The energy recovery wheel shall be an integral part of the rooftop unit with unitary construction and does not require field assembly. Bolt-on energy recovery units that require field assembly and section to section gasketing and sealing are not acceptable.
    b. The wheel capacity, air pressure drop and effectiveness shall be AHRI certified per AHRI Standard 1060. Thermal performance shall be certified by the manufacturer in accordance with ASHRAE Standard 84, Method of Testing Air-to-Air Heat Exchangers and AHRI Standard 1060, Rating Air-to-Air Heat Exchangers For Energy Recovery Ventilation Equipment.
    c. The rooftop unit shall be designed with a track so the entire energy recovery wheel cassette can slide out from the rooftop unit to facilitate cleaning.
    d. The unit shall have 2” Merv 8 filters for the outdoor air before the wheel to help keep the wheel clean and reduce maintenance. Filter access shall be by a hinged access door with ¼ turn latches.
    e. The matrix design shall have channels to reduce cross contamination between the outdoor air and the exhaust air. The layers shall be effectively captured in aluminum and stainless steel segment frames that provide a rigid and self-supporting matrix. All diameter and perimeter seals shall be provided as part of the cassette assembly and shall be factory set. Drive belt(s) of stretch urethane shall be provided for wheel rim drive without the need for external tensioners or adjustment.
    f. The total energy recovery wheel shall be coated with silica gel desiccant permanently bonded without the use of binders or adhesives, which may degrade desiccant performance. The substrate shall be lightweight polymer and shall not degrade nor require additional coatings for application in marine or coastal environments. Coated segments shall be washable with detergent or alkaline coil cleaner and water. Desiccant shall not dissolve nor deliquesce in the presence of water or high humidity.
    g. Wheels shall be provided with removable energy transfer matrix. Wheel frame construction shall be a welded hub, spoke and rim assembly of stainless, plated and/or coated steel and shall be self-supporting without matrix segments in place. Segments shall be removable without the use of tools to facilitate maintenance and cleaning.
    h. Wheel bearings shall be selected to provide an L-10 life in excess of 400,000 hours. Rim shall be continuous rolled stainless steel. Wheels shall be connected to the shaft by means of taper lock hubs.
    i. The control of the energy recovery wheel shall be by the DDC system controls througha BACnet interface furnished by the RTU manufacturer. The DDC system shall have visibility of the outdoor air temperature, leaving wheel temperature, return air temperature, and exhaust air temperature. These temperatures shall be displayed at the rooftop units DDC controller LCD display. All of these temperatures shall be made available through the BACnet interface.

j. The rooftop unit with the energy recovery wheel shall incorporate the economizer operation. The energy recovery wheel shall have a bypass damper. When the unit is in the economizer mode of operation the energy recovery wheel shall stop and the bypass dampers shall be opened. The outdoor air shall be drawn through the bypass dampers to reduce the pressure drop of the outdoor airstream.

k. The DDC controls shall provide frost control for the energy recovery wheel. When a frost condition is encountered the unit controller shall stop the wheel. When in the frost control mode the wheel shall be jogged periodically and not be allowed to stay in the stationary position.

12. Controls
    a. Field Installed DDC Controls by Others (except for refrigeration controls).
    b. Performance:
        1) Controls shall be field provided and field installed by others. Provide RTUs with stripped control systems except for the refrigeration/cooling controls.
        2) The RTU refrigeration controls shall send a 0-10 VDC signal to the direct digital control system rooftop unit controller for modulation of the cooling system.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that roof is ready to receive work and opening dimensions are as indicated on shop drawings.

B. Verify that proper power supply is available.

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install in accordance with NFPA 90A.

C. Mount units on factory built roof mounting curb providing watertight enclosure to protect ductwork and utility services. Install roof mounting curb level.

3.3 SYSTEM STARTUP

A. Prepare and start equipment. Adjust for proper operation.

3.4 CLOSEOUT ACTIVITIES

A. Demonstrate operation to Nanuet Union Free School District's maintenance personnel.

END OF SECTION 23 74 13

SECTION 237433 - DEDICATED OUTDOOR AIR UNITS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Roof-mounted Dedicated Outdoor Air Units (DOAS).

1.2 REFERENCE STANDARDS

A. ASHRAE Std 90.1 - Energy Standard for Buildings Except Low-Rise Residential Buildings; 2013, Including All Addenda.

B. NFPA 54 - National Fuel Gas Code; 2015.

C. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

D. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2015.

E. ANSI Z21.40.1/CGA 2.91

F. ANSI Z21.40.2/CGA 2.92

1.3 SUBMITTALS

A. Product Data: Provide data with dimensions, duct and service connections, accessories, controls, electrical nameplate data, and wiring diagrams.

B. Shop Drawings: Indicate dimensions, duct and service connections, accessories, controls, electrical nameplate data, and wiring diagrams.

C. Manufacturer's Instructions: Indicate rigging, assembly, and installation instructions.

D. Operation And Maintenance Data: Include manufacturer's descriptive literature, operating instructions, installation instructions, maintenance and repair data, and parts listing.

E. Warranty: Submit manufacturer’s warranty and ensure forms have been filled out in Nanuet Union Free School District's name and registered with manufacturer.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

1.5 EXTRA MATERIALS

A. Supply two sets for each unit of filters.

PART 2 PRODUCTS

2.1 INDIRECT GAS FIRED ROOFTOP MAKE-UP AIR UNIT

A. MANUFACTURED UNITS
   1. Unit with Integral Heating shall be fully assembled at the factory and consist of an insulated metal cabinet, outdoor air intake weatherhood with aluminum mesh filter, motorized intake damper sensors, curb assembly, filter assembly for intake air, supply air blower assembly and an electrical control center. All specified components and internal accessories factory installed and tested and prepared for single-point high voltage connection.

B. Materials: Formed, double wall insulated metal cabinet
   1. Outside casing: 18 gauge, galvanized (G90) steel meeting ASTM A653 for components that do not receive a painted finish. Pre-painted components as supplied by the factory

shall have polyester urethane paint on 18 gauge G60 galvaneal steel. Base rail shall be 12 gauge, galvazined (G90) steel.

2. Internal assemblies: 24 gauge, galvanized (G90) steel except for motor supports which shall be minimum14 gauge galvanized (G90) steel.

C. Cabinet Insulation: Comply with NFPA 90A and NFPA 90B and erosion requirements of UL 181.
   1. Materials: Fiberglass insulation. If insulation other than fiberglass is used, it must also meet the Fire Hazard Classification shown below.
      a. Thickness: 1 inch (25 mm)
      b. Fire Hazard Classification: Maximum flame spread of 25 and smoke developed of 50, when tested in accordance with ASTM C 411.
      c. Location and application: Floor of each unit shall be insulated with 1 inch thick rigid fiberglass insulation, covered on one surface with integral aluminum foil. Full interior coverage of entire cabinet to include walls and roof of unit shall be semi-rigid type and installed between inner and outer shells of all cabinet exterior components.

D. Access panels: Unit shall be equipped with insulated, removable, hinged access panels to provide easy access to all major components. Access panels shall be fabricated of 18 gauge galvanized G90 steel. Removable access panels shall incorporate a formed drip edge.

E. Supply Air blower assembly: Blower assembly consists of an electric motor and a direct driven, double width, and double inlet forward curve blower. Assembly shall be mounted on heavy gauge galvanized rails and further mounted on minimum 1.125 inch thick neoprene vibration isolators.

F. Control panel / connections: unit shall have an electrical control center where all high and low voltage connections are made. Control center shall be constructed to permit single-point high voltage power supply connections.

G. Indirect Gas-Fired Furnace
   1. Shall be ETL Certified as a component of the unit.
   2. Shall have an integral combustion gas blower.
   3. Shall be ETL Certified for installation downstream of a cooling coil.
   4. Shall have fault sensors to provide fault conditions to optional digital controller or building controls.
   5. Shall have 4-pass tubular heat exchangers, constructed of type 409 stainless steel. Heat exchanger tubes shall be installed on the vest plate by means of swaged assembly, welded connections are not acceptable. Heat exchanger tubes shall be supported by a minimum of two fabricated assemblies that support the tubes and also permit expansion and contraction of the tubes.
   6. Heat exchanger shall have a 5 year extended warranty.
   7. Furnace control shall be single furnace with 16:1 turndown.
   8. Shall be encased in a weather-tight metal housing with intake air vents. Large, metal lift-off or hinged door shall provide easy access to the enclosed vest plate, control circuitry, gas train, burner assembly and exhaust blower.
   9. Shall have solid state controls permitting stand-alone operation or control by building controllers.

H. Intake Air: Class 1A Motorized damper of insulated low leakage type shall be factory installed.

I. Curb Assembly: An 18 inch high curb assembly made of 14 gauge galvanized steel shall be provided by the factory for assembly and installation. The curb assembly shall provide perimeter support of the entire unit and shall have a end discharge duct adapter for supply air. The curb assembly shall enclose the underside of the unit and shall be sized to fit into a recess in the bottom of the unit. Contractor shall be responsible for coordinating with roofing contractor

to ensure curb unit is properly flashed to provide protection against weather/moisture penetration. Contractor shall provide and install appropriate insulation for the curb assembly.

J. BLOWER
1. Blower section construction, Supply Air: Direct drive motor and blower shall be assembled onto a minimum 14 gauge galvanized steel platform and shall have neoprene vibration isolation devices, minimum of 1-1/8 inches thick.
2. Blower assemblies: Shall be statically and dynamically balanced and designed for continuous operation at maximum rated fan speed and horsepower.
3. Centrifugal blower housing: Formed and reinforced steel panels to make curved scroll housing with shaped cutoff.
4. Mixed flow blower fan wheel.
5. Blower section motor source quality control: Blower performance shall be factory tested for flow rate, pressure, power, air density, rotation speed and efficiency. Ratings are to be established in accordance with AMCA 210, “Laboratory Methods of Testing Fans for Rating”.

K. MOTOR
1. General: Blower motors greater than or equal to ¾ horsepower shall be “NEMA Premium™” unless otherwise indicated. Compliance with EPAct minimum energy-efficiency standards for single speed ODP and TE enclosures is not acceptable. Motors shall be heavy-duty, permanently lubricated type to match the fan load and furnished at the specified voltage, phase and enclosure. Drives shall be sized for a minimum of 150% of driven horsepower and pulleys shall be fully machined cast-type, keyed and fully secured to the fan wheel and motor shafts. Electric motors of ten horsepower or less shall be supplied with an adjustable drive pulley.
2. Unit shall be provided with factory furnished variable frequency drive for the supply with 0-10 VDC external control signal modulation capability.

L. UNIT CONTROLS
1. This unit shall be controlled by a factory-installed microprocessor programmable controller (DDC) that is connected to various sensors.
2. Unit shall incorporate a DDC controller with integral LCD screen that provides text readouts of status, operating settings and alarm conditions. DDC controller shall have a built-in keypad to permit operator to access read-out screens and change settings without the use of ancillary equipment, devices or software. DDC controllers that require the use of equipment or software that is not factory-installed in the unit are not acceptable. Alarm readouts consisting of flashing light codes are not acceptable.
3. Operating protocol: The DDC shall be factory-programmed for BACnet MSTP for monitoring of the unit’s status and control of the unit’s functions.

M. FILTERS
1. Unit shall have 2" thick MERV 13 disposable pleated filters located in the outdoor air intake and shall be accessible from the exterior of the unit.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install to NFPA 90A.

C. Provide flexible duct connections on outlet from unit; refer to Section 233300.

D. Installation shall be accomplished in accordance with these written specifications, project drawings, manufacturer’s installation instructions as documented in manufacturer’s IOM, Best Practices and all applicable building codes.

E. Gas-fired air-conditioning appliances shall be tested in accordance with ANSI Z21.40.1/CGA 2.91 or ANSI Z21.40.2/CGA 2.92 and shall be installed in accordance with the manufacturer's instructions.

3.2 START-UP SERVICE

A. Engage a factory authorized service representative to perform startup service. Clean entire unit, comb coil fins as necessary, and install clean filters. Verify water source for compliance with manufacturer’s requirements for flow and temperature. Measure and record electrical values for voltage and amperage. Refer to Division 23 “Testing, Adjusting and Balancing” and comply with provisions therein.

END OF SECTION 23 74 33

SECTION 238126.13 - SMALL-CAPACITY SPLIT-SYSTEM AIR CONDITIONERS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Air-source heat pumps.

B. Indoor air handling (fan and coil) units for ducted systems.

C. Controls.

1.2 REFERENCE STANDARDS

A. AHRI 270 - Sound Performance Rating of Outdoor Unitary Equipment; 2008.

B. AHRI 520 - Performance Rating of Positive Displacement Condensing Units; 2004.

C. ASHRAE Std 15 - Safety Standard for Refrigeration Systems; 2013.

D. ASHRAE Std 52.2 - Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size; 2012, with 2015 amendments.

E. ASHRAE Std 90.1 I-P - Energy Standard for Buildings Except Low-Rise Residential Buildings; 2013, Including All Ammendments and Errata.

F. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2015.

G. NFPA 90B - Standard for the Installation of Warm Air Heating and Air-Conditioning Systems; 2015.

1.3 SUBMITTALS

A. Product Data: Provide rated capacities, weights, accessories, electrical nameplate data, and wiring diagrams.

B. Sustainable Design Documentation: Submit manufacturer's product data on refrigerant used, showing compliance with specified requirements.

C. Shop Drawings: Indicate assembly, required clearances, and location and size of field connections.

D. Design Data: Indicate refrigerant pipe sizing.

E. Manufacturer's Instructions: Indicate rigging, assembly, and installation instructions.

F. Project Record Documents: Record actual locations of components and connections.

G. Operation and Maintenance Data: Include manufacturer's descriptive literature, operating instructions, installation instructions, maintenance and repair data, and parts listing.

H. Warranty: Submit manufacturers warranty and ensure forms have been filled out in Nanuet Union Free School District's name and registered with manufacturer.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

B. Installer Qualifications: Company specializing in performing the work of this section with minimum 3 years of experience and approved by manufacturer.

1.5 WARRANTY

A. Provide five year manufacturers warranty for compressors.

PART 2 PRODUCTS

2.1 SYSTEM DESIGN

A. Split-System Heating and Cooling Units: Self-contained, packaged, matched factory-engineered and assembled, pre-wired indoor and outdoor units; UL listed.
   1. Heating and Cooling: Air-source electric heat pump located in outdoor unit with evaporator.
   2. Provide refrigerant lines internal to units and between indoor and outdoor units, factory cleaned, dried, pressurized and sealed, with insulated suction line.

B. Performance Requirements: See Drawings for additional requirements.

2.2 INDOOR AIR HANDLING UNITS FOR DUCTED SYSTEMS

A. LOW PROFILE CEILING-CONCEALED DUCTED INDOOR UNIT
   1. General:
      a. The indoor unit shall be factory assembled, wired and run tested. Contained within the unit shall be all factory wiring, piping, electronic modulating linear expansion device, control circuit board and fan motor. The unit shall have a self-diagnostic function, 3-minute time delay mechanism, and an auto restart function. Indoor unit and refrigerant pipes shall be charged with dehydrated air before shipment from the factory. The unit shall be suitable for use in plenums in accordance with UL1995 ed 4.
   2. Unit Cabinet:
      a. The cabinet shall be space saving, low profile height of 7-7/8” or less, ceiling-concealed ducted—with a rear return and a fixed horizontal discharge supply.
      b. The cabinet shall be configured for horizontal supply and return air connections. Bottom return air connection shall be achievable with the Bottom Return Plate manufacturer supplied accessory.
   3. Fan:
      a. Indoor units shall feature adjustable external static pressure settings up to 0.20 in. WG.
      b. The indoor unit fan shall be an assembly with one statically and dynamically balanced Sirocco fan direct driven by a single motor with permanently lubricated bearings.
      c. The indoor unit shall include an AUTO fan setting capable of maximizing energy efficiency by adjusting the fan speed based on the difference between controller set-point and space temperature. The indoor fan shall be capable of four (4) speed settings, Low, Med, High and Auto.
   4. Filter Frame and Filter
      a. Filter frame shall be constructed of 20 gauge G-60 galvanized steel. Knurled thumb screws on access door allow filter replacement. Foam gasket provides air-tight connection to indoor unit and access door. Filter frame shall be configurable for rear or bottom return.
      b. Filter shall be rated MERV 8 when tested in accordance with ANSI/ASHRAE 52.2 Standard Rated Class 2 under U.L.. Standard 900.
   5. Coil:
      a. The indoor coil shall be of nonferrous construction with smooth plate fins on copper tubing. The tubing shall have inner grooves for high efficiency heat exchange. All tube joints shall be brazed with phos-copper or silver alloy.
      b. The coils shall be pressure tested at the factory.
      c. Coil shall be provided with a sloped drain pan. Units without sloped drain pans which must be installed cockeyed to ensure proper drainage are not allowed.

d. The unit shall be provided with an integral condensate lift mechanism able to raise drain water 21 inches above the condensate pan.

6. Electrical:
   a. The unit electrical power shall be 208/230 volts, 1 phase, 60 hertz.
   b. The system shall be equipped with A-Control – a system directing that the indoor unit be powered directly from the outdoor unit using a 3-wire, 14 gauge AWG connections plus ground.
   c. The indoor unit shall not have any supplemental electrical heat elements.
7. Controls:
   a. Indoor unit shall compensate for the higher temperature sensed by the return air sensor compared to the temperature at level of the occupant when in HEAT mode. Disabling of compensation shall be possible for individual units to accommodate instances when compensation is not required.
   b. Control board shall include contacts for control of external heat source. External heat may be energized as second stage when the space temperature is 1.8°F from set point.
   c. A factory-installed drain pan sensor shall provide protection against drain pan overflow by sensing a high condensate level in the drain pan. Should this occur the control shuts down the indoor unit before an overflow can occur.

2.3 OUTDOOR UNITS

A. The outdoor units shall be specifically designed to work with the ducted, 4-way cassette, one-way cassette and multi-position air handler indoor units. The outdoor units must have a thermally fused powder coated finish. The outdoor unit shall be completely factory assembled, piped and wired. Each unit shall be run tested at the factory.

B. Outdoor unit shall have a sound rating no higher than 55 dB(A). If an alternate manufacturer is selected, any additional material, cost, and labor to meet published sound levels shall be incurred by the contractor.

C. Refrigerant lines from the outdoor unit to the indoor units shall be insulated in accordance with the installation manual.

D. The outdoor unit shall meet performance requirements per schedule and be within piping limitations & acceptable ambient temperature ranges as described in respective manufacturers' published product catalogs. Non-published product capabilities or performance data are not acceptable.

E. The outdoor unit shall be capable of guaranteed operation in heating mode down to -13°F ambient temperatures and cooling mode up to 115°F without additional restrictions on line length & vertical separation beyond those published in respective product catalogs. Models with capacity data for required temperature range published as "for reference only" are not considered capable of guaranteed operation and are not acceptable. If an alternate manufacturer is selected, any additional material, cost, and labor to meet ambient operating range and performance shall be incurred by the contractor.

F. The outdoor unit shall be provided with a manufacturer supplied 20 gauge hot dipped galvanized snow /hail guard. The snow/hail guard protects the outdoor coil surfaces from hail damage and snow build-up in severe climates.

G. Four-legged outdoor unit mounting systems shall be provided by manufacturer. Stand shall be made from 7 gauge plate steel with thermally fused polyester powder coat finish that meets ASTM D3451-06 standards. Stands shall be provided with galvanized mounting hardware and meets all ASCE 7 overturning safety requirement.

H. Unit Cabinet:

1. The casing shall be fabricated of galvanized steel, bonderized, finished with an electrostatically applied, thermally fused acrylic or polyester powder coating for corrosion protection. Assembly hardware shall be cadmium plated for weather resistance.
2. Cabinet color shall be Munsell 3Y 7.8/1.1.
3. Two (2) mild steel mounting feet, traverse mounted across the cabinet base pan, welded mount, providing four (4) slotted mounting holes shall be furnished. Assembly shall withstand lateral wind gust up to 155 MPH to meet applicable weather codes.The casing(s) shall be fabricated of galvanized steel, bonderized and finished.

I. Fan:
1. The unit shall be furnished with a direct drive propeller type fan.
2. The outdoor unit fan motor shall be a direct current (DC) motor and have permanently lubricated bearings.
3. The fan motor shall be mounted for quiet operation.
4. The fan shall be provided with a raised guard to prevent contact with moving parts.
5. The outdoor unit shall have horizontal discharge airflow.

J. Refrigerant and Refrigerant Piping
1. R410A refrigerant shall be required for systems.
2. Polyolester (POE) oil—widely available and used in conventional domestic systems—shall be required. Prior to bidding, manufacturers using alternate oil types shall submit material safety data sheets (MSDS) and comparison of hygroscopic properties for alternate oil with list of local suppliers stocking alternate oil for approval at least two weeks prior to bidding.
3. Refrigerant piping shall be phosphorus deoxidized copper (copper and copper alloy seamless pipes) of sufficient radial thickness as defined by the equipment manufacturer and installed in accordance with manufacturer recommendations.
4. Refrigerant line sizing shall be in accordance with manufacturer specifications.

K. Coil:
1. The outdoor unit coil shall be of nonferrous construction with lanced or corrugated plate fins on copper tubing.
2. The coil fins shall have a factory applied corrosion resistant Blue Fin finish. Uncoated aluminum coils/fins are not allowed.
3. The coil shall be protected with an integral metal guard.
4. Refrigerant flow from the outdoor unit shall be regulated by means of an electronically controlled, precision, linear expansion valve.
5. Outdoor unit shall be pre-charged with sufficient R-410a refrigerant for up to twenty five (25) feet of refrigerant piping for capacities up to 24,000 BTU/h.
6. All refrigerant lines between outdoor and indoor units shall be of annealed, refrigeration grade copper tubing, ARC Type, meeting ASTM B280 requirements.
7. All refrigerant connections between outdoor and indoor units shall be flare type.

L. Compressor:
1. The compressor shall be a high performance, hermetic, inverter driven, variable speed, dual rotary type manufactured by Mitsubishi Electric Corporation.
2. The compressor motor shall be direct current (DC) type equipped with a factory supplied and installed inverter drive package.
3. The compressor will be equipped with internal thermal overload protection.
4. The outdoor unit must have the ability to operate over the full capacity range with a maximum height difference of 40 feet (12 meters) for 9,000, 12,000, and 15,000 BTU/h models, 50 feet (15 meters) for 18,000 BTU/h models, and 100 feet (30 meters) for 24,000 BTU/h, 30,000 BTU/h and 36,000 BTU/h models; and have refrigerant tubing length of up to 65 feet (20 meters) for 9,000, 12,000, and 15,000 BTU/h models, and 100 feet (30 meters) for 18,000 BTU/h, 24,000 BTU/h, 30,000 BTU/h and 36,000 BTU/h models between the indoor and outdoor units.

5. Filters, sight glasses, and traps shall not be used, and no additional refrigerant oil shall be required.
6. The compressor shall be mounted so as to avoid the transmission of vibration.

M. Basepan Heater:
1. Each outdoor unit module shall be equipped with a basepan heater to protect the coil against ice build-up during prolonged winter operation. Basepan heater shall activate only if compressor is operating in heating mode at an outdoor ambient temperature of 36F or below.

2.4 ACCESSORY EQUIPMENT

A. Controls
1. The control system shall consist of a minimum of one microprocessor on each indoor unit and one in the outdoor unit, communicating via A-Control data over power transmission. The microprocessor located in the indoor unit shall have the capability of monitoring return air temperature and indoor coil temperature, receiving and processing commands from the wired or wireless controller, providing emergency operation and controlling the outdoor unit. The control signal between the indoor and outdoor unit shall be pulse signal 24 volts DC.
2. A three (3) conductor 14 gauge AWG wire with ground shall provide power feed and bi-directional control transmission between the outdoor and indoor units.
3. The system shall be capable of automatic restart when power is restored after power interruption. The system shall have self-diagnostics ability, including total hours of compressor run time. Diagnostics codes for indoor and outdoor units shall be displayed on the wired controller panel.
4. The indoor and outdoor unit control system shall be capable of supporting integration with Building Management Systems (BMS) through BACnet Protocol (ANSI/ASHRAE 135-2010) and be Certified by the (BTL) BACnet® Testing Laboratories. The BACnet® interface shall support BACnet Broadcast Management (BBMD).

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that substrates are ready for installation of units and openings are as indicated on shop drawings.

B. Verify that proper power supply is available and in correct location.

3.2 INSTALLATION

A. Install in accordance with NFPA 90A and NFPA 90B.

B. Install refrigeration systems in accordance with ASHRAE Std 15.

END OF SECTION 23 81 26.13

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SECTION 238129 - VARIABLE REFRIGERANT FLOW HVAC SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Variable refrigerant volume HVAC system includes:
   1. Outdoor/condensing unit(s).
   2. Indoor/evaporator units.
   3. Refrigerant piping.
   4. Control wiring.

1.2 SUBMITTALS

A. Product Data: Submit manufacturer's standard data sheets showing the following for each item of equipment, marked to correlate to equipment item markings indicated in Contract Documents:
   1. Outdoor/Central Units:
      a. Refrigerant Type and Size of Charge.
      b. Cooling Capacity: Btu/h.
      c. Heating Capacity: Btu/h.
      d. Cooling Input Power: Btu/h.
      e. Heating Input Power: Btu/h.
      f. Operating Temperature Range, Cooling and Heating.
      g. Air Flow: Cubic feet per minute.
      h. Fan Curves.
      i. External Static Pressure (ESP): Inches WG.
      j. Sound Pressure Level: dB(A).
      k. Electrical Data:
         1) Maximum Circuit Amps (MCA).
         2) Maximum Fuse Amps (MFA).
         3) Maximum Starting Current (MSC).
         4) Full Load Amps (FLA).
         5) Total Over Current Amps (TOCA).
         6) Fan Motor: HP.
      l. Weight and Dimensions.
      m. Maximum number of indoor units that can be served.
      n. Maximum refrigerant piping run from outdoor/condenser unit to indoor/evaporator unit.
      o. Maximum height difference between outdoor/condenser unit to indoor/evaporator unit, both above and below.
      p. Control Options.
   2. Indoor/Evaporator Units:
      a. Cooling Capacity: Btu/h.
      b. Heating Capacity: Btu/h.
      c. Cooling Input Power: Btu/h.
      d. Heating Input Power: Btu/h.
      e. Air Flow: Cubic feet per minute.
      f. Fan Curves.
      g. External Static Pressure (ESP): Inches WG.
      h. Sound Pressure level: dB(A).
      i. Electrical Data:
         1) Maximum Circuit Amps (MCA).

2) Maximum Fuse Amps (MFA).
3) Maximum Starting Current (MSC).
4) Full Load Amps (FLA).
5) Total Over Current Amps (TOCA).
6) Fan Motor: HP.

j. Maximum Lift of Built-in Condensate Pump.
k. Weight and Dimensions.
l. Control Options.

3. Control Panels: Complete description of options, control points, zones/groups.

B. Shop Drawings: Installation drawings custom-made for this project; include as-designed HVAC layouts, locations of equipment items, refrigerant piping sizes and locations, condensate piping sizes and locations, remote sensing devices, control components, electrical connections, control wiring connections. Include:
1. Detailed piping diagrams, with branch balancing devices.
2. Condensate piping routing, size, and pump connections.
3. Detailed power wiring diagrams.
4. Detailed control wiring diagrams.
5. Locations of required access through fixed construction.
6. Drawings required by manufacturer.

PART 2 PRODUCTS

2.1 MULTI-ZONE HEAT PUMP UNITS

A. Ported outdoor units shall be specifically designed to work with the wall mount, floor mount, ducted, 4-way ceiling recessed, 1-way ceiling recessed, ceiling suspended and multi-position air handler indoor unit types. The outdoor unit shall be completely factory assembled, piped and wired. Each unit shall be run tested at the factory prior to shipment.

B. Outdoor unit shall have a sound rating no higher than 58 dB(A). If an alternate manufacturer is selected, any additional material, cost, and labor to meet published sound levels shall be incurred by the contractor.

C. Refrigerant lines from the outdoor unit to the indoor units shall be insulated in accordance with the installation manual.

D. The outdoor unit shall meet performance requirements per schedule and be within piping limitations & acceptable ambient temperature ranges as described in respective manufacturers' published product catalogs. Non-published product capabilities or performance data are not acceptable.

E. The outdoor unit shall be capable of guaranteed operation in heating mode down to -13°F ambient temperatures and cooling mode up to 115°F without additional restrictions on line length & vertical separation beyond those published in respective product catalogs. Models with capacity data for required temperature range published as "for reference only" are not considered capable of guaranteed operation and are not acceptable. If an alternate manufacturer is selected, any additional material, cost, and labor to meet ambient operating range and performance shall be incurred by the contractor.

F. The outdoor unit shall be provided with a manufacturer supplied 20 gauge hot dipped galvanized snow /hail guard. The snow/hail guard protects the outdoor coil surfaces from hail damage and snow build-up in severe climates.

G. Four-legged outdoor unit mounting systems shall be provided by manufacturer. Stand shall be made from 7 gauge plate steel with thermally fused polyester powder coat finish that meets ASTM D3451-06 standards. Stands shall be provided with galvanized mounting hardware and meets all ASCE 7 overturning safety requirement.

H. Unit Cabinet:
   1. The casing shall be fabricated of galvanized steel, bonderized, finished with an electrostatically applied, thermally fused acrylic or polyester powder coating for corrosion protection. Assembly hardware shall be cadmium plated for weather resistance.
   2. Cabinet color shall be Munsell 3Y 7.8/1.1.
   3. Two (2) mild steel mounting feet, traverse mounted across the cabinet base pan, welded mount, providing four (4) slotted mounting holes shall be furnished. Assembly shall withstand lateral wind gust up to 155 MPH to meet applicable weather codes.

I. Fan:
   1. The unit shall be furnished with a direct drive, high performance propeller type fan.
   2. The condenser fan motor shall be a variable speed, direct current (DC) motor and shall have permanently lubricated bearings.
   3. Fan speed shall switch automatically according to the number of operating indoor units and the compressor operating frequency.
   4. The fan motor shall be mounted with vibration isolation for quiet operation.
   5. The fan shall be provided with a raised guard to prevent contact with moving parts.
   6. The outdoor unit shall have horizontal discharge airflow.

J. Refrigerant and Refrigerant Piping:
   1. R410A refrigerant shall be required for systems.
   2. Polyolester (POE) oil—widely available and used in conventional domestic systems—shall be required. Prior to bidding, manufacturers using alternate oil types shall submit material safety data sheets (MSDS) and comparison of hygroscopic properties for alternate oil with list of local suppliers stocking alternate oil for approval at least two weeks prior to bidding.
   3. Refrigerant piping shall be phosphorus deoxidized copper (copper and copper alloy seamless pipes) of sufficient radial thickness as defined by the equipment manufacturer and installed in accordance with manufacturer recommendations.
   4. Refrigerant piping limits shall be in accordance with manufacturer specifications.

K. Coil:
   1. The outdoor unit coil shall be of nonferrous construction with lanced or corrugated plate fins on copper tubing.
   2. The coil shall be protected with an integral guard.
   3. Refrigerant flow from the outdoor unit to the indoor units shall be independently controlled by means of individual electronic linear expansion valves for each indoor unit.
   4. All refrigerant lines between outdoor and indoor units shall be of annealed, refrigeration grade copper tubing, ARC Type, meeting ASTM B280 requirements.
   5. All refrigerant connections between outdoor and indoor units shall be flare type.

L. Compressor:
   1. The compressor shall be a high performance, hermetic, inverter driven, variable speed, dual rotary type manufactured by Mitsubishi Electric Corporation.
   2. The compressor motor shall be direct current (DC) type equipped with a factory supplied and installed inverter drive package.
   3. The compressor will be equipped with an internal thermal overload.
   4. The outdoor unit shall be equipped with a suction side refrigerant accumulator.
   5. There shall be no need for line size changes. Filters, sight glasses, and traps shall not be used, and no additional refrigerant oil shall be required.
   6. The compressor shall be mounted to avoid the transmission of vibration.

M. Basepan Heater:
   1. Each outdoor unit module shall be equipped with a basepan heater to protect the coil against ice build-up during prolonged winter operation. Basepan heater shall activate only

if compressor is operating in heating mode at an outdoor ambient temperature of 36F or below.

2.2 INDOOR/EVAPORATOR UNITS

A. 4-WAY CEILING-RECESSED CASSETTE WITH GRILLE FOR 2X2 GRID INDOOR UNIT

1. General:
   a. The indoor unit shall be a four-way cassette style indoor unit that recesses into the ceiling with a ceiling grille. The indoor unit shall be factory assembled, wired and run tested. Contained within the unit shall be all factory wiring, piping, electronic modulating linear expansion device, control circuit board and fan motor. The unit shall have a self-diagnostic function, 3-minute time delay mechanism, an auto restart function, an emergency operation function and a test run switch. Indoor unit and refrigerant pipes shall be charged with dehydrated air before shipment from the factory. The unit shall be suitable for use in plenums in accordance with UL1995 ed 4.
2. Unit Cabinet:
   a. The cabinet shall be a compact 22-7/16” wide x 22-7/16” deep so it will fit within a standard 24” square suspended ceiling grid.
   b. The cabinet panel shall have provisions for a field installed filtered outside air intake.
   c. Four-way grille shall be fixed to bottom of cabinet allowing two, three or four-way blow.
3. Fan:
   a. The indoor fan shall be an assembly with a turbo fan direct driven by a single motor.
   b. The indoor fan shall be statically and dynamically balanced to run on a motor with permanently lubricated bearings.
   c. The indoor unit shall include an AUTO fan setting capable of maximizing energy efficiency by adjusting the fan speed based on the difference between controller set-point and space temperature. The indoor fan shall be capable of three (3) speed settings, Low, Mid, and High.
   d. The indoor unit shall have an adjustable air outlet system offering 4-way airflow, 3-way airflow, or 2-way airflow.
   e. The indoor unit vanes shall have 5 fixed positions and a swing feature that shall be capable of automatically swinging the vanes up and down for uniform air distribution.
4. Filter:
   a. Return air shall be filtered by means of a long-life washable filter.
5. Coil:
   a. The indoor coil shall be of nonferrous construction with smooth plate fins on copper tubing. The tubing shall have inner grooves for high efficiency heat exchange. All tube joints shall be brazed with phos-copper or silver alloy.
   b. The coils shall be pressure tested at the factory.
   c. The unit shall be provided with an integral condensate lift mechanism that will be able to raise drain water 19-3/4” inches above the condensate pan.
6. Electrical:
   a. The unit electrical power shall be 208-230 volts, 1-phase, 60 hertz.
   b. The system shall be equipped with A-Control – a system directing that the indoor unit be powered directly from the outdoor unit using a 3-wire, 14 gauge AWG connections plus ground.
   c. The indoor unit shall not have any supplemental electrical heat elements.
7. Controls:
   a. Indoor unit shall compensate for the higher temperature sensed by the return air sensor compared to the temperature at level of the occupant when in HEAT mode.

Disabling of compensation shall be possible for individual units to accommodate instances when compensation is not required.

b. A factory-installed drain pan sensor shall provide protection against drain pan overflow by sensing a high condensate level in the drain pan. Should this occur the control shuts down the indoor unit before an overflow can occur.

2.3 CONTROLS

A. The control system shall consist of a minimum of one microprocessor on each indoor unit and one in the outdoor unit, communicating via A-Control data over power transmission. The microprocessor located in the indoor unit shall have the capability of monitoring return air temperature and indoor coil temperature, receiving and processing commands from the wired or wireless controller, providing emergency operation and controlling the outdoor unit. The control signal between the indoor and outdoor unit shall be pulse signal 24 volts DC.

B. A three (3) conductor 14 gauge AWG wire with ground shall provide power feed and bi-directional control transmission between the outdoor and indoor units.

C. The system shall be capable of automatic restart when power is restored after power interruption. The system shall have self-diagnostics ability, including total hours of compressor run time. Diagnostics codes for indoor and outdoor units shall be displayed on the wired controller panel.

D. The indoor and outdoor unit control system shall be capable of supporting integration with Building Management Systems (BMS) through BACnet Protocol (ANSI/ASHRAE 135-2010) and be Certified by the (BTL) BACnet® Testing Laboratories. The BACnet® interface shall support BACnet Broadcast Management (BBMD).

PART 3 EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install refrigerant piping in accordance with equipment manufacturer's instructions.

C. Perform wiring in accordance with NFPA 70, National Electric Code (NEC).

D. Coordinate with installers of systems and equipment connecting to this system.

3.2 SYSTEM STARTUP

A. Prepare and start equipment and system in accordance with manufacturer's instructions and recommendations.

B. Adjust equipment for proper operation within manufacturer's published tolerances.

END OF SECTION 23 81 29

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SECTION 238200 - CONVECTION HEATING AND COOLING UNITS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Fin Tube Enclosure Systems.

1.2 REFERENCE STANDARDS

A. AHRI 410 - Standard for Forced-Circulation Air-Cooling and Air-Heating Coils; 2001 (R2011).

B. ASHRAE (HVACA) - ASHRAE Handbook - HVAC Applications; 2015.

C. ASHRAE Std 62.1 - Laboratory Method of Testing to Determine the Sound Power in a Duct; 2013.

D. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

E. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2015.

F. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2005.

1.3 SUBMITTALS

A. Product Data: Provide typical catalog of information including arrangements.

B. Shop Drawings:
   1. Indicate cross sections of cabinets, grilles, bracing and reinforcing, and typical elevations.
   2. Indicate air coil and frame configurations, dimensions, materials, rows, connections, and rough-in dimensions.
   3. Submit schedules of equipment and enclosures typically indicating length and number of pieces of element and enclosure, corner pieces, end caps, cap strips, access doors, pilaster covers, and comparison of specified heat required to actual heat output provided.
   4. Indicate mechanical and electrical service locations and requirements.

C. Selection Samples: For each finish product specified, color chart representing manufacturer's full range of available colors.

D. Verification Samples: For each finish product specified, color chip representing actual product in color and texture.

E. Certificates: Certify that coils are tested and rated in accordance with AHRI 410.

F. Manufacturer's Instructions: Indicate installation instructions and recommendations.

G. Operation and Maintenance Data: Include manufacturer's descriptive literature, operating instructions, installation instructions, maintenance and repair data, and parts listings.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

B. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

PART 2 PRODUCTS

2.1 HYDRONIC BASEBOARD RADIATION ENCLOSURE SYSTEMS

A. Fin Tube Enclosure Replacement Systems:

1. Cold-rolled gavanized steel, 16 gauge with stamped louver on top and bottom of enclosure unit, flat top or slope type as outlined on the drawings, height as outlined on the drawings.
2. Accessories as called out on drawings:
   a. End caps, Wall trim supports, 12" wide enclosures with access doors, 12" wide end cap with access doors.
3. Finish of enclosure systems shall be selected by architect.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that surfaces are suitable for installation.

B. Verify that field measurements are as indicated on drawings.

3.2 INSTALLATION

A. Install in accordance with manufacturer's recommendations.

B. Install equipment exposed to finished areas after walls and ceilings are finished and painted.

C. Do not damage equipment or finishes.

3.3 CLEANING

A. After construction and painting is completed, clean exposed surfaces of units.

B. Touch-up marred or scratched surfaces of factory-finished cabinets using finish materials furnished by the manufacturer.

C. Install new filters.

D. Protect units before, during and after installation. Damaged material due to improper site protection shall be cause for rejection.

3.4 PROTECTION

A. Provide finished cabinet units with protective covers during the balance of construction.

END OF SECTION 23 82 00

SECTION 238216 - AIR COILS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Water heating coils.

1.2 REFERENCE STANDARDS

A. AHRI 410 - Standard for Forced-Circulation Air-Cooling and Air-Heating Coils; 2001 (R2011).

B. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2005.

1.3 SUBMITTALS

A. Product Data: Provide coil and frame configurations, dimensions, materials, rows, connections, and rough-in dimensions.

B. Shop Drawings: Indicate coil and frame configurations, dimensions, materials, rows, connections, and rough-in dimensions.

C. Certificates: Certify that coil capacities, pressure drops, and selection procedures meet or exceed specified requirements.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Protect coil fins from crushing and bending by leaving in shipping cases until installation, and by storing indoors.

B. Protect coils from entry of dirt and debris with pipe caps or plugs.

PART 2 PRODUCTS

2.1 40% PROPYLENE GLYCOL SOLUTION HEATING COILS

A. Tubes: 5/8 inch OD seamless copper arranged in parallel or staggered pattern, expanded into fins, silver brazed joints.

B. Fins: Aluminum continuous plate type with full fin collars.

C. Casing: Die formed channel frame of 16 gage, 0.0598 inch galvanized steel with mounting holes on 3 inch centers. Provide tube supports for coils longer than 36 inches.

D. Testing: Air test under water to 450 psi for working pressure of 250 psi and 300 degrees F.

E. Configuration: Drainable, with threaded plugs for drain and vent.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's written instructions.

B. Install in ducts and casings in accordance with SMACNA (DCS).
   1. Support coil sections independent of piping on steel channel or double angle frames and secure to casings.
   2. Provide airtight seal between coil and duct or casing.

C. Protect coils to prevent damage to fins and flanges. Comb out bent fins.

D. Install coils level. Install cleanable tube coils with 1:50 pitch.

E. Make connections to coils with unions and flanges.

F. Hydronic Coils:
   1. Hydronic Coils: Connect water supply to leaving air side of coil (counterflow arrangement).
   2. Provide shut-off valves on supply and return lines and lockshield balancing valve with memory stop on return line. Install valves and unions for each coil arranged to allow coil removal, balancing valve service, control valve service and strainer service without system shutdown. Unions are not required on flanged devices.
   3. Locate water supply at bottom of supply header and return water connection at top.
   4. Provide manual air vents at high points complete with stop valve.
   5. Ensure water coils are drainable and provide drain connection at low points below roof level of heating coils located within rooftop air handling units.

G. Insulate headers located outside air flow as specified for piping. Refer to Section 230719.

H. Insulate heating coils as specified for equipment where installed within systems that include mechanical cooling. Refer to Section 230716.

END OF SECTION 23 82 16

SECTION 238300 - RADIANT HEATING AND COOLING UNITS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Hydronic radiant panel heaters (ceiling mounted).

B. Exposed radiant panel heaters.

1.2 REFERENCE STANDARDS

A. ASHRAE Std 138 - Method of Testing for Rated Ceiling Panels for Sensible Heating and Cooling; 2013.

B. ASTM B75/B75M - Standard Specification for Seamless Copper Tube; 2011.

C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.

1.3 SUBMITTALS

A. Product Data: Provide data for ceiling panel heaters.

B. Manufacturer's Installation Instructions: Indicate installation instructions and recommendations.

C. Field Quality Control Submittals: Indicate test reports and inspection reports.

D. Operation and Maintenance Data: Include manufacturer's descriptive literature, operating instructions of equipment and controls, installation instructions, maintenance and repair data, and parts listings.

E. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Nanuet Union Free School District's name and registered with manufacturer.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

1.5 WARRANTY

A. Provide 5 year manufacturer's warranty for ceiling mounted hydronic radiant panel heating units.

PART 2 PRODUCTS

2.1 HYDRONIC RADIANT PANEL HEATERS

A. Acceptable Manufacturers:
   1. Aerotech (basis of design).
   2. Price Industries: www.price-hvac.com/#sle.
   3. Sterling: www.sterlingheat.com.

B. Exposed Linear Radiant Panels
   1. Exposed linear radiant panels shall use extruded aluminum with integrated heat sinks on the back to transfer heat between copper tubes and the panel face. The linear radiant panel is to radiate heat to the zone below.
   2. Water Tubes: Tubes shall consist of ASTM B75 ½” nominal copper tubing. Water connections shall be suitable for solder, compression fittings, push-on fittings or threaded connection.

3. Heat Sinks: Heat sinks shall be extruded aluminum and copper pipe will be mechanically fastened to the heat sink. A non-hardening heat transfer paste is required between the tubing and the heat sink.
4. Extruded Aluminum Plank: The panel shall be constructed of 1.2 mm thick extruded aluminum.
5. Paint Finish: All visible components shall be powder-coated with highly emissive powder coat polyester paint for optimal radiative properties as well as durability and easy cleaning. Manufacturer shall provide water pressure drop data as well as heat output data derived from tests in accordance with DIN 14037 (heating).
6. Linear radiant panel capacity shall be tested and certified by manufacturer in accordance with DIN 14037 (heating) to meet the performance listed on the schedule. Should any performance rating, water supply temperature, water pressure drop, etc. deviate from the schedule, manufacturer shall submit updated capacity as well as computational fluid dynamic modeling demonstrating that any changes do not impact the air distribution in a room that would cause a detriment to the PMV and ADPI rating from the design conditions. Manufacturer shall have factory testing facility available to perform performance test of units in accordance with said standard, as required. Upon request, up to 1% of units for the project can be tested in accordance with the standard.
7. Water connections shall be shipped sealed to limit the introduction of dust and dirt during shipping and construction.

C. Ceiling Mounted Modular Radiant Panels
1. Modular radiant panels shall use heat sinks on the back of a rigid ceiling tile to transfer heat between copper tubes and the panel face. The modular radiant panels are to radiate heat to the zone below.
2. Water Tubes: Tubes shall consist of ASTM B75 ½" nominal copper tubing. Water connections shall be suitable for solder, compression fittings, push-on fittings or threaded connection.
3. Heat Sinks: Heat sinks shall be extruded aluminum and copper pipe will be mechanically fastened to the heat sink. A non-hardening heat transfer paste is required between the tubing and the heat sink and between the heat sink and the panel.
4. Face: The panel face shall be constructed of 14 ga. aluminum.
5. Paint Finish: All visible components shall be powder-coated with highly emissive powder coat polyester paint for optimal radiative properties as well as durability and easy cleaning. Manufacturer shall provide water pressure drop data as well as heat and cool output data derived from tests in accordance with DIN 14037 (heating).
6. Modular radiant panel capacity shall be tested and certified by manufacturer in accordance with DIN 14037 (heating) to meet the performance listed on the schedule. Should any performance rating, chilled water supply temperature, water pressure drop, etc. deviate from the schedule, manufacturer shall submit updated capacity as well as computational fluid dynamic modeling demonstrating that any changes do not impact the air distribution in a room that would cause a detriment to the PMV and ADPI rating from the design conditions. Manufacturer shall have factory testing facility available to perform performance test of units in accordance with said standard, as required. Upon request, up to 1% of units for the project can be tested in accordance with the standard. Request will be made with order and prior to shipment of chilled sails. Engineer will have the option of witnessing this test.
7. Water connections shall be shipped sealed to limit the introduction of dust and dirt during shipping and construction.

PART 3 EXECUTION

3.1 EXAMINATION

A. Hydronic Radiant Ceiling Panel Heaters:
   1. Examine areas to receive radiant heating units for compliance with requirements for installation tolerances and other conditions affecting performance.
   2. Examine roughing-in for hydronic piping connections to verify actual locations prior to installation.
   3. Ensure surfaces in contact with radiant heating panels are free of burrs and sharp protrusions.
   4. Ensure surfaces are level and plumb.
   5. Proceed with installation only after unsatisfactory conditions are corrected.

3.2 PREPARATION

A. Clean all surfaces prior to installation.

3.3 INSTALLATION

A. Install in accordance with manufacturer's recommendations.

B. Hydronic Radiant Ceiling Panel Heaters:
   1. Install level and plumb.
   2. Suspend from structure.
   3. Support in grid-type suspended ceiling using grid as support element as follows:
      a. Install a minimum of four ceiling support system rods or wires for each panel, located not more than 6 inches from panel corners.
      b. Fasten support clips to panel and to ceiling grid members at or near each panel corner with clips designed for the application.
      c. For panels of sizes less than ceiling grid, install as indicated on reflected ceiling plan(s) or center of acoustical panel, and support panels independently with at least two 3/4 inch metal channels spanning and secured to ceiling tees.
      d. Install at least one independent support rod or wire from structure to tab on panel with breaking strength of the weight of panel at a safety factor of 3.
   4. Unless otherwise indicated, install shutoff valve and union or flange at each connection.
   5. Provide tamper-proof, balancing valve with memory stop on return piping.
   6. Provide 1.5" thick, 1.5 pound per cubic foot density flexible insulation over the top of each radiant panel.

3.4 FIELD QUALITY CONTROL

A. Provide manufacturer's field representative to test, inspect, instruct, and observe.

B. Hydronic Radiant Ceiling Panel Heaters:
   1. Inspect for damage to finish.
   2. Repair damaged finish to match original finish.
   3. Perform the following field tests, inspections, and prepare test reports:
      a. Leak Test:
         1) After installation, fill water tubes, and test for leaks.
         2) Repair leaks and retest until no leaks exist.
      b. Test and adjust controls and safeties.
   4. Remove and replace damaged and malfunctioning controls and equipment and retest as specified above.

3.5 CLEANING

A. Radiant Ceiling Panel Heaters: Remove paint splatters, other spots, dirt, and debris.

3.6 PROTECTION

A. Protect installed products from damage until Date of Substantial Completion.

END OF SECTION 23 83 00

SECTION 260505 - SELECTIVE DEMOLITION FOR ELECTRICAL

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Electrical demolition.

PART 2 PRODUCTS

2.1 MATERIALS AND EQUIPMENT

A. Materials and equipment for patching and extending work: As specified in individual sections.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify field measurements and circuiting arrangements are as indicated.

B. Verify that abandoned wiring and equipment serve only abandoned facilities.

C. Demolition drawings are based on casual field observation and existing record documents.

D. Report discrepancies to Engineer before disturbing existing installation.

E. Beginning of demolition means installer accepts existing conditions.

3.2 PREPARATION

A. Provide temporary wiring and connections to maintain existing systems in service during construction. When work must be performed on energized equipment or circuits, use personnel experienced in such operations.

B. Existing Electrical Service: Maintain existing system in service until new system is complete and ready for service. Disable system only to make switchovers and connections. Minimize outage duration.
   1. Obtain permission from Nanuet Union Free School District at least two weeks before partially or completely disabling system.
   2. Make temporary connections to maintain service in areas adjacent to work area.

3.3 DEMOLITION AND EXTENSION OF EXISTING ELECTRICAL WORK

A. Perform work for removal and disposal of equipment and materials containing toxic substances regulated under the Federal Toxic Substances Control Act (TSCA) in accordance with applicable federal, state, and local regulations. Applicable equipment and materials include, but are not limited to:
   1. PCB-containing electrical equipment, including transformers, capacitors, and switches.
   2. PCB- and DEHP-containing lighting ballasts.
   3. Mercury-containing lamps and tubes, including fluorescent lamps, high intensity discharge (HID), arc lamps, ultra-violet, high pressure sodium, mercury vapor, ignitron tubes, neon, and incandescent.

B. Remove, relocate, and extend existing installations to accommodate 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. Remove abandoned outlets if conduit servicing them is abandoned and removed. Provide blank cover for abandoned outlets that 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.
   1. Dispose of lamps, ballasts and any other luminaire materials that may contain mercury or hazardous wastes. The disposal of these elements should conform to NYCRR (New York Codes Rules and Regulations) and DEC regulations according to the Universal Waste Rule.
   2. Sort and package lamps and ballasts separately according to approved recycling center's specification and arrange for transport to said recycling center.

I. Repair adjacent construction and finishes damaged during demolition and extension work.

J. Maintain access to existing electrical installations that remain active. Modify installation or provide access panel as appropriate.

3.4 CLEANING AND REPAIR

A. Clean and repair existing materials and equipment that remain or that are to be reused.

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: Remove existing luminaires for cleaning. Use mild detergent to clean all exterior and interior surfaces; rinse with clean water and wipe dry. Replace lamps, ballasts and broken electrical parts.

END OF SECTION 26 05 05

SECTION 260519 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 2 PRODUCTS

1.1 CONDUCTOR AND CABLE APPLICATIONS

A. Do not use conductors and cables for applications other than as permitted by NFPA 70 and product listing.

B. Provide single conductor building wire installed in suitable raceway unless otherwise indicated, permitted, or required.

1.2 CONDUCTOR AND CABLE GENERAL REQUIREMENTS

A. Provide products that comply with requirements of NFPA 70.

B. Provide products listed, classified, and labeled as suitable for the purpose intended.

C. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, etc. as required for a complete operating system.

D. Comply with NEMA WC 70.

E. Thermoplastic-Insulated Conductors and Cables: Listed and labeled as complying with UL 83.

F. Thermoset-Insulated Conductors and Cables: Listed and labeled as complying with UL 44.

G. Conductor Material:
   1. Provide copper conductors only. Aluminum conductors are not acceptable for this project. Conductor sizes indicated are based on copper.
   2. Copper Conductors: Soft drawn annealed, 98 percent conductivity, uncoated copper conductors complying with ASTM B3, ASTM B8, or ASTM B787/B787M unless otherwise indicated.
   3. Tinned Copper Conductors: Comply with ASTM B33.

H. Minimum Conductor Size:
   1. Branch Circuits: 12 AWG.
      a. Exceptions:
         1) 20 A, 120 V circuits longer than 75 feet: 10 AWG, for voltage drop.
         2) 20 A, 120 V circuits longer than 150 feet: 8 AWG, for voltage drop.

I. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

J. Conductor Color Coding:
   1. Color code conductors as indicated unless otherwise required by the authority having jurisdiction. Maintain consistent color coding throughout project.
   2. Color Coding Method: Integrally colored insulation.
      a. Conductors size 4 AWG and larger may have black insulation color coded using vinyl color coding electrical tape.
   3. Color Code:
      a. 480Y/277 V, 3 Phase, 4 Wire System:
         1) Phase A: Brown.
         2) Phase B: Orange.
         3) Phase C: Yellow.
         4) Neutral/Grounded: Gray.
      b. 208Y/120 V, 3 Phase, 4 Wire System:
         1) Phase A: Black.
         2) Phase B: Red.
         3) Phase C: Blue.

4) Neutral/Grounded: White.
c. Equipment Ground, All Systems: Green.
d. Travelers for 3-Way and 4-Way Switching: Pink.
e. For control circuits, comply with manufacturer's recommended color code.

1.3 SINGLE CONDUCTOR BUILDING WIRE

A. Manufacturers:
1. Copper Building Wire:
a. Cerro Wire LLC: www.cerrowire.com/#sle.
b. Encore Wire Corporation: www.encorewire.com/#sle.
c. Southwire Company: www.southwire.com/#sle.

B. Description: Single conductor insulated wire.

C. Conductor Stranding:
1. Feeders and Branch Circuits:
a. Size 10 AWG and Smaller: Solid.
b. Size 8 AWG and Larger: Stranded.

D. Insulation Voltage Rating: 600 V.

E. Insulation:
1. Copper Building Wire: Type THHN/THWN or THHN/THWN-2, except as indicated below.
a. Installed Underground: Type XHHW-2.

1.4 WIRING CONNECTORS

A. Description: Wiring connectors appropriate for the application, suitable for use with the conductors to be connected, and listed as complying with UL 486A-486B or UL 486C as applicable.

B. Connectors for Grounding and Bonding: Comply with Section 260526.

C. Wiring Connectors for Splices and Taps:
1. Copper Conductors Size 8 AWG and Smaller: Use twist-on insulated spring connectors.
2. Copper Conductors Size 6 AWG and Larger: Use mechanical connectors or compression connectors.

D. Wiring Connectors for Terminations:
1. Provide compression adapters for connecting conductors to equipment furnished with mechanical lugs when only compression connectors are specified.
2. Where over-sized conductors are larger than the equipment terminations can accommodate, provide connectors suitable for reducing to appropriate size, but not less than required for the rating of the overcurrent protective device.
3. Provide motor pigtail connectors for connecting motor leads in order to facilitate disconnection.
4. Copper Conductors Size 8 AWG and Larger: Use mechanical connectors or compression connectors where connectors are required.
5. Conductors for Control Circuits: Use crimped terminals for all connections.

E. Do not use insulation-piercing or insulation-displacement connectors designed for use with conductors without stripping insulation.

F. Do not use push-in wire connectors as a substitute for twist-on insulated spring connectors.

G. Twist-on Insulated Spring Connectors: Rated 600 V, 221 degrees F for standard applications and 302 degrees F for high temperature applications; pre-filled with sealant and listed as complying with UL 486D for damp and wet locations.
1. Manufacturers:

a. 3M: www.3m.com/#sle.
b. Ideal Industries, Inc: www.idealindustries.com/#sle.
c. NSI Industries LLC: www.nsiindustries.com/#sle.

H. Mechanical Connectors: Provide bolted type or set-screw type.

I. Compression Connectors: Provide circumferential type or hex type crimp configuration.

J. Crimped Terminals: Nylon-insulated, with insulation grip and terminal configuration suitable for connection to be made.

1.5 ACCESSORIES

A. Electrical Tape:
1. Vinyl Color Coding Electrical Tape: Integrally colored to match color code indicated; listed as complying with UL 510; minimum thickness of 7 mil; resistant to abrasion, corrosion, and sunlight; suitable for continuous temperature environment up to 221 degrees F.
2. Vinyl Insulating Electrical Tape: Complying with ASTM D3005 and listed as complying with UL 510; minimum thickness of 7 mil; resistant to abrasion, corrosion, and sunlight; conformable for application down to 0 degrees F and suitable for continuous temperature environment up to 221 degrees F.
3. Rubber Splicing Electrical Tape: Ethylene Propylene Rubber (EPR) tape, complying with ASTM D4388; minimum thickness of 30 mil; suitable for continuous temperature environment up to 194 degrees F and short-term 266 degrees F overload service.
4. Electrical Filler Tape: Rubber-based insulating moldable putty, minimum thickness of 125 mil; suitable for continuous temperature environment up to 176 degrees F.
5. Varnished Cambric Electrical Tape: Cotton cambric fabric tape, with or without adhesive, oil-primed and coated with high-grade insulating varnish; minimum thickness of 7 mil; suitable for continuous temperature environment up to 221 degrees F.
6. Moisture Sealing Electrical Tape: Insulating mastic compound laminated to flexible, all-weather vinyl backing; minimum thickness of 90 mil.

B. Heat Shrink Tubing: Heavy-wall, split-resistant, with factory-applied adhesive; rated 600 V; suitable for direct burial applications; listed as complying with UL 486D.

C. Wire Pulling Lubricant: Listed; suitable for use with the conductors or cables to be installed and suitable for use at the installation temperature.
1. Manufacturers:
a. 3M: www.3m.com/#sle.
b. American Polywater Corporation: www.polywater.com/#sle.
c. Ideal Industries, Inc: www.idealindustries.com/#sle.

PART 3 EXECUTION

2.1 EXAMINATION

A. Verify that interior of building has been protected from weather.

B. Verify that work likely to damage wire and cable has been completed.

C. Verify that raceways, boxes, and equipment enclosures are installed and are properly sized to accommodate conductors and cables in accordance with NFPA 70.

D. Verify that field measurements are as indicated.

E. Verify that conditions are satisfactory for installation prior to starting work.

2.2 PREPARATION

A. Clean raceways thoroughly to remove foreign materials before installing conductors and cables.

2.3 INSTALLATION

A. Circuiting Requirements:
   1. Unless dimensioned, circuit routing indicated is diagrammatic.
   2. When circuit destination is indicated without specific routing, determine exact routing required.
   3. Arrange circuiting to minimize splices.
   4. Include circuit lengths required to install connected devices within 10 ft of location indicated.
   5. Maintain separation of Class 1, Class 2, and Class 3 remote-control, signaling, and power-limited circuits in accordance with NFPA 70.
   6. Maintain separation of wiring for emergency systems in accordance with NFPA 70.
   7. Circuiting Adjustments: Unless otherwise indicated, when branch circuits are indicated as separate, combining them together in a single raceway is not permitted.
      a. Provide no more than six current-carrying conductors in a single raceway. Dedicated neutral conductors are considered current-carrying conductors.
      b. Increase size of conductors as required to account for ampacity derating.
      c. Size raceways, boxes, etc. to accommodate conductors.
   8. Common Neutrals: Unless otherwise indicated, sharing of neutral/grounded conductors among up to three single phase branch circuits of different phases installed in the same raceway is not permitted. Provide dedicated neutral/grounded conductor for each individual branch circuit.

B. Install products in accordance with manufacturer's instructions.

C. Perform work in accordance with NECA 1 (general workmanship).

D. Installation in Raceway:
   1. Tape ends of conductors and cables to prevent infiltration of moisture and other contaminants.
   2. Pull all conductors and cables together into raceway at same time.
   3. Do not damage conductors and cables or exceed manufacturer's recommended maximum pulling tension and sidewall pressure.
   4. Use suitable wire pulling lubricant where necessary, except when lubricant is not recommended by the manufacturer.

E. Paralleled Conductors: Install conductors of the same length and terminate in the same manner.

F. Secure and support conductors and cables in accordance with NFPA 70 using suitable supports and methods approved by the authority having jurisdiction. Provide independent support from building structure. Do not provide support from raceways, piping, ductwork, or other systems.
   1. Installation Above Suspended Ceilings: Do not provide support from ceiling support system. Do not provide support from ceiling grid or allow conductors and cables to lay on ceiling tiles.

G. Install conductors with a minimum of 12 inches of slack at each outlet.

H. Where conductors are installed in enclosures for future termination by others, provide a minimum of 5 feet of slack.

I. Neatly train and bundle conductors inside boxes, wireways, panelboards and other equipment enclosures.

J. Group or otherwise identify neutral/grounded conductors with associated ungrounded conductors inside enclosures in accordance with NFPA 70.

K. Make wiring connections using specified wiring connectors.

1. Make splices and taps only in accessible boxes. Do not pull splices into raceways or make splices in conduit bodies or wiring gutters.
2. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors.
3. Do not remove conductor strands to facilitate insertion into connector.
4. Clean contact surfaces on conductors and connectors to suitable remove corrosion, oxides, and other contaminates. Do not use wire brush on plated connector surfaces.
5. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.
6. Compression Connectors: Secure connections using manufacturer's recommended tools and dies.

L. Insulate splices and taps that are made with uninsulated connectors using methods suitable for the application, with insulation and mechanical strength at least equivalent to unspliced conductors.
   1. Dry Locations: Use insulating covers specifically designed for the connectors, electrical tape, or heat shrink tubing.
      a. For taped connections, first apply adequate amount of rubber splicing electrical tape or electrical filler tape, followed by outer covering of vinyl insulating electrical tape.
      b. For taped connections likely to require re-entering, including motor leads, first apply varnished cambric electrical tape, followed by adequate amount of rubber splicing electrical tape, followed by outer covering of vinyl insulating electrical tape.
   2. Damp Locations: Use insulating covers specifically designed for the connectors, electrical tape, or heat shrink tubing.
      a. For connections with insulating covers, apply outer covering of moisture sealing electrical tape.
      b. For taped connections, follow same procedure as for dry locations but apply outer covering of moisture sealing electrical tape.

M. Insulate ends of spare conductors using vinyl insulating electrical tape.

N. Field-Applied Color Coding: Where vinyl color coding electrical tape is used in lieu of integrally colored insulation as permitted in Part 2 under "Color Coding", apply half overlapping turns of tape at each termination and at each location conductors are accessible.

O. Identify conductors and cables in accordance with Section 260553.

P. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 078400.

Q. Unless specifically indicated to be excluded, provide final connections to all equipment and devices, including those furnished by others, as required for a complete operating system.

2.4 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 7.3.2. The insulation resistance test is required for all conductors. The resistance test for parallel conductors listed as optional is not required.
   1. Disconnect surge protective devices (SPDs) prior to performing any high potential testing. Replace SPDs damaged by performing high potential testing with SPDs connected.

C. Correct deficiencies and replace damaged or defective conductors and cables.

END OF SECTION 26 05 19

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SECTION 260526 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Grounding and bonding requirements.

B. Conductors for grounding and bonding.

C. Connectors for grounding and bonding.

D. Ground rod electrodes.

1.2 REFERENCE STANDARDS

A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2010.

B. NEMA GR 1 - Grounding Rod Electrodes and Grounding Rod Electrode Couplings; 2007.

C. NETA ATS - Acceptance Testing Specifications for Electrical Power Equipment and Systems; 2013.

D. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

E. NFPA 780 - Standard for the Installation of Lightning Protection Systems; 2014.

F. UL 467 - Grounding and Bonding Equipment; Current Edition, Including All Revisions.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Verify exact locations of underground metal water service pipe entrances to building.
   2. Notify Engineer of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

B. Sequencing:
   1. Do not install ground rod electrodes until final backfill and compaction is complete.

1.4 SUBMITTALS

A. Product Data: Provide manufacturer's standard catalog pages and data sheets for grounding and bonding system components.

B. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

1.5 QUALITY ASSURANCE

A. Comply with requirements of NFPA 70.

PART 2 PRODUCTS

2.1 GROUNDING AND BONDING REQUIREMENTS

A. Do not use products for applications other than as permitted by NFPA 70 and product listing.

B. Unless specifically indicated to be excluded, provide all required components, conductors, connectors, conduit, boxes, fittings, supports, accessories, etc. as necessary for a complete grounding and bonding system.

C. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

D. Grounding Electrode System:
   1. Provide connection to required and supplemental grounding electrodes indicated to form grounding electrode system.
      a. Provide continuous grounding electrode conductors without splice or joint.
      b. Install grounding electrode conductors in raceway where exposed to physical damage. Bond grounding electrode conductor to metallic raceways at each end with bonding jumper.
   2. Ground Rod Electrode(s):
      a. Provide three electrodes in an equilateral triangle configuration unless otherwise indicated or required.
      b. Space electrodes not less than 10 feet from each other and any other ground electrode.

E. Separately Derived System Grounding:
   1. Separately derived systems include, but are not limited to:
      a. Transformers (except autotransformers such as buck-boost transformers).
   2. Provide grounding electrode conductor to connect derived system grounded conductor to nearest effectively grounded metal building frame. Unless otherwise indicated, make connection at neutral (grounded) bus in source enclosure.
   3. Provide bonding jumper to connect derived system grounded conductor to nearest metal building frame and nearest metal water piping in the area served by the derived system, where not already used as a grounding electrode for the derived system. Make connection at same location as grounding electrode conductor connection.
   4. Provide system bonding jumper to connect system grounded conductor to equipment ground bus. Make connection at same location as grounding electrode conductor connection. Do not make any other connections between neutral (grounded) conductors and ground on load side of separately derived system disconnect.
   5. Where the source and first disconnecting means are in separate enclosures, provide supply-side bonding jumper between source and first disconnecting means.

F. Bonding and Equipment Grounding:
   1. Provide bonding for equipment grounding conductors, equipment ground busses, metallic equipment enclosures, metallic raceways and boxes, device grounding terminals, and other normally non-current-carrying conductive materials enclosing electrical conductors/equipment or likely to become energized as indicated and in accordance with NFPA 70.
   2. Provide insulated equipment grounding conductor in each feeder and branch circuit raceway. Do not use raceways as sole equipment grounding conductor.
   3. Where circuit conductor sizes are increased for voltage drop, increase size of equipment grounding conductor proportionally in accordance with NFPA 70.
   4. Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box with bonding jumper.
   5. Terminate branch circuit equipment grounding conductors on solidly bonded equipment ground bus only. Do not terminate on neutral (grounded) or isolated/insulated ground bus.
   6. Provide bonding jumper across expansion or expansion/deflection fittings provided to accommodate conduit movement.
   7. Provide bonding for interior metal piping systems in accordance with NFPA 70. This includes, but is not limited to:
      a. Metal water piping where not already effectively bonded to metal underground water pipe used as grounding electrode.
      b. Metal gas piping.

G. Communications Systems Grounding and Bonding:

1. Provide intersystem bonding termination at service equipment or metering equipment enclosure and at disconnecting means for any additional buildings or structures in accordance with NFPA 70.

H. Lightning Protection Systems, in Addition to Requirements of Section 264113:
   1. Do not use grounding electrode dedicated for lightning protection system for component of building grounding electrode system provided under this section.
   2. Provide bonding of building grounding electrode system provided under this section and lightning protection grounding electrode system in accordance with NFPA 70 and NFPA 780.

2.2 GROUNDING AND BONDING COMPONENTS

A. General Requirements:
   1. Provide products listed, classified, and labeled as suitable for the purpose intended.
   2. Provide products listed and labeled as complying with UL 467 where applicable.

B. Conductors for Grounding and Bonding, in Addition to Requirements of Section 260526:
   1. Use insulated copper conductors unless otherwise indicated.
      a. Exceptions:
         1) Use bare copper conductors where installed underground in direct contact with earth.
         2) Use bare copper conductors where directly encased in concrete (not in raceway).

C. Connectors for Grounding and Bonding:
   1. Description: Connectors appropriate for the application and suitable for the conductors and items to be connected; listed and labeled as complying with UL 467.
   2. Unless otherwise indicated, use exothermic welded connections for underground, concealed and other inaccessible connections.
   3. Unless otherwise indicated, use mechanical connectors, compression connectors, or exothermic welded connections for accessible connections.
      a. Exceptions:
         1) Use exothermic welded connections for connections to metal building frame.
   4. Manufacturers - Exothermic Welded Connections:
      a. Cadweld, a brand of Erico International Corporation: www.erico.com/#sle.

D. Ground Rod Electrodes:
   1. Comply with NEMA GR 1.
   2. Material: Copper-bonded (copper-clad) steel.
   3. Size: 3/4 inch diameter by 10 feet length, unless otherwise indicated.
   4. Where rod lengths of greater than 10 feet are indicated or otherwise required, sectionalized ground rods may be used.
   5. Manufacturers:
      a. Advanced Lightning Technology (ALT): www.altfab.com/#sle.
      b. Erico International Corporation: www.erico.com/#sle.
      c. Galvan Industries, Inc: www.galvanelectrical.com/#sle.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that work likely to damage grounding and bonding system components has been completed.

B. Verify that field measurements are as indicated.

C. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Perform work in accordance with NECA 1 (general workmanship).

C. Ground Rod Electrodes: Unless otherwise indicated, install ground rod electrodes vertically. Where encountered rock prohibits vertical installation, install at 45 degree angle or bury horizontally in trench at least 30 inches (750 mm) deep in accordance with NFPA 70 or provide ground plates.
   1. Outdoor Installations: Unless otherwise indicated, install with top of rod 6 inches below finished grade.
   2. Indoor Installations: Unless otherwise indicated, install with 4 inches of top of rod exposed.

D. Make grounding and bonding connections using specified connectors.
   1. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors. Do not remove conductor strands to facilitate insertion into connector.
   2. Remove nonconductive paint, enamel, or similar coating at threads, contact points, and contact surfaces.
   3. Exothermic Welds: Make connections using molds and weld material suitable for the items to be connected in accordance with manufacturer's recommendations.
   4. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.
   5. Compression Connectors: Secure connections using manufacturer's recommended tools and dies.

E. Identify grounding and bonding system components in accordance with Section 260553.

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 7.13.

C. Perform ground electrode resistance tests under normally dry conditions. Precipitation within the previous 48 hours does not constitute normally dry conditions.

D. Investigate and correct deficiencies where measured ground resistances do not comply with specified requirements.

END OF SECTION 26 05 26

SECTION 260529 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Support and attachment requirements and components for equipment, conduit, cable, boxes, and other electrical work.

1.2 REFERENCE STANDARDS

A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2015.

B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.

C. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel; 2013.

D. MFMA-4 - Metal Framing Standards Publication; 2004.

E. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2010.

F. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

G. UL 5B - Strut-Type Channel Raceways and Fittings; Current Edition, Including All Revisions.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate sizes and arrangement of supports and bases with the actual equipment and components to be installed.
   2. Coordinate the work with other trades to provide additional framing and materials required for installation.
   3. Coordinate compatibility of support and attachment components with mounting surfaces at the installed locations.
   4. Coordinate the arrangement of supports with ductwork, piping, equipment and other potential conflicts installed under other sections or by others.
   5. Notify Engineer of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

B. Sequencing:
   1. Do not install products on or provide attachment to concrete surfaces until concrete has fully cured in accordance with Section 033000.

1.4 QUALITY ASSURANCE

A. Comply with NFPA 70.

B. Comply with applicable building code.

C. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.1 SUPPORT AND ATTACHMENT COMPONENTS

A. General Requirements:
   1. Comply with the following. Where requirements differ, comply with most stringent.
      a. NFPA 70.
      b. Requirements of authorities having jurisdiction.
   2. Provide all required hangers, supports, anchors, fasteners, fittings, accessories, and hardware as necessary for the complete installation of electrical work.
   3. Provide products listed, classified, and labeled as suitable for the purpose intended, where applicable.
   4. Where support and attachment component types and sizes are not indicated, select in accordance with manufacturer's application criteria as required for the load to be supported with a minimum safety factor of 1.5. Include consideration for vibration, equipment operation, and shock loads where applicable.
   5. Do not use products for applications other than as permitted by NFPA 70 and product listing.
   6. Do not use wire, chain, perforated pipe strap, or wood for permanent supports unless specifically indicated or permitted.
   7. Steel Components: Use corrosion resistant materials suitable for the environment where installed.
      a. Indoor Dry Locations: Use zinc-plated steel or approved equivalent unless otherwise indicated.
      b. Outdoor and Damp or Wet Indoor Locations: Use galvanized steel, stainless steel, or approved equivalent unless otherwise indicated.
      c. Zinc-Plated Steel: Electroplated in accordance with ASTM B633.
      d. Galvanized Steel: Hot-dip galvanized after fabrication in accordance with ASTM A123/A123M or ASTM A153/A153M.

B. Conduit and Cable Supports: Straps, clamps, etc. suitable for the conduit or cable to be supported.
   1. Conduit Straps: One-hole or two-hole type; steel or malleable iron.
   2. Conduit Clamps: Bolted type unless otherwise indicated.
   3. Manufacturers:
      a. Cooper Crouse-Hinds, a division of Eaton Corporation: www.cooperindustries.com/#sle.
      b. Erico International Corporation: www.erico.com/#sle.
      c. O-Z/Gedney, a brand of Emerson Electric Co: www.emerson.com/#sle.
      d. Thomas & Betts Corporation: www.tnb.com/#sle.

C. Outlet Box Supports: Hangers, brackets, etc. suitable for the boxes to be supported.
   1. Manufacturers:
      a. Cooper Crouse-Hinds, a division of Eaton Corporation: www.cooperindustries.com/#sle.
      b. Erico International Corporation: www.erico.com/#sle.
      c. O-Z/Gedney, a brand of Emerson Electric Co: www.emerson.com/#sle.
      d. Thomas & Betts Corporation: www.tnb.com/#sle.

D. Metal Channel (Strut) Framing Systems: Factory-fabricated continuous-slot metal channel (strut) and associated fittings, accessories, and hardware required for field-assembly of supports.
   1. Comply with MFMA-4.

2. Channel (Strut) Used as Raceway (only where specifically indicated): Listed and labeled as complying with UL 5B.
3. Channel Material:
   a. Indoor Dry Locations: Use painted steel, zinc-plated steel, or galvanized steel.
   b. Outdoor and Damp or Wet Indoor Locations: Use galvanized steel.
4. Minimum Channel Thickness: Steel sheet, 12 gauge, 0.1046 inch.
5. Minimum Channel Dimensions: 1-5/8 inch width by 13/16 inch height.
6. Manufacturers:
   a. Cooper B-Line, a division of Eaton Corporation: www.cooperindustries.com/#sle.
   b. Thomas & Betts Corporation: www.tnb.com/#sle.
   c. Unistrut, a brand of Atkore International Inc: www.unistrut.com/#sle.

E. Hanger Rods: Threaded zinc-plated steel unless otherwise indicated.
1. Minimum Size, Unless Otherwise Indicated or Required:
   a. Equipment Supports: 1/2 inch diameter.
   b. Busway Supports: 1/2 inch diameter.
   c. Single Conduit up to 1 inch (27 mm) trade size: 1/4 inch diameter.
   d. Single Conduit larger than 1 inch (27 mm) trade size: 3/8 inch diameter.
   e. Trapeze Support for Multiple Conduits: 3/8 inch diameter.
   f. Outlet Boxes: 1/4 inch diameter.
   g. Luminaires: 1/4 inch diameter.

F. Anchors and Fasteners:
1. Unless otherwise indicated and where not otherwise restricted, use the anchor and fastener types indicated for the specified applications.
2. Concrete: Use preset concrete inserts, expansion anchors, or screw anchors.
3. Solid or Grout-Filled Masonry: Use expansion anchors or screw anchors.
4. Hollow Masonry: Use toggle bolts.
5. Hollow Stud Walls: Use toggle bolts.
6. Steel: Use beam clamps, machine bolts, or welded threaded studs.
7. Sheet Metal: Use sheet metal screws.
8. Wood: Use wood screws.
9. Plastic and lead anchors are not permitted.
10. Preset Concrete Inserts: Continuous metal channel (strut) and spot inserts specifically designed to be cast in concrete ceilings, walls, and floors.
    a. Comply with MFMA-4.
    b. Channel Material: Use galvanized steel.
    c. Manufacturer: Same as manufacturer of metal channel (strut) framing system.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that mounting surfaces are ready to receive support and attachment components.

C. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Perform work in accordance with NECA 1 (general workmanship).

C. Install anchors and fasteners in accordance with ICC Evaluation Services, LLC (ICC-ES) evaluation report conditions of use where applicable.

D. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.

E. Unless specifically indicated or approved by Engineer, do not provide support from suspended ceiling support system or ceiling grid.

F. Unless specifically indicated or approved by Engineer, do not provide support from roof deck.

G. Do not penetrate or otherwise notch or cut structural members without approval of Structural Engineer.

H. Equipment Support and Attachment:
   1. Use metal fabricated supports or supports assembled from metal channel (strut) to support equipment as required.
   2. Use metal channel (strut) secured to studs to support equipment surface-mounted on hollow stud walls when wall strength is not sufficient to resist pull-out.
   3. Use metal channel (strut) to support surface-mounted equipment in wet or damp locations to provide space between equipment and mounting surface.
   4. Securely fasten floor-mounted equipment. Do not install equipment such that it relies on its own weight for support.

I. Busway Support and Attachment: Also comply with Section 262513.

J. Preset Concrete Inserts: Use manufacturer provided closure strips to inhibit concrete seepage during concrete pour.

K. Secure fasteners according to manufacturer's recommended torque settings.

L. Remove temporary supports.

3.3 FIELD QUALITY CONTROL

A. Inspect support and attachment components for damage and defects.

B. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.

C. Correct deficiencies and replace damaged or defective support and attachment components.

END OF SECTION 26 05 29

SECTION 260533.13 - CONDUIT FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Galvanized steel rigid metal conduit (RMC).
B. Intermediate metal conduit (IMC).
C. PVC-coated galvanized steel rigid metal conduit (RMC).
D. Flexible metal conduit (FMC).
E. Liquidtight flexible metal conduit (LFMC).
F. Electrical metallic tubing (EMT).
G. Conduit fittings.
H. Accessories.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate minimum sizes of conduits with the actual conductors to be installed, including adjustments for conductor sizes increased for voltage drop.
   2. Coordinate the arrangement of conduits with structural members, ductwork, piping, equipment and other potential conflicts installed under other sections or by others.
   3. Verify exact conduit termination locations required for boxes, enclosures, and equipment installed under other sections or by others.
   4. Coordinate the work with other trades to provide roof penetrations that preserve the integrity of the roofing system and do not void the roof warranty.
   5. Notify Engineer of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.
B. Sequencing:
   1. Do not begin installation of conductors and cables until installation of conduit is complete between outlet, junction and splicing points.

1.3 SUBMITTALS

A. Product Data: Provide manufacturer's standard catalog pages and data sheets for conduits and fittings.
B. Shop Drawings:
   1. Include proposed locations of roof penetrations and proposed methods for sealing.
C. Project Record Documents: Record actual routing for conduits installed underground, conduits embedded within concrete slabs, and conduits 2 inch (53 mm) trade size and larger.

1.4 QUALITY ASSURANCE

A. Comply with requirements of NFPA 70.
B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.
C. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store conduit and fittings in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.1 CONDUIT APPLICATIONS

A. Do not use conduit and associated fittings for applications other than as permitted by NFPA 70 and product listing.

B. Unless otherwise indicated and where not otherwise restricted, use the conduit types indicated for the specified applications. Where more than one listed application applies, comply with the most restrictive requirements. Where conduit type for a particular application is not specified, use galvanized steel rigid metal conduit.

C. Concealed Within Hollow Stud Walls: Use galvanized steel rigid metal conduit, intermediate metal conduit (IMC), or electrical metallic tubing (EMT).

D. Concealed Above Accessible Ceilings: Use galvanized steel rigid metal conduit, intermediate metal conduit (IMC), or electrical metallic tubing (EMT).

E. Interior, Damp or Wet Locations: Use galvanized steel rigid metal conduit.

F. Exposed, Interior, Not Subject to Physical Damage: Use galvanized steel rigid metal conduit, intermediate metal conduit (IMC), or electrical metallic tubing (EMT).

G. Exposed, Interior, Subject to Physical Damage: Use galvanized steel rigid metal conduit or intermediate metal conduit (IMC).
   1. Locations subject to physical damage include, but are not limited to:
      a. Where exposed below 10 feet, except within electrical and communication rooms or closets.

H. Exposed, Exterior: Use galvanized steel rigid metal conduit, intermediate metal conduit (IMC), or PVC-coated galvanized steel rigid metal conduit.

I. Concealed, Exterior, Not Embedded in Concrete or in Contact With Earth: Use galvanized steel rigid metal conduit or intermediate metal conduit (IMC).

J. Connections to Luminaires Above Accessible Ceilings: Use flexible metal conduit.
   1. Maximum Length: 6 feet.

K. Connections to Vibrating Equipment:
   1. Damp, Wet, or Corrosive Locations: Use liquidtight flexible metal conduit.
   2. Maximum Length: 6 feet unless otherwise indicated.

2.2 CONDUIT REQUIREMENTS

A. Communications Systems Conduits: Also comply with Section 271000.

B. Fittings for Grounding and Bonding: Also comply with Section 260526.

C. Provide all conduit, fittings, supports, and accessories required for a complete raceway system.

D. Provide products listed, classified, and labeled as suitable for the purpose intended.

E. Minimum Conduit Size, Unless Otherwise Indicated:
   1. Branch Circuits: 3/4 inch (21 mm) trade size.
   2. Branch Circuit Homeruns: 3/4 inch (21 mm) trade size.
   3. Control Circuits: 1/2 inch (16 mm) trade size.
   4. Flexible Connections to Luminaires: 3/8 inch (12 mm) trade size.
   5. Underground, Interior: 1 inch (27 mm) trade size.
   6. Underground, Exterior: 1 inch (27 mm) trade size.

F. Where conduit size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

2.3 GALVANIZED STEEL RIGID METAL CONDUIT (RMC)

A. Manufacturers:
   1. Allied Tube & Conduit, a division of Atkore International: www.alliedeg.com/#sle.
   2. Nucor Tubular Products: www.nucortubular.com/#sle.
   3. Wheatland Tube, a division of Zekelman Industries: www.wheatland.com/#sle.

B. Description: NFPA 70, Type RMC galvanized steel rigid metal conduit complying with ANSI C80.1 and listed and labeled as complying with UL 6.

C. Fittings:
   1. Non-Hazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
   2. Material: Use steel or malleable iron.
   3. Connectors and Couplings: Use threaded type fittings only. Threadless set screw and compression (gland) type fittings are not permitted.

2.4 INTERMEDIATE METAL CONDUIT (IMC)

A. Manufacturers:
   1. Allied Tube & Conduit, a division of Atkore International: www.alliedeg.com/#sle.
   2. Nucor Tubular Products: www.nucortubular.com/#sle.
   3. Wheatland Tube, a division of Zekelman Industries: www.wheatland.com/#sle.

B. Description: NFPA 70, Type IMC galvanized steel intermediate metal conduit complying with ANSI C80.6 and listed and labeled as complying with UL 1242.

C. Fittings:
   1. Non-Hazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
   2. Material: Use steel or malleable iron.
   3. Connectors and Couplings: Use threaded type fittings only. Threadless set screw and compression (gland) type fittings are not permitted.

2.5 PVC-COATED GALVANIZED STEEL RIGID METAL CONDUIT (RMC)

A. Description: NFPA 70, Type RMC galvanized steel rigid metal conduit with external polyvinyl chloride (PVC) coating complying with NEMA RN 1 and listed and labeled as complying with UL 6.

B. Exterior Coating: Polyvinyl chloride (PVC), nominal thickness of 40 mil.

C. PVC-Coated Fittings:
   1. Manufacturer: Same as manufacturer of PVC-coated conduit to be installed.
   2. Non-Hazardous Locations: Use fittings listed and labeled as complying with UL 514B.
   3. Material: Use steel or malleable iron.
   4. Exterior Coating: Polyvinyl chloride (PVC), minimum thickness of 40 mil.

D. PVC-Coated Supports: Furnish with exterior coating of polyvinyl chloride (PVC), minimum thickness of 15 mil.

2.6 FLEXIBLE METAL CONDUIT (FMC)

A. Description: NFPA 70, Type FMC standard wall steel flexible metal conduit listed and labeled as complying with UL 1, and listed for use in classified firestop systems to be used.

B. Fittings:

1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
2. Material: Use steel or malleable iron.

2.7 LIQUIDTIGHT FLEXIBLE METAL CONDUIT (LFMC)

A. Manufacturers:
   1. AFC Cable Systems, Inc: www.afcweb.com/#sle.
   2. Electri-Flex Company: www.electriflex.com/#sle.
   3. International Metal Hose: www.metalhose.com/#sle.

B. Description: NFPA 70, Type LFMC polyvinyl chloride (PVC) jacketed steel flexible metal conduit listed and labeled as complying with UL 360.

C. Fittings:
   1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
   2. Material: Use steel or malleable iron.

2.8 ELECTRICAL METALLIC TUBING (EMT)

A. Manufacturers:
   1. Allied Tube & Conduit, a division of Atkore International: www.alliedeg.com/#sle.
   2. Nucor Tubular Products: www.nucortubular/#sle.
   3. Wheatland Tube, a division of Zekelman Industries: www.wheatland.com/#sle.

B. Description: NFPA 70, Type EMT steel electrical metallic tubing complying with ANSI C80.3 and listed and labeled as complying with UL 797.

C. Fittings:
   1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
   2. Material: Use steel or malleable iron.
   3. Connectors and Couplings: Use compression (gland) or set-screw type.
      a. Do not use indenter type connectors and couplings.
   4. Damp or Wet Locations (where permitted): Use fittings listed for use in wet locations.

2.9 ACCESSORIES

A. Conduit Joint Compound: Corrosion-resistant, electrically conductive; suitable for use with the conduit to be installed.

B. Solvent Cement for PVC Conduit and Fittings: As recommended by manufacturer of conduit and fittings to be installed.

C. Pull Strings: Use nylon cord with average breaking strength of not less than 200 pound-force.

D. Modular Seals for Conduit Penetrations: Rated for minimum of 40 psig; Suitable for the conduits to be installed.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that mounting surfaces are ready to receive conduits.

C. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Perform work in accordance with NECA 1 (general workmanship).

C. Install galvanized steel rigid metal conduit (RMC) in accordance with NECA 101.

D. Install intermediate metal conduit (IMC) in accordance with NECA 101.

E. Install PVC-coated galvanized steel rigid metal conduit (RMC) using only tools approved by the manufacturer.

F. Install rigid polyvinyl chloride (PVC) conduit in accordance with NECA 111.

G. Install liquidtight flexible nonmetallic conduit (LFNC) in accordance with NECA 111.

H. Conduit Routing:
   1. Unless dimensioned, conduit routing indicated is diagrammatic.
   2. When conduit destination is indicated without specific routing, determine exact routing required.
   3. Conceal all conduits unless specifically indicated to be exposed.
   4. Conduits in the following areas may be exposed, unless otherwise indicated:
      a. Electrical rooms.
      b. Mechanical equipment rooms.
      c. Within joists in areas with no ceiling.
   5. Unless otherwise approved, do not route conduits exposed:
      a. Across floors.
      b. Across roofs.
      c. Across top of parapet walls.
      d. Across building exterior surfaces.
   6. Conduits installed underground or embedded in concrete may be routed in the shortest possible manner unless otherwise indicated. Route all other conduits parallel or perpendicular to building structure and surfaces, following surface contours where practical.
   7. Arrange conduit to maintain adequate headroom, clearances, and access.
   8. Arrange conduit to provide no more than the equivalent of four 90 degree bends between pull points.
   9. Arrange conduit to prevent moisture traps. Provide drain fittings at low points and at sealing fittings where moisture may collect.
   10. Maintain minimum clearance of 6 inches between conduits and piping for other systems.
   11. Maintain minimum clearance of 12 inches between conduits and hot surfaces. This includes, but is not limited to:
      a. Heaters.
      b. Hot water piping.
      c. Flues.
   12. Group parallel conduits in the same area together on a common rack.

I. Conduit Support:
   1. Secure and support conduits in accordance with NFPA 70 and Section 260529 using suitable supports and methods approved by the authority having jurisdiction.
   2. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.
   3. Installation Above Suspended Ceilings: Do not provide support from ceiling support system. Do not provide support from ceiling grid or allow conduits to lay on ceiling tiles.
   4. Use conduit strap to support single surface-mounted conduit.
      a. Use clamp back spacer with conduit strap for damp and wet locations to provide space between conduit and mounting surface.

5. Use metal channel (strut) with accessory conduit clamps to support multiple parallel surface-mounted conduits.
6. Use conduit clamp to support single conduit from beam clamp or threaded rod.
7. Use trapeze hangers assembled from threaded rods and metal channel (strut) with accessory conduit clamps to support multiple parallel suspended conduits.
8. Use non-penetrating rooftop supports to support conduits routed across rooftops (only where approved).
9. Use of spring steel conduit clips for support of conduits is not permitted.
    a. Support of electrical metallic tubing (EMT) up to 1 inch (27 mm) trade size concealed above accessible ceilings and within hollow stud walls.
10. Use of wire for support of conduits is not permitted.
11. Where conduit support intervals specified in NFPA 70 and NECA standards differ, comply with the most stringent requirements.

J. Connections and Terminations:
1. Use approved zinc-rich paint or conduit joint compound on field-cut threads of galvanized steel conduits prior to making connections.
2. Where two threaded conduits must be joined and neither can be rotated, use three-piece couplings or split couplings. Do not use running threads.
3. Use suitable adapters where required to transition from one type of conduit to another.
4. Provide drip loops for liquidtight flexible conduit connections to prevent drainage of liquid into connectors.
5. Terminate threaded conduits in boxes and enclosures using threaded hubs or double lock nuts for dry locations and raintight hubs for wet locations.
6. Provide insulating bushings or insulated throats at all conduit terminations to protect conductors.
7. Secure joints and connections to provide maximum mechanical strength and electrical continuity.

K. Penetrations:
1. Do not penetrate or otherwise notch or cut structural members, including footings and grade beams, without approval of Structural Engineer.
2. Make penetrations perpendicular to surfaces unless otherwise indicated.
3. Provide sleeves for penetrations as indicated or as required to facilitate installation. Set sleeves flush with exposed surfaces unless otherwise indicated or required.
4. Conceal bends for conduit risers emerging above ground.
5. Seal interior of conduits entering the building from underground at first accessible point to prevent entry of moisture and gases.
6. Provide suitable modular seal where conduits penetrate exterior wall below grade.
7. Where conduits penetrate waterproof membrane, seal as required to maintain integrity of membrane.
8. Make penetrations for roof-mounted equipment within associated equipment openings and curbs where possible to minimize roofing system penetrations. Where penetrations are necessary, seal as indicated or as required to preserve integrity of roofing system and maintain roof warranty. Include proposed locations of penetrations and methods for sealing with submittals.
9. Provide metal escutcheon plates for conduit penetrations exposed to public view.
10. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 078400.

L. Underground Installation:
1. Minimum Cover, Unless Otherwise Indicated or Required:
    a. Underground, Exterior: 24 inches.
    b. Under Slab on Grade: 12 inches to bottom of slab.

2. Provide underground warning tape in accordance with Section 260553 along entire conduit length for service entrance where not concrete-encased.

M. Conduit Movement Provisions: Where conduits are subject to movement, provide expansion and expansion/deflection fittings to prevent damage to enclosed conductors or connected equipment. This includes, but is not limited to:
   1. Where conduits cross structural joints intended for expansion, contraction, or deflection.
   2. Where calculated in accordance with NFPA 70 for rigid polyvinyl chloride (PVC) conduit installed above ground to compensate for thermal expansion and contraction.
   3. Where conduits are subject to earth movement by settlement or frost.

N. Conduit Sealing:
   1. Use foam conduit sealant to prevent entry of moisture and gases. This includes, but is not limited to:
      a. Where conduits enter building from outside.
      b. Where service conduits enter building from underground distribution system.
      c. Where conduits enter building from underground.
      d. Where conduits may transport moisture to contact live parts.
   2. Where conduits cross barriers between areas of potential substantial temperature differential, use foam conduit sealant at accessible point near penetration to prevent condensation. This includes, but is not limited to:
      a. Where conduits pass from outdoors into conditioned interior spaces.
      b. Where conduits pass from unconditioned interior spaces into conditioned interior spaces.

O. Condensation Prevention: Where conduits cross barriers between areas of potential substantial temperature differential, provide sealing fitting or approved sealing compound at an accessible point near the penetration to prevent condensation. This includes, but is not limited to:
   1. Where conduits pass from outdoors into conditioned interior spaces.
   2. Where conduits pass from unconditioned interior spaces into conditioned interior spaces.

P. Provide pull string in all empty conduits and in conduits where conductors and cables are to be installed by others. Leave minimum slack of 12 inches at each end.

Q. Provide grounding and bonding in accordance with Section 260526.

3.3 FIELD QUALITY CONTROL

A. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.

B. Where coating of PVC-coated galvanized steel rigid metal conduit (RMC) contains cuts or abrasions, repair in accordance with manufacturer's instructions.

C. Correct deficiencies and replace damaged or defective conduits.

3.4 CLEANING

A. Clean interior of conduits to remove moisture and foreign matter.

3.5 PROTECTION

A. Immediately after installation of conduit, use suitable manufactured plugs to provide protection from entry of moisture and foreign material and do not remove until ready for installation of conductors.

END OF SECTION 26 05 33.13

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SECTION 260533.16 - BOXES FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Outlet and device boxes up to 100 cubic inches, including those used as junction and pull boxes.

B. Cabinets and enclosures, including junction and pull boxes larger than 100 cubic inches.

C. Floor boxes.

D. Underground boxes/enclosures.

1.2 REFERENCE STANDARDS

A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2010.

B. NECA 130 - Standard for Installing and Maintaining Wiring Devices; 2010.

C. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; 2012.

D. NEMA OS 1 - Sheet-Steel Outlet Boxes, Device Boxes, Covers, and Box Supports; 2013.

E. NEMA OS 2 - Nonmetallic Outlet Boxes, Device Boxes, Covers and Box Supports; 2013.

F. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2014.

G. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

H. SCTE 77 - Specification for Underground Enclosure Integrity; 2013.

I. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations; Current Edition, Including All Revisions.

J. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations; Current Edition, Including All Revisions.

K. UL 508A - Industrial Control Panels; Current Edition, Including All Revisions.

L. UL 514A - Metallic Outlet Boxes; Current Edition, Including All Revisions.

M. UL 514C - Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers; Current Edition, Including All Revisions.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate the work with other trades to avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and working clearances for electrical equipment required by NFPA 70.
2. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.
3. Coordinate minimum sizes of boxes with the actual installed arrangement of conductors, clamps, support fittings, and devices, calculated according to NFPA 70.
4. Coordinate minimum sizes of pull boxes with the actual installed arrangement of connected conduits, calculated according to NFPA 70.
5. Coordinate the placement of boxes with millwork, furniture, devices, equipment, etc. installed under other sections or by others.
6. Coordinate the work with other trades to preserve insulation integrity.
7. Coordinate the work with other trades to provide walls suitable for installation of flush-mounted boxes where indicated.

8. Notify Engineer of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.4 QUALITY ASSURANCE

A. Comply with requirements of NFPA 70.

B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.

C. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.1 BOXES

A. General Requirements:
   1. Do not use boxes and associated accessories for applications other than as permitted by NFPA 70 and product listing.
   2. Provide all boxes, fittings, supports, and accessories required for a complete raceway system and to accommodate devices and equipment to be installed.
   3. Provide products listed, classified, and labeled as suitable for the purpose intended.
   4. Where box size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.
   5. Provide grounding terminals within boxes where equipment grounding conductors terminate.

B. Outlet and Device Boxes Up to 100 cubic inches, Including Those Used as Junction and Pull Boxes:
   1. Use sheet-steel boxes for dry locations unless otherwise indicated or required.
   2. Use cast iron boxes or cast aluminum boxes for damp or wet locations unless otherwise indicated or required; furnish with compatible weatherproof gasketed covers.
   3. Use cast iron boxes or cast aluminum boxes where exposed galvanized steel rigid metal conduit or exposed intermediate metal conduit (IMC) is used.
   4. Use nonmetallic boxes where exposed rigid PVC conduit is used.
   5. Use suitable concrete type boxes where flush-mounted in concrete.
   6. Use suitable masonry type boxes where flush-mounted in masonry walls.
   7. Use raised covers suitable for the type of wall construction and device configuration where required.
   8. Use shallow boxes where required by the type of wall construction.
   9. Do not use "through-wall" boxes designed for access from both sides of wall.
   10. Sheet-Steel Boxes: Comply with NEMA OS 1, and list and label as complying with UL 514A.
   11. Cast Metal Boxes: Comply with NEMA FB 1, and list and label as complying with UL 514A; furnish with threaded hubs.
   12. Nonmetallic Boxes: Comply with NEMA OS 2, and list and label as complying with UL 514C.
   13. Boxes for Supporting Luminaires and Ceiling Fans: Listed as suitable for the type and weight of load to be supported; furnished with fixture stud to accommodate mounting of luminaire where required.

14. Boxes for Ganged Devices: Use multigang boxes of single-piece construction. Do not use field-connected gangable boxes unless specifically indicated or permitted.
15. Minimum Box Size, Unless Otherwise Indicated:
    a. Wiring Devices (Other Than Communications Systems Outlets): 4 inch square by 1-1/2 inch deep (100 by 38 mm) trade size.
    b. Communications Systems Outlets: Comply with Section 271000.
    c. Ceiling Outlets: 4 inch octagonal or square by 1-1/2 inch deep (100 by 38 mm) trade size.
16. Wall Plates: Comply with Section 262726.
17. Manufacturers:
    a. Cooper Crouse-Hinds, a division of Eaton Corporation: www.cooperindustries.com/#sle.
    b. Hubbell Incorporated; RACO Products: www.hubbell-rtb.com/#sle.
    c. O-Z/Gedney, a brand of Emerson Electric Co: www.emerson.com/#sle.
    d. Thomas & Betts Corporation: www.tnb.com/#sle.

C. Cabinets and Enclosures, Including Junction and Pull Boxes Larger Than 100 cubic inches:
1. Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E, or UL 508A.
2. NEMA 250 Environment Type, Unless Otherwise Indicated:
    a. Indoor Clean, Dry Locations: Type 1, painted steel.
    b. Outdoor Locations: Type 3R, painted steel.
3. Junction and Pull Boxes Larger Than 100 cubic inches:
    a. Provide screw-cover or hinged-cover enclosures unless otherwise indicated.
4. Cabinets and Hinged-Cover Enclosures, Other Than Junction and Pull Boxes:
    a. Provide lockable hinged covers, all locks keyed alike unless otherwise indicated.
    b. Back Panels: Painted steel, removable.
    c. Terminal Blocks: Provide voltage/current ratings and terminal quantity suitable for purpose indicated, with 25 percent spare terminal capacity.
5. Finish for Painted Steel Enclosures: Manufacturer's standard grey unless otherwise indicated.
6. Manufacturers:
    a. Cooper B-Line, a division of Eaton Corporation: www.cooperindustries.com/#sle.
    b. Hoffman, a brand of Pentair Technical Products: www.hoffmanonline.com/#sle.
    c. Hubbell Incorporated; Wiegmann Products: www.hubbell-wiegmann.com/#sle.

D. Floor Boxes:
1. Description: Floor boxes compatible with floor box service fittings provided in accordance with Section 262726; with partitions to separate multiple services; furnished with all components, adapters, and trims required for complete installation.
2. Use sheet-steel or cast iron floor boxes within slab above grade.
3. Metallic Floor Boxes: Fully adjustable (with integral means for leveling adjustment prior to and after concrete pour).
4. Manufacturer: Same as manufacturer of floor box service fittings.

E. Underground Boxes/Enclosures:
1. Description: In-ground, open bottom boxes furnished with flush, non-skid covers with legend indicating type of service and stainless steel tamper resistant cover bolts.
2. Size: As indicated on drawings.
3. Depth: As required to extend below frost line to prevent frost upheaval, but not less than 12 inches.
4. Provide logo on cover to indicate type of service.
5. Applications:

a. Sidewalks and Landscaped Areas Subject Only to Occasional Nondeliberate Vehicular Traffic: Use polymer concrete enclosures, with minimum SCTE 77, Tier 8 load rating.
b. Parking Lots, in Areas Subject Only To Occasional Nondeliberate Vehicular Traffic: Use polymer concrete enclosures, with minimum SCTE 77, Tier 15 load rating.
c. Do not use polymer concrete enclosures in areas subject to deliberate vehicular traffic.

6. Polymer Concrete Underground Boxes/Enclosures: Comply with SCTE 77.
   a. Manufacturers:
      1) Hubbell Incorporated; Quazite Products: www.hubbellpowersystems.com/#sle.
      2) Oldcastle Precast, Inc: www.oldcastleprecast.com/#sle.
   b. Combination fiberglass/polymer concrete boxes/enclosures are acceptable.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that mounting surfaces are ready to receive boxes.

C. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Install boxes in accordance with NECA 1 (general workmanship) and, where applicable, NECA 130, including mounting heights specified in those standards where mounting heights are not indicated.

C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.

D. Provide separate boxes for emergency power and normal power systems.

E. Unless otherwise indicated, provide separate boxes for line voltage and low voltage systems.

F. Flush-mount boxes in finished areas unless specifically indicated to be surface-mounted.

G. Unless otherwise indicated, boxes may be surface-mounted where exposed conduits are indicated or permitted.

H. Box Locations:
   1. Locate boxes to be accessible. Provide access panels in accordance with Section 083100 as required where approved by the Architect.
   2. Unless dimensioned, box locations indicated are approximate.
   3. Locate boxes as required for devices installed under other sections or by others.
      a. Switches, Receptacles, and Other Wiring Devices: Comply with Section 262726.
      b. Communications Systems Outlets: Comply with Section 271000.
   4. Locate boxes so that wall plates do not span different building finishes.
   5. Locate boxes so that wall plates do not cross masonry joints.
   6. Unless otherwise indicated, where multiple outlet boxes are installed at the same location at different mounting heights, install along a common vertical center line.
   7. Do not install flush-mounted boxes on opposite sides of walls back-to-back. Provide minimum 6 inches horizontal separation unless otherwise indicated.
   8. Acoustic-Rated Walls: Do not install flush-mounted boxes on opposite sides of walls back-to-back; provide minimum 24 inches horizontal separation.
   9. Fire Resistance Rated Walls: Install flush-mounted boxes such that the required fire resistance will not be reduced.

a. Do not install flush-mounted boxes on opposite sides of walls back-to-back; provide minimum 24 inches separation where wall is constructed with individual noncommunicating stud cavities or protect both boxes with listed putty pads.
b. Do not install flush-mounted boxes with area larger than 16 square inches or such that the total aggregate area of openings exceeds 100 square inches for any 100 square feet of wall area.

10. Locate junction and pull boxes as indicated, as required to facilitate installation of conductors, and to limit conduit length and/or number of bends between pulling points in accordance with Section 260533.13.
11. Locate junction and pull boxes in the following areas, unless otherwise indicated or approved by the Architect:
    a. Concealed above accessible suspended ceilings.
    b. Within joists in areas with no ceiling.
    c. Electrical rooms.
    d. Mechanical equipment rooms.

I. Box Supports:
1. Secure and support boxes in accordance with NFPA 70 and Section 260529 using suitable supports and methods approved by the authority having jurisdiction.
2. Provide independent support from building structure except for cast metal boxes (other than boxes used for fixture support) supported by threaded conduit connections in accordance with NFPA 70. Do not provide support from piping, ductwork, or other systems.
3. Installation Above Suspended Ceilings: Do not provide support from ceiling grid or ceiling support system.
4. Use far-side support to secure flush-mounted boxes supported from single stud in hollow stud walls. Repair or replace supports for boxes that permit excessive movement.

J. Install boxes plumb and level.

K. Flush-Mounted Boxes:
1. Install boxes in noncombustible materials such as concrete, tile, gypsum, plaster, etc. so that front edge of box or associated raised cover is not set back from finished surface more than 1/4 inch or does not project beyond finished surface.
2. Install boxes in combustible materials such as wood so that front edge of box or associated raised cover is flush with finished surface.
3. Repair rough openings around boxes in noncombustible materials such as concrete, tile, gypsum, plaster, etc. so that there are no gaps or open spaces greater than 1/8 inch at the edge of the box.

L. Install boxes as required to preserve insulation integrity.

M. Metallic Floor Boxes: Install box level at the proper elevation to be flush with finished floor.

N. Underground Boxes/Enclosures:
1. Install enclosure on gravel base, minimum 6 inches deep.
2. Flush-mount enclosures located in concrete or paved areas.
3. Mount enclosures located in landscaped areas with top at 1 inch above finished grade.
4. Install additional bracing inside enclosures in accordance with manufacturer's instructions to minimize box sidewall deflections during backfilling. Backfill with cover bolted in place.

O. Install permanent barrier between ganged wiring devices when voltage between adjacent devices exceeds 300 V.

P. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 078400.

Q. Close unused box openings.

R. Install blank wall plates on junction boxes and on outlet boxes with no devices or equipment installed or designated for future use.

S. Provide grounding and bonding in accordance with Section 260526.

T. Identify boxes in accordance with Section 260553.

3.3 CLEANING

A. Clean interior of boxes to remove dirt, debris, plaster and other foreign material.

3.4 PROTECTION

A. Immediately after installation, protect boxes from entry of moisture and foreign material until ready for installation of conductors.

END OF SECTION 26 05 33.16

SECTION 260533.23 - SURFACE RACEWAYS FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Surface raceway systems.

B. Wireways.

1.2 REFERENCE STANDARDS

A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2010.

B. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

C. UL 5 - Surface Metal Raceways and Fittings; Current Edition, Including All Revisions.

D. UL 870 - Wireways, Auxiliary Gutters, and Associated Fittings; Current Edition, Including All Revisions.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate the placement of raceways with millwork, furniture, equipment, etc. installed under other sections or by others.
   2. Coordinate rough-in locations of outlet boxes provided under Section 260533.16 and conduit provided under Section 260533.13 as required for installation of raceways provided under this section.
   3. Verify minimum sizes of raceways with the actual conductors and components to be installed.
   4. Notify Engineer of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

B. Sequencing:
   1. Do not install raceways until final surface finishes and painting are complete.
   2. Do not begin installation of conductors and cables until installation of raceways is complete between outlet, junction and splicing points.

1.4 SUBMITTALS

A. Product Data: Provide manufacturer's standard catalog pages and data sheets including dimensions, knockout sizes and locations, materials, fabrication details, finishes, service condition requirements, and accessories.
   1. Surface Raceway Systems: Include information on fill capacities for conductors and cables.

B. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

1.5 QUALITY ASSURANCE

A. Comply with requirements of NFPA 70.

B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.

C. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

D. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

PART 2 PRODUCTS

2.1 RACEWAY REQUIREMENTS

A. Provide all components, fittings, supports, and accessories required for a complete raceway system.

B. Provide products listed, classified, and labeled as suitable for the purpose intended.

C. Do not use raceways for applications other than as permitted by NFPA 70 and product listing.

2.2 SURFACE RACEWAY SYSTEMS

A. Manufacturers:
   1. Hubbell Incorporated: www.hubbell.com/#sle.
   2. MonoSystems, Inc: www.monosystems.com/#sle.
   3. Wiremold, a brand of Legrand North America, Inc: www.legrand.us/#sle.

B. Surface Metal Raceways: Listed and labeled as complying with UL 5.

2.3 WIREWAYS

A. Description: Lay-in wireways and wiring troughs with removable covers; listed and labeled as complying with UL 870.

B. Wireway Type, Unless Otherwise Indicated:

C. Where wireway size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that outlet boxes and conduit terminations are installed in proper locations and are properly sized in accordance with NFPA 70 to accommodate raceways.

C. Verify that mounting surfaces are ready to receive raceways and that final surface finishes are complete, including painting.

D. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Perform work in accordance with NECA 1 (general workmanship).

C. Install raceways plumb and level.

D. Arrange wireways and associated raceway connections to comply with NFPA 70, including but not limited to requirements for deflected conductors and wireways used as pullboxes. Increase size of wireway where necessary.

E. Secure and support raceways in accordance with Section 260529 at intervals complying with NFPA 70 and manufacturer's requirements.

F. Close unused raceway openings.

G. Provide grounding and bonding in accordance with Section 260526.

3.3 FIELD QUALITY CONTROL

A. Inspect raceways for damage and defects.

B. Correct wiring deficiencies and replace damaged or defective raceways.

3.4 CLEANING

A. Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish.

3.5 PROTECTION

A. Protect installed raceways from subsequent construction operations.

END OF SECTION 26 05 33.23

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SECTION 260553 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Electrical identification requirements.
B. Identification nameplates and labels.
C. Wire and cable markers.
D. Underground warning tape.
E. Warning signs and labels.

1.2 REFERENCE STANDARDS

A. ANSI Z535.2 - American National Standard for Environmental and Facility Safety Signs; 2011.
B. ANSI Z535.4 - American National Standard for Product Safety Signs and Labels; 2011.
C. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
D. NFPA 70E - Standard for Electrical Safety in the Workplace; 2015.
E. UL 969 - Marking and Labeling Systems; Current Edition, Including All Revisions.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
    1. Verify final designations for equipment, systems, and components to be identified prior to fabrication of identification products.
B. Sequencing:
    1. Do not conceal items to be identified, in locations such as above suspended ceilings, until identification products have been installed.
    2. Do not install identification products until final surface finishes and painting are complete.

1.4 SUBMITTALS

A. Product Data: Provide manufacturer's standard catalog pages and data sheets for each product.

1.5 QUALITY ASSURANCE

A. Comply with requirements of NFPA 70.

1.6 FIELD CONDITIONS

A. Do not install adhesive products when ambient temperature is lower than recommended by manufacturer.

PART 2 PRODUCTS

2.1 IDENTIFICATION REQUIREMENTS

A. Identification for Equipment:
    1. Use identification nameplate to identify each piece of electrical distribution and control equipment and associated sections, compartments, and components.
        a. Panelboards:
            1) Identify ampere rating.
            2) Identify voltage and phase.

3) Identify power source and circuit number. Include location when not within sight of equipment.
4) Identify main overcurrent protective device. Use identification label for panelboards with a door. For power distribution panelboards without a door, use identification nameplate.
5) Use typewritten circuit directory to identify load(s) served for panelboards with a door. Identify spares and spaces using pencil.
6) For power panelboards without a door, use identification nameplate to identify load(s) served for each branch device. Do not identify spares and spaces.

2. Use identification nameplate to identify disconnect location for equipment with remote disconnecting means.
3. Use identification label or handwritten text using indelible marker on inside of door at each fused switch to identify required NEMA fuse class and size.
4. Use identification label to identify overcurrent protective devices for branch circuits serving fire alarm circuits. Identify with text "FIRE ALARM CIRCUIT".
5. Available Fault Current Documentation: Use identification label to identify the available fault current and date calculations were performed at locations requiring documentation by NFPA 70, including but not limited to the following.
   a. Service equipment.
   b. Industrial control panels.
   c. Motor control centers.
   d. Elevator control panels.
   e. Industrial machinery.
6. Use warning signs to identify electrical hazards for entrances to all rooms and other guarded locations that contain exposed live parts operating at 600 V nominal or less with the word message "DANGER; Electrical hazard; Authorized personnel only" or approved equivalent.
7. Use warning labels, identification nameplates, or identification labels to identify electrical hazards for equipment where multiple power sources are present with the word message "DANGER; Hazardous voltage; Multiple power sources may be present; Disconnect all electric power including remote disconnects before servicing" or approved equivalent.

B. Identification for Conductors and Cables:
1. Color Coding for Power Conductors 600 V and Less: Comply with Section 260519.
2. Identification for Communications Conductors and Cables: Comply with Section 271000.
3. Use identification nameplate or identification label to identify color code for ungrounded and grounded power conductors inside door or enclosure at each piece of feeder or branch-circuit distribution equipment when premises has feeders or branch circuits served by more than one nominal voltage system.
4. Use wire and cable markers to identify circuit number or other designation indicated for power, control, and instrumentation conductors and cables at the following locations:
   a. At each source and load connection.
   b. Within boxes when more than one circuit is present.
   c. Within equipment enclosures when conductors and cables enter or leave the enclosure.
5. Use wire and cable markers to identify connected grounding electrode system components for grounding electrode conductors.

C. Identification for Boxes:
1. Use identification labels or handwritten text using indelible marker to identify circuits enclosed.
   a. For exposed boxes in public areas, use only identification labels.

D. Identification for Luminaires:

1. Use permanent red dot on luminaire frame to identify luminaires connected to emergency power system.

2.2 IDENTIFICATION NAMEPLATES AND LABELS

A. Identification Nameplates:
   1. Manufacturers:
      a. Brimar Industries, Inc: www.brimar.com/#sle.
      b. Kolbi Pipe Marker Co: www.kolbipipemarkers.com/#sle.
      c. Seton Identification Products: www.seton.com/#sle.
   2. Materials:
      a. Indoor Clean, Dry Locations: Use plastic nameplates.
      b. Outdoor Locations: Use plastic, stainless steel, or aluminum nameplates suitable for exterior use.
   3. Plastic Nameplates: Two-layer or three-layer laminated acrylic or electrically non-conductive phenolic with beveled edges; minimum thickness of 1/16 inch; engraved text.
      a. Exception: Provide minimum thickness of 1/8 inch when any dimension is greater than 4 inches.
   4. Stainless Steel Nameplates: Minimum thickness of 1/32 inch; engraved or laser-etched text.
   5. Aluminum Nameplates: Anodized; minimum thickness of 1/32 inch; engraved or laser-etched text.
   6. Mounting Holes for Mechanical Fasteners: Two, centered on sides for sizes up to 1 inch high; Four, located at corners for larger sizes.

B. Identification Labels:
   1. Manufacturers:
      a. Brady Corporation: www.bradyid.com/#sle.
      b. Brother International Corporation: www.brother-usa.com/#sle.
      c. Panduit Corp: www.panduit.com/#sle.
   2. Materials: Use self-adhesive laminated plastic labels; UV, chemical, water, heat, and abrasion resistant.
   3. Text: Use factory pre-printed or machine-printed text. Do not use handwritten text unless otherwise indicated.

C. Format for Equipment Identification:
   1. Minimum Size: 1 inch by 2.5 inches.
   2. Legend:
      a. System designation where applicable:
         1) Emergency Power System: Identify with text "EMERGENCY".
         2) Fire Alarm System: Identify with text "FIRE ALARM".
      b. Equipment designation or other approved description.
      c. Other information as indicated.
   3. Text: All capitalized unless otherwise indicated.
   4. Minimum Text Height:
      a. System Designation: 1 inch.
      b. Equipment Designation: 1/2 inch.
      c. Other Information: 1/4 inch.
      d. Exception: Provide minimum text height of 1 inch for equipment located more than 10 feet above floor or working platform.
   5. Color:
      a. Normal Power System: White text on black background.
      b. Emergency Power System: White text on red background.

c. Fire Alarm System: White text on red background.

D. Format for General Information and Operating Instructions:
1. Minimum Size: 1 inch by 2.5 inches.
2. Legend: Include information or instructions indicated or as required for proper and safe operation and maintenance.
3. Text: All capitalized unless otherwise indicated.
4. Minimum Text Height: 1/4 inch.
5. Color: Black text on white background unless otherwise indicated.
a. Exceptions:
1) Provide white text on red background for general information or operational instructions for emergency systems.
2) Provide white text on red background for general information or operational instructions for fire alarm systems.

E. Format for Caution and Warning Messages:
1. Minimum Size: 2 inches by 4 inches.
2. Legend: Include information or instructions indicated or as required for proper and safe operation and maintenance.
3. Text: All capitalized unless otherwise indicated.
4. Minimum Text Height: 1/2 inch.
5. Color: Black text on yellow background unless otherwise indicated.

F. Format for Receptacle Identification:
1. Minimum Size: 3/8 inch by 1.5 inches.
2. Legend: Power source and circuit number or other designation indicated.
a. Include voltage and phase for other than 120 V, single phase circuits.
3. Text: All capitalized unless otherwise indicated.
4. Minimum Text Height: 3/16 inch.
5. Color: Black text on clear background.

G. Format for Control Device Identification:
1. Minimum Size: 3/8 inch by 1.5 inches.
2. Legend: Load controlled or other designation indicated.
3. Text: All capitalized unless otherwise indicated.
4. Minimum Text Height: 3/16 inch.
5. Color: Black text on clear background.

2.3 WIRE AND CABLE MARKERS

A. Manufacturers:
1. Brady Corporation: www.bradyid.com/#sle.
2. HellermannTyton: www.hellermanntyton.com/#sle.
3. Panduit Corp: www.panduit.com/#sle.

B. Markers for Conductors and Cables: Use wrap-around self-adhesive vinyl cloth, wrap-around self-adhesive vinyl self-laminating, heat-shrink sleeve, plastic sleeve, plastic clip-on, or vinyl split sleeve type markers suitable for the conductor or cable to be identified.

C. Markers for Conductor and Cable Bundles: Use plastic marker tags secured by nylon cable ties.

D. Legend: Power source and circuit number or other designation indicated.

E. Text: Use factory pre-printed or machine-printed text, all capitalized unless otherwise indicated.

F. Minimum Text Height: 1/8 inch.

G. Color: Black text on white background unless otherwise indicated.

2.4 UNDERGROUND WARNING TAPE

A. Manufacturers:
   1. Brady Corporation: www.bradyid.com/#sle.
   2. Brimar Industries, Inc: www.brimar.com/#sle.
   3. Seton Identification Products: www.seton.com/#sle.

B. Materials: Use non-detectable type polyethylene tape suitable for direct burial, unless otherwise indicated.

C. Non-detectable Type Tape: 6 inches wide, with minimum thickness of 4 mil.

D. Foil-backed Detectable Type Tape: 3 inches wide, with minimum thickness of 5 mil, unless otherwise required for proper detection.

E. Legend: Type of service, continuously repeated over full length of tape.

F. Color:
   1. Tape for Buried Power Lines: Black text on red background.
   2. Tape for Buried Communication, Alarm, and Signal Lines: Black text on orange background.

2.5 WARNING SIGNS AND LABELS

A. Manufacturers:
   1. Brimar Industries, Inc: www.brimar.com/#sle.
   2. Clarion Safety Systems, LLC: www.clarionsafety.com/#sle.
   3. Seton Identification Products: www.seton.com/#sle.

B. Comply with ANSI Z535.2 or ANSI Z535.4 as applicable.

C. Warning Signs:
   1. Materials:
      a. Indoor Dry, Clean Locations: Use factory pre-printed rigid plastic or self-adhesive vinyl signs.
      b. Outdoor Locations: Use factory pre-printed rigid aluminum signs.
   2. Rigid Signs: Provide four mounting holes at corners for mechanical fasteners.
   3. Minimum Size: 7 by 10 inches unless otherwise indicated.

D. Warning Labels:
   1. Materials: Use factory pre-printed or machine-printed self-adhesive polyester or self-adhesive vinyl labels; UV, chemical, water, heat, and abrasion resistant; produced using materials recognized to UL 969.
   2. Machine-Printed Labels: Use thermal transfer process printing machines and accessories recommended by label manufacturer.
   3. Minimum Size: 2 by 4 inches unless otherwise indicated.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Install identification products to be plainly visible for examination, adjustment, servicing, and maintenance. Unless otherwise indicated, locate products as follows:
   1. Surface-Mounted Equipment: Enclosure front.
   2. Flush-Mounted Equipment: Inside of equipment door.
   3. Free-Standing Equipment: Enclosure front; also enclosure rear for equipment with rear access.
   4. Elevated Equipment: Legible from the floor or working platform.

5. Branch Devices: Adjacent to device.
6. Interior Components: Legible from the point of access.
7. Conduits: Legible from the floor.
8. Boxes: Outside face of cover.
9. Conductors and Cables: Legible from the point of access.
10. Devices: Outside face of cover.

C. Install identification products centered, level, and parallel with lines of item being identified.

D. Secure nameplates to exterior surfaces of enclosures using stainless steel screws and to interior surfaces using self-adhesive backing or epoxy cement.
   1. Do not use adhesives on exterior surfaces except where substrate cannot be penetrated.

E. Install self-adhesive labels and markers to achieve maximum adhesion, with no bubbles or wrinkles and edges properly sealed.

F. Install underground warning tape above buried lines with one tape per trench at 3 inches below finished grade.

G. Secure rigid signs using stainless steel screws.

H. Mark all handwritten text, where permitted, to be neat and legible.

3.2 FIELD QUALITY CONTROL

A. Replace self-adhesive labels and markers that exhibit bubbles, wrinkles, curling or other signs of improper adhesion.

B. Install minimum of one arc flash label on each panel, panel section, switch, enclosed breaker, or other electrical equipment installed or incoporated into the Work. On unit substation equipment, over-current devices 1000 amps and above, and distribution panels 800 amps and above, install minimum of two labels evenly spaced at probable access points. Install up to ten (10) additional labels as required by the engineer.

END OF SECTION 26 05 53

SECTION 260923 - LIGHTING CONTROL DEVICES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Occupancy sensors.

1.2 REFERENCE STANDARDS

A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2010.

B. NECA 130 - Standard for Installing and Maintaining Wiring Devices; 2010.

C. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate the placement of lighting control devices with millwork, furniture, equipment, etc. installed under other sections or by others.
   2. Coordinate the placement of wall switch occupancy sensors with actual installed door swings.
   3. Coordinate the placement of occupancy sensors with millwork, furniture, equipment or other potential obstructions to motion detection coverage installed under other sections or by others.

B. Sequencing:
   1. Do not install lighting control devices until final surface finishes and painting are complete.

1.4 SUBMITTALS

A. Product Data: Include ratings, configurations, standard wiring diagrams, dimensions, colors, service condition requirements, and installed features.

B. Shop Drawings:
   1. Occupancy Sensors: Provide lighting plan indicating location, model number, and orientation of each occupancy sensor and associated system component.

C. Field Quality Control Reports.

D. Operation and Maintenance Data: Include detailed information on device programming and setup.

E. Project Record Documents: Record actual installed locations and settings for lighting control devices.

1.5 QUALITY ASSURANCE

A. Comply with requirements of NFPA 70.

1.6 DELIVERY, STORAGE, AND PROTECTION

A. Store products in a clean, dry space in original manufacturer's packaging in accordance with manufacturer's written instructions until ready for installation.

1.7 FIELD CONDITIONS

1.8 WARRANTY

A. See Section 017800 - Closeout Submittals, for additional warranty requirements.

B. Provide five year manufacturer warranty for all occupancy sensors.

PART 2 PRODUCTS

2.1 LIGHTING CONTROL DEVICES - GENERAL REQUIREMENTS

A. Provide products listed, classified, and labeled as suitable for the purpose intended.

B. Unless specifically indicated to be excluded, provide all required conduit, wiring, connectors, hardware, components, accessories, etc. as required for a complete operating system.

2.2 OCCUPANCY SENSORS

A. Manufacturers:
   1. Hubbell Incorporated: www.hubbell.com/#sle.
   2. Sensor Switch Inc: www.sensorswitch.com/#sle.
   3. WattStopper: www.wattstopper.com/#sle.

B. All Occupancy Sensors:
   1. Description: Factory-assembled commercial specification grade devices for indoor use capable of sensing both major motion, such as walking, and minor motion, such as small desktop level movements, according to published coverage areas, for automatic control of load indicated.
   2. Sensor Technology:
      a. Passive Infrared (PIR) Occupancy Sensors: Designed to detect occupancy by sensing movement of thermal energy between zones.
      b. Ultrasonic Occupancy Sensors: Designed to detect occupancy by sensing frequency shifts in emitted and reflected inaudible sound waves.
      c. Passive Infrared/Ultrasonic Dual Technology Occupancy Sensors: Designed to detect occupancy using a combination of both passive infrared and ultrasonic technologies.
      d. Passive Infrared/Acoustic Dual Technology Occupancy Sensors: Designed to detect occupancy using a combination of both passive infrared and audible sound sensing technologies.
   3. Provide LED to visually indicate motion detection with separate color LEDs for each sensor type in dual technology units.
   4. Operation: Unless otherwise indicated, occupancy sensor to turn load on when occupant presence is detected and to turn load off when no occupant presence is detected during an adjustable turn-off delay time interval.
   5. Dual Technology Occupancy Sensors: Field configurable turn-on and hold-on activation with settings for activation by either or both sensing technologies.
   6. Passive Infrared Lens Field of View: Field customizable by addition of factory masking material, adjustment of integral blinders, or similar means to block motion detection in selected areas.
   7. Turn-Off Delay: Field adjustable, with time delay settings up to 30 minutes.
   8. Sensitivity: Field adjustable.
   9. Adaptive Technology: Field selectable; capable of self-adjusting sensitivity and time delay according to conditions.
   10. Compatibility (Non-Dimming Sensors): Suitable for controlling incandescent lighting, low-voltage lighting with electronic and magnetic transformers, fluorescent lighting with electronic and magnetic ballasts, and fractional motor loads, with no minimum load requirements.
   11. Load Rating for Line Voltage Occupancy Sensors: As required to control the load indicated on drawings.

C. Wall Switch Occupancy Sensors:

1. All Wall Switch Occupancy Sensors:
    a. Description: Occupancy sensors designed for installation in standard wall box at standard wall switch mounting height with a field of view of 180 degrees, integrated manual control capability, and no leakage current to load in off mode.
    b. Unless otherwise indicated or required to control the load indicated on drawings, provide line voltage units with self-contained relay.
    c. Where indicated, provide two-circuit units for control of two separate lighting loads, with separate manual controls and separately programmable operation for each load.
    d. Operation: Operates only as vacancy sensor (manual-on/automatic-off) in accordance with California Title 24 requirements.
    e. Manual-Off Override Control: When used to turn off load while in automatic-on mode, unit to revert back to automatic mode after no occupant presence is detected during the delayed-off time interval.

D. Ceiling Mounted Occupancy Sensors:
1. All Ceiling Mounted Occupancy Sensors:
    a. Description: Low profile occupancy sensors designed for ceiling installation.
    b. Unless otherwise indicated or required to control the load indicated on drawings, provide low voltage units, for use with separate compatible accessory power packs.
    c. Provide field selectable setting for disabling LED motion detector visual indicator.
    d. Occupancy sensor to be field selectable as either manual-on/automatic-off or automatic on/off.
    e. Finish: White unless otherwise indicated.

E. Power Packs for Low Voltage Occupancy Sensors:
1. Description: Plenum rated, self-contained low voltage class 2 transformer and relay compatible with specified low voltage occupancy sensors for switching of line voltage loads.
2. Provide quantity and configuration of power and slave packs with all associated wiring and accessories as required to control the load indicated on drawings.
3. Input Supply Voltage: Dual rated for 120/277 V ac.
4. Load Rating: As required to control the load indicated on drawings.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate devices and conductors in accordance with NFPA 70.

C. Verify that openings for outlet boxes are neatly cut and will be completely covered by devices or wall plates.

D. Verify that final surface finishes are complete, including painting.

E. Verify that branch circuit wiring installation is completed, tested, and ready for connection to lighting control devices.

F. Verify that the service voltage and ratings of lighting control devices are appropriate for the service voltage and load requirements at the location to be installed.

G. Verify that conditions are satisfactory for installation prior to starting work.

3.2 PREPARATION

A. Provide extension rings to bring outlet boxes flush with finished surface.

B. Clean dirt, debris, plaster, and other foreign materials from outlet boxes.

3.3 INSTALLATION

A. Install lighting control devices in accordance with NECA 1 (general workmanship) and, where applicable, NECA 130, including mounting heights specified in those standards unless otherwise indicated.

B. Coordinate locations of outlet boxes provided under Section 260533.16 as required for installation of lighting control devices provided under this section.
   1. Mounting Heights: Unless otherwise indicated, as follows:
      a. Wall Switch Occupancy Sensors: 48 inches above finished floor.
   2. Orient outlet boxes for vertical installation of lighting control devices unless otherwise indicated.
   3. Locate wall switch occupancy sensors on strike side of door with edge of wall plate 3 inches from edge of door frame. Where locations are indicated otherwise, notify Engineer to obtain direction prior to proceeding with work.

C. Install lighting control devices in accordance with manufacturer's instructions.

D. Unless otherwise indicated, connect lighting control device grounding terminal or conductor to branch circuit equipment grounding conductor and to outlet box with bonding jumper.

E. Install lighting control devices plumb and level, and held securely in place.

F. Where required and not furnished with lighting control device, provide wall plate in accordance with Section 262726.

G. Provide required supports in accordance with Section 260529.

H. Where applicable, install lighting control devices and associated wall plates to fit completely flush to mounting surface with no gaps and rough opening completely covered without strain on wall plate. Repair or reinstall improperly installed outlet boxes or improperly sized rough openings. Do not use oversized wall plates in lieu of meeting this requirement.

I. Occupancy Sensor Locations:
   1. Location Adjustments: Locations indicated are diagrammatic and only intended to indicate which rooms or areas require devices. Provide quantity and locations as required for complete coverage of respective room or area based on manufacturer's recommendations for installed devices.
   2. Locate ultrasonic and dual technology passive infrared/ultrasonic occupancy sensors a minimum of 4 feet from air supply ducts or other sources of heavy air flow and as per manufacturer's recommendations, in order to minimize false triggers.

J. Unless otherwise indicated, install power packs for lighting control devices above accessible ceiling or above access panel in inaccessible ceiling near the sensor location.

K. Where indicated, install separate compatible wall switches for manual control interface with lighting control devices or associated power packs.

L. Unless otherwise indicated, install switches on load side of power packs so that switch does not turn off power pack.

3.4 FIELD QUALITY CONTROL

A. Inspect each lighting control device for damage and defects.

B. Test occupancy sensors to verify proper operation, including time delays and ambient light thresholds where applicable. Verify optimal coverage for entire room or area. Record test results in written report to be included with submittals.

C. Correct wiring deficiencies and replace damaged or defective lighting control devices.

3.5 ADJUSTING

A. Adjust devices and wall plates to be flush and level.

B. Adjust occupancy sensor settings to minimize undesired activations while optimizing energy savings, and to achieve desired function as indicated or as directed by Engineer.

C. Where indicated or as directed by Architect, install factory masking material or adjust integral blinders on passive infrared (PIR) and dual technology occupancy sensor lenses to block undesired motion detection.

3.6 CLEANING

A. Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish.

3.7 COMMISSIONING

A. See Section 019113 - General Commissioning Requirements for commissioning requirements.

3.8 CLOSEOUT ACTIVITIES

A. Demonstration: Demonstrate proper operation of lighting control devices to Engineer, and correct deficiencies or make adjustments as directed.

END OF SECTION 26 09 23

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SECTION 262416 - PANELBOARDS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Power distribution panelboards.

B. Lighting and appliance panelboards.

C. Overcurrent protective devices for panelboards.

1.2 REFERENCE STANDARDS

A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2010.

B. NECA 407 - Standard for Installing and Maintaining Panelboards; 2009.

C. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2014.

D. NEMA PB 1 - Panelboards; 2011.

E. NEMA PB 1.1 - General Instructions for Proper Installation, Operation and Maintenance of Panelboards Rated 600 Volts or Less; 2013.

F. NETA ATS - Acceptance Testing Specifications for Electrical Power Equipment and Systems; 2013.

G. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

H. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations; Current Edition, Including All Revisions.

I. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations; Current Edition, Including All Revisions.

J. UL 67 - Panelboards; Current Edition, Including All Revisions.

K. UL 489 - Molded-Case Circuit Breakers, Molded-Case Switches and Circuit Breaker Enclosures; Current Edition, Including All Revisions.

L. UL 869A - Reference Standard for Service Equipment; Current Edition, Including All Revisions.

M. UL 943 - Ground-Fault Circuit-Interrupters; Current Edition, Including All Revisions.

N. UL 1699 - Arc-Fault Circuit-Interrupters; Current Edition, Including All Revisions.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate the work with other trades to avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and working clearances for electrical equipment required by NFPA 70.
   2. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.
   3. Coordinate the work with other trades to provide walls suitable for installation of flush-mounted panelboards where indicated.
   4. Verify with manufacturer that conductor terminations are suitable for use with the conductors to be installed.
   5. Notify Engineer of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.4 SUBMITTALS

A. Product Data: Provide manufacturer's standard catalog pages and data sheets for panelboards, enclosures, overcurrent protective devices, and other installed components and accessories.

B. Shop Drawings: Indicate outline and support point dimensions, voltage, main bus ampacity, overcurrent protective device arrangement and sizes, short circuit current ratings, conduit entry locations, conductor terminal information, and installed features and accessories.
   1. Include dimensioned plan and elevation views of panelboards and adjacent equipment with all required clearances indicated.
   2. Include wiring diagrams showing all factory and field connections.
   3. Clearly indicate whether proposed short circuit current ratings are fully rated or, where acceptable, series rated systems.

C. Source Quality Control Test Reports: Include reports for tests designated in NEMA PB 1 as design tests.

D. Field Quality Control Test Reports.

E. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

F. Project Record Documents: Record actual installed locations of panelboards and actual installed circuiting arrangements.

G. Maintenance Data: Include information on replacement parts and recommended maintenance procedures and intervals.

H. Maintenance Materials: Furnish the following for Nanuet Union Free School District's use in maintenance of project.
   1. See Section 016000 - Product Requirements, for additional provisions.
   2. Panelboard Keys: Two of each different key.

1.5 QUALITY ASSURANCE

A. Comply with requirements of NFPA 70.

B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.

C. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

D. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store panelboards in accordance with manufacturer's instructions and NECA 407.

B. Store in a clean, dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.

C. Handle carefully in accordance with manufacturer's written instructions to avoid damage to panelboard internal components, enclosure, and finish.

1.7 FIELD CONDITIONS

A. Maintain ambient temperature within the following limits during and after installation of panelboards:
   1. Panelboards Containing Circuit Breakers: Between 23 degrees F and 104 degrees F.
   2. Panelboards Containing Fusible Switches: Between -22 degrees F and 104 degrees F.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Eaton Corporation: www.eaton.com/#sle.

B. Schneider Electric; Square D Products: www.schneider-electric.us/#sle.

C. Siemens Industry, Inc: www.usa.siemens.com/#sle.

D. Source Limitations: Furnish panelboards and associated components produced by the same manufacturer as the other electrical distribution equipment used for this project and obtained from a single supplier.

2.2 PANELBOARDS - GENERAL REQUIREMENTS

A. Provide products listed, classified, and labeled as suitable for the purpose intended.

B. Unless otherwise indicated, provide products suitable for continuous operation under the following service conditions:
   1. Altitude: Less than 6,600 feet.
   2. Ambient Temperature:
      a. Panelboards Containing Circuit Breakers: Between 23 degrees F and 104 degrees F.
      b. Panelboards Containing Fusible Switches: Between -22 degrees F and 104 degrees F.

C. Short Circuit Current Rating:
   1. Provide panelboards with listed short circuit current rating not less than the available fault current at the installed location as indicated on the drawings.

D. Panelboards Used for Service Entrance: Listed and labeled as suitable for use as service equipment according to UL 869A.

E. Mains: Configure for top or bottom incoming feed as indicated or as required for the installation.

F. Branch Overcurrent Protective Devices: Replaceable without disturbing adjacent devices.

G. Bussing: Sized in accordance with UL 67 temperature rise requirements.
   1. Provide fully rated neutral bus, with a suitable lug for each feeder or branch circuit requiring a neutral connection.
   2. Provide solidly bonded equipment ground bus in each panelboard, with a suitable lug for each feeder and branch circuit equipment grounding conductor.
   3. Provide separate isolated/insulated ground bus where indicated.

H. Conductor Terminations: Suitable for use with the conductors to be installed.

I. Enclosures: Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E.
   1. Environment Type per NEMA 250: Unless otherwise indicated, as specified for the following installation locations:
      a. Indoor Clean, Dry Locations: Type 1.
      b. Outdoor Locations: Type 3R.
   2. Boxes: Galvanized steel unless otherwise indicated.
      a. Provide wiring gutters sized to accommodate the conductors to be installed.

b. Increase gutter space as required where sub-feed lugs, feed-through lugs, gutter taps, or oversized lugs are provided.
c. Provide removable end walls for NEMA Type 1 enclosures.
d. Provide painted steel boxes for surface-mounted panelboards where exposed to public view, finish to match fronts.

3. Fronts:
a. Fronts for Surface-Mounted Enclosures: Same dimensions as boxes.
b. Fronts for Flush-Mounted Enclosures: Overlap boxes on all sides to conceal rough opening.
c. Finish for Painted Steel Fronts: Manufacturer's standard grey unless otherwise indicated.

4. Lockable Doors: All locks keyed alike unless otherwise indicated.

J. Future Provisions: Prepare all unused spaces for future installation of devices including bussing, connectors, mounting hardware and all other required provisions.

K. Multi-Section Panelboards: Provide enclosures of the same height, with feed-through lugs or sub-feed lugs and feeders as indicated or as required to interconnect sections.

L. Load centers are not acceptable.

2.3 LIGHTING AND APPLIANCE PANELBOARDS

A. Description: Panelboards complying with NEMA PB 1, lighting and appliance branch circuit type, circuit breaker type, and listed and labeled as complying with UL 67; ratings, configurations and features as indicated on the drawings.

B. Conductor Terminations:
1. Main and Neutral Lug Material: Copper, suitable for terminating copper conductors only.
2. Main and Neutral Lug Type: Mechanical.

C. Bussing:
1. Phase Bus Connections: Arranged for sequential phasing of overcurrent protective devices.
2. Phase and Neutral Bus Material: Copper.
3. Ground Bus Material: Copper.

D. Circuit Breakers: Thermal magnetic bolt-on type.

E. Enclosures:
1. Provide surface-mounted or flush-mounted enclosures.
2. Fronts: Provide lockable hinged door with concealed hinges for access to overcurrent protective device handles without exposing live parts.
3. Fronts: Provide door-in-door trim with hinged cover for access to load terminals and wiring gutters, and separate lockable hinged door with concealed hinges for access to overcurrent protective device handles without exposing live parts.
4. Provide clear plastic circuit directory holder mounted on inside of door.

2.4 OVERCURRENT PROTECTIVE DEVICES

A. Molded Case Circuit Breakers:
1. Description: Quick-make, quick-break, over center toggle, trip-free, trip-indicating circuit breakers listed and labeled as complying with UL 489; ratings, configurations, and features as indicated on the drawings.
2. Interrupting Capacity:
a. Provide circuit breakers with interrupting capacity as required to provide the short circuit current rating indicated, but not less than:
1) 10,000 rms symmetrical amperes at 240 VAC or 208 VAC.

2) 14,000 rms symmetrical amperes at 480 VAC.

b. Fully Rated Systems: Provide circuit breakers with interrupting capacity not less than the short circuit current rating indicated.

3. Conductor Terminations:
   a. Provide mechanical lugs unless otherwise indicated.
   b. Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.
4. Thermal Magnetic Circuit Breakers: For each pole, furnish thermal inverse time tripping element for overload protection and magnetic instantaneous tripping element for short circuit protection.
5. Multi-Pole Circuit Breakers: Furnish with common trip for all poles.
6. Provide the following circuit breaker types where indicated:
   a. Ground Fault Circuit Interrupter (GFCI) Circuit Breakers: Listed as complying with UL 943, class A for protection of personnel.
   b. Ground Fault Equipment Protection Circuit Breakers: Designed to trip at 30 mA for protection of equipment.
   c. Arc-Fault Circuit Interrupter (AFCI) Circuit Breakers: Combination type listed as complying with UL 1699.
7. Provide listed switching duty rated circuit breakers with SWD marking for all branch circuits serving fluorescent lighting.
8. Do not use tandem circuit breakers.
9. Do not use handle ties in lieu of multi-pole circuit breakers.
10. Provide multi-pole circuit breakers for multi-wire branch circuits as required by NFPA 70.
11. Provide the following features and accessories where indicated or where required to complete installation:
    a. Shunt Trip: Provide coil voltage as required for connection to indicated trip actuator.
    b. Handle Pad-Lock Provision: For locking circuit breaker handle in OFF position.

2.5 SOURCE QUALITY CONTROL

A. Factory test panelboards according to NEMA PB 1.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that the ratings and configurations of the panelboards and associated components are consistent with the indicated requirements.

C. Verify that mounting surfaces are ready to receive panelboards.

D. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

A. Perform work in accordance with NECA 1 (general workmanship).

B. Install products in accordance with manufacturer's instructions.

C. Install panelboards in accordance with NECA 407 and NEMA PB 1.1.

D. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.

E. Provide required support and attachment in accordance with Section 260529.

F. Install panelboards plumb.

G. Install flush-mounted panelboards so that trims fit completely flush to wall with no gaps and rough opening completely covered.

H. Mount panelboards such that the highest position of any operating handle for circuit breakers or switches does not exceed 79 inches above the floor or working platform.

I. Provide minimum of six spare 1 inch trade size conduits out of each flush-mounted panelboard stubbed into accessible space above ceiling.

J. Provide grounding and bonding in accordance with Section 260526.
   1. Terminate branch circuit equipment grounding conductors on solidly bonded equipment ground bus only. Do not terminate on isolated/insulated ground bus.
   2. Terminate branch circuit isolated grounding conductors on isolated/insulated ground bus only. Do not terminate on solidly bonded equipment ground bus.

K. Install all field-installed branch devices, components, and accessories.

L. Where accessories are not self-powered, provide control power source as indicated or as required to complete installation.

M. Multi-Wire Branch Circuits: Group grounded and ungrounded conductors together in the panelboard as required by NFPA 70.

N. Provide filler plates to cover unused spaces in panelboards.

O. Provide circuit breaker lock-on devices to prevent unauthorized personnel from de-energizing essential loads.
   1. Emergency and night lighting circuits.
   2. Fire detection and alarm circuits.
   3. Communications equipment circuits.
   4. Intrusion detection and access control system circuits.
   5. Video surveillance system circuits.

P. Identify panelboards in accordance with Section 260553.

3.3 FIELD QUALITY CONTROL

A. Inspect and test in accordance with NETA ATS, except Section 4.

B. Molded Case Circuit Breakers: Perform inspections and tests listed in NETA ATS, Section 7.6.1.1 for all main circuit breakers and circuit breakers larger than 100 amperes. Tests listed as optional are not required, except for the following:
   1. Perform insulation-resistance tests on all control wiring with respect to ground.
   2. Test functions of the trip unit by means of secondary injection.

C. Ground Fault Protection Systems: Test in accordance with manufacturer's instructions as required by NFPA 70.
   1. Perform inspections and tests listed in NETA ATS, Section 7.14. The insulation-resistance test on control wiring listed as optional is required.

D. Test GFCI circuit breakers to verify proper operation.

E. Test AFCI circuit breakers to verify proper operation.

F. Test shunt trips to verify proper operation.

G. Procure services of a qualified manufacturer's representative to observe installation and assist in inspection, testing, and adjusting. Include manufacturer's reports with field quality control submittals.

H. Correct deficiencies and replace damaged or defective panelboards or associated components.

3.4 ADJUSTING

A. Adjust tightness of mechanical and electrical connections to manufacturer's recommended torque settings.

B. Adjust alignment of panelboard fronts.

C. Load Balancing: For each panelboard, rearrange circuits such that the difference between each measured steady state phase load does not exceed 20 percent and adjust circuit directories accordingly. Maintain proper phasing for multi-wire branch circuits.

3.5 CLEANING

A. Clean dirt and debris from panelboard enclosures and components according to manufacturer's instructions.

B. Repair scratched or marred exterior surfaces to match original factory finish.

END OF SECTION 26 24 16

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SECTION 262421 - CIRCUIT BREAKERS FOR EXISTING PANELBOARDS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Circuit Breakers.

1.2 REFERENCES

A. NFPA 70 - National Electrical Code; National Fire Protection Association; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.3 SUBMITTALS

A. Product Data: Provide manufacturer's standard catalog pages and data sheets for circuit breakers, enclosures, and other installed components and accessories

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Match existing circuit breaker manufacturer.

2.2 CIRCUIT BREAKERS

A. Match existing make and model.

B. Compatible with existing panelboard.

C. Trip rating and number of poles as indicated on drawings.

2.3 ACCESSORIES

A. As required to complete installation:

PART 3 EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install circuit breakers in existing panelboard(s) as indicated on drawings.

C. Provide updated typewritten circuit directory reflecting each branch circuit load.

3.2 FIELD QUALITY CONTROL

A. Perform field inspection and testing in accordance with Section 01400.

3.3 ADJUSTING

A. Measure steady state load currents at each panelboard feeder; rearrange circuits in the panelboard to balance the phase loads to within 10 percent of each other. Maintain proper phasing for multi-wire branch circuits.

END OF SECTION 26 24 21

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SECTION 262726 - WIRING DEVICES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Wall switches.

B. Receptacles.

C. Wall plates.

1.2 REFERENCE STANDARDS

A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2010.

B. NECA 130 - Standard for Installing and Maintaining Wiring Devices; 2010.

C. NEMA WD 1 - General Color Requirements for Wiring Devices; 1999 (R 2010).

D. NEMA WD 6 - Wiring Devices - Dimensional Specifications; 2012.

E. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

F. UL 20 - General-Use Snap Switches; Current Edition, Including All Revisions.

G. UL 498 - Attachment Plugs and Receptacles; Current Edition, Including All Revisions.

H. UL 514D - Cover Plates for Flush-Mounted Wiring Devices; Current Edition, Including All Revisions.

I. UL 943 - Ground-Fault Circuit-Interrupters; Current Edition, Including All Revisions.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate the placement of outlet boxes with millwork, furniture, equipment, etc. installed under other sections or by others.
   2. Coordinate wiring device ratings and configurations with the electrical requirements of actual equipment to be installed.
   3. Coordinate the placement of outlet boxes for wall switches with actual installed door swings.
   4. Coordinate the installation and preparation of uneven surfaces, such as split face block, to provide suitable surface for installation of wiring devices.
   5. Coordinate the core drilling of holes for poke-through assemblies with the work covered under other sections.
   6. Notify Engineer of any conflicts or deviations from Contract Documents to obtain direction prior to proceeding with work.

B. Sequencing:
   1. Do not install wiring devices until final surface finishes and painting are complete.

1.4 SUBMITTALS

A. Product Data: Provide manufacturer's catalog information showing dimensions, colors, and configurations.

B. Field Quality Control Test Reports.

C. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

D. Project Record Documents: Record actual installed locations of wiring devices.

1.5 QUALITY ASSURANCE

A. Comply with requirements of NFPA 70.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

C. Products: Listed, classified, and labeled as suitable for the purpose intended.

D. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.6 DELIVERY, STORAGE, AND PROTECTION

A. Store in a clean, dry space in original manufacturer's packaging until ready for installation.

PART 2 PRODUCTS

2.1 WIRING DEVICE APPLICATIONS

A. Provide wiring devices suitable for intended use and with ratings adequate for load served.

B. For single receptacles installed on an individual branch circuit, provide receptacle with ampere rating not less than that of the branch circuit.

C. Provide weather resistant GFCI receptacles with specified weatherproof covers for receptacles installed outdoors or in damp or wet locations.

D. Provide tamper resistant receptacles for receptacles installed in dwelling units.

E. Provide GFCI protection for receptacles installed within 6 feet of sinks.

F. Provide GFCI protection for receptacles installed in kitchens.

G. Provide GFCI protection for receptacles serving electric drinking fountains.

H. Unless noted otherwise, do not use combination switch/receptacle devices.

2.2 WIRING DEVICE FINISHES

A. Provide wiring device finishes as described below unless otherwise indicated.

B. Wiring Devices, Unless Otherwise Indicated: White with white nylon wall plate.

C. Wiring Devices Installed in Finished Spaces: White with white nylon wall plate.

D. Wiring Devices Installed in Unfinished Spaces: Black with galvanized steel wall plate.

E. Wiring Devices Installed in Wet or Damp Locations: White with specified weatherproof cover.

2.3 WALL SWITCHES

A. Manufacturers:
   1. Leviton Manufacturing Company, Inc: www.leviton.com/#sle.
   2. Pass & Seymour, a brand of Legrand North America, Inc: www.legrand.us/#sle.

B. Wall Switches - General Requirements: AC only, quiet operating, general-use snap switches with silver alloy contacts, complying with NEMA WD 1 and NEMA WD 6, and listed as complying with UL 20; types as indicated on the drawings.
   1. Wiring Provisions: Terminal screws for side wiring and screw actuated binding clamp for back wiring with separate ground terminal screw.

C. Standard Wall Switches: Industrial specification grade, 20 A, 120/277 V with standard toggle type switch actuator and maintained contacts; single pole single throw, double pole single throw, three way, or four way as indicated on the drawings.

2.4 RECEPTACLES

A. Receptacles - General Requirements: Self-grounding, complying with NEMA WD 1 and NEMA WD 6, and listed as complying with UL 498; types as indicated on the drawings.
   1. Wiring Provisions: Terminal screws for side wiring with separate ground terminal screw.
   2. NEMA configurations specified are according to NEMA WD 6.

B. Convenience Receptacles:
   1. Standard Convenience Receptacles: Commercial specification grade, 20A, 125V, NEMA 5-20R; single or duplex as indicated on the drawings.
   2. Weather Resistant Convenience Receptacles: Commercial specification grade, 20A, 125V, NEMA 5-20R, listed and labeled as weather resistant type complying with UL 498 Supplement SE suitable for installation in damp or wet locations; single or duplex as indicated on the drawings.

C. GFCI Receptacles:
   1. GFCI Receptacles - General Requirements: Self-testing, with feed-through protection and light to indicate ground fault tripped condition and loss of protection; listed as complying with UL 943, class A.
      a. Provide test and reset buttons of same color as device.
   2. Standard GFCI Receptacles: Industrial specification grade, duplex, 20A, 125V, NEMA 5-20R, rectangular decorator style.
   3. Weather Resistant GFCI Receptacles: Industrial specification grade, duplex, 20A, 125V, NEMA 5-20R, rectangular decorator style, listed and labeled as weather resistant type complying with UL 498 Supplement SE suitable for installation in damp or wet locations.

2.5 WALL PLATES

A. Manufacturers:
   1. Hubbell Incorporated: www.hubbell-wiring.com/#sle.
   2. Leviton Manufacturing Company, Inc: www.leviton.com/#sle.
   3. Lutron Electronics Company, Inc: www.lutron.com/#sle.
   4. Pass & Seymour, a brand of Legrand North America, Inc: www.legrand.us/#sle.
   5. Source Limitations: Where wall controls are furnished as part of lighting control system, provide accessory matching receptacles and wallplates by the same manufacturer.

B. Wall Plates: Comply with UL 514D.
   1. Configuration: One piece cover as required for quantity and types of corresponding wiring devices.
   2. Size: Standard.
   3. Screws: Metal with slotted heads finished to match wall plate finish.

C. Nylon Wall Plates: Smooth finish, high-impact thermoplastic.

D. Galvanized Steel Wall Plates: Rounded corners and edges, with corrosion resistant screws.

E. Weatherproof Covers for Damp Locations: Gasketed, thermoplastic, with self-closing hinged cover and corrosion-resistant screws; listed as suitable for use in wet locations with cover closed.

F. Weatherproof Covers for Wet Locations: Gasketed, thermoplastic, with hinged lockable cover and corrosion-resistant screws; listed as suitable for use in wet locations while in use with attachment plugs connected and identified as extra-duty type.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate devices and conductors in accordance with NFPA 70.

C. Verify that wall openings are neatly cut and will be completely covered by wall plates.

D. Verify that final surface finishes are complete, including painting.

E. Verify that branch circuit wiring installation is completed, tested, and ready for connection to wiring devices.

F. Verify that conditions are satisfactory for installation prior to starting work.

3.2 PREPARATION

A. Provide extension rings to bring outlet boxes flush with finished surface.

B. Clean dirt, debris, plaster, and other foreign materials from outlet boxes.

3.3 INSTALLATION

A. Perform work in accordance with NECA 1 (general workmanship) and, where applicable, NECA 130, including mounting heights specified in those standards unless otherwise indicated.

B. Coordinate locations of outlet boxes provided under Section 260533.16 as required for installation of wiring devices provided under this section.
   1. Mounting Heights: Unless otherwise indicated, as follows:
   2. Orient outlet boxes for vertical installation of wiring devices unless otherwise indicated.
   3. Where multiple receptacles or wall switches are installed at the same location and at the same mounting height, gang devices together under a common wall plate.
   4. Locate wall switches on strike side of door with edge of wall plate 3 inches from edge of door frame. Where locations are indicated otherwise, notify Engineer to obtain direction prior to proceeding with work.
   5. Locate receptacles for electric drinking fountains concealed behind drinking fountain according to manufacturer's instructions.

C. Install wiring devices in accordance with manufacturer's instructions.

D. Install permanent barrier between ganged wiring devices when voltage between adjacent devices exceeds 300 V.

E. Where required, connect wiring devices using pigtails not less than 6 inches long. Do not connect more than one conductor to wiring device terminals.

F. Connect wiring devices by wrapping conductor clockwise 3/4 turn around screw terminal and tightening to proper torque specified by the manufacturer. Where present, do not use push-in pressure terminals that do not rely on screw-actuated binding.

G. Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box with bonding jumper.

H. Provide GFCI receptacles with integral GFCI protection at each location indicated. Do not use feed-through wiring to protect downstream devices.

I. Unless otherwise indicated, GFCI receptacles may be connected to provide feed-through protection to downstream devices. Label such devices to indicate they are protected by upstream GFCI protection.

J. Where split-wired duplex receptacles are indicated, remove tabs connecting top and bottom receptacles.

K. Install wiring devices plumb and level with mounting yoke held rigidly in place.

L. Install wall switches with OFF position down.

M. Do not share neutral conductor on branch circuits utilizing wall dimmers.

N. Install vertically mounted receptacles with grounding pole on bottom and horizontally mounted receptacles with grounding pole on right.

O. Install wall plates to fit completely flush to wall with no gaps and rough opening completely covered without strain on wall plate. Repair or reinstall improperly installed outlet boxes or improperly sized rough openings. Do not use oversized wall plates in lieu of meeting this requirement.

P. Install blank wall plates on junction boxes and on outlet boxes with no wiring devices installed or designated for future use.

Q. Identify wiring devices in accordance with Section 260553.

3.4 FIELD QUALITY CONTROL

A. Inspect each wiring device for damage and defects.

B. Operate each wall switch with circuit energized to verify proper operation.

C. Test each receptacle to verify operation and proper polarity.

D. Test each GFCI receptacle for proper tripping operation according to manufacturer's instructions.

E. Correct wiring deficiencies and replace damaged or defective wiring devices.

3.5 ADJUSTING

A. Adjust devices and wall plates to be flush and level.

3.6 CLEANING

A. Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish.

END OF SECTION 26 27 26

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SECTION 262816.13 - ENCLOSED CIRCUIT BREAKERS

PART 2 PRODUCTS

1.1 ENCLOSED CIRCUIT BREAKERS

A. Description: Units consisting of molded case circuit breakers individually mounted in enclosures.

B. Provide products listed, classified, and labeled as suitable for the purpose intended.

C. Unless otherwise indicated, provide products suitable for continuous operation under the following service conditions:
   1. Altitude: Less than 6,600 feet.
   2. Ambient Temperature: Between 23 degrees F and 104 degrees F.

D. Short Circuit Current Rating:

E. Conductor Terminations: Suitable for use with the conductors to be installed.

F. Provide solidly bonded equipment ground bus in each enclosed circuit breaker, with a suitable lug for terminating each equipment grounding conductor.

G. Enclosures: Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E.
   1. Environment Type per NEMA 250: Unless otherwise indicated, as specified for the following installation locations:

H. Provide externally operable handle with means for locking in the OFF position.

1.2 MOLDED CASE CIRCUIT BREAKERS

A. Description: Quick-make, quick-break, over center toggle, trip-free, trip-indicating circuit breakers listed and labeled as complying with UL 489, and complying with FS W-C-375 where applicable; ratings, configurations, and features as indicated on the drawings.

B. Interrupting Capacity:
   1. Provide circuit breakers with interrupting capacity as required to provide the short circuit current rating indicated, but not less than:
   2. Fully Rated Systems: Provide circuit breakers with interrupting capacity not less than the short circuit current rating indicated.

C. Conductor Terminations:
   1. Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.

D. Multi-Pole Circuit Breakers: Furnish with common trip for all poles.

END OF SECTION 26 28 16.13

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SECTION 262816.16 - ENCLOSED SWITCHES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Enclosed safety switches.

1.2 REFERENCE STANDARDS

A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2010.

B. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2014.

C. NEMA KS 1 - Heavy Duty Enclosed and Dead-Front Switches (600 Volts Maximum); 2013.

D. NETA ATS - Acceptance Testing Specifications for Electrical Power Equipment and Systems; 2013.

E. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

F. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations; Current Edition, Including All Revisions.

G. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations; Current Edition, Including All Revisions.

H. UL 98 - Enclosed and Dead-Front Switches; Current Edition, Including All Revisions.

I. UL 869A - Reference Standard for Service Equipment; Current Edition, Including All Revisions.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate the work with other trades. Avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and within working clearances for electrical equipment required by NFPA 70.
   2. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.
   3. Verify with manufacturer that conductor terminations are suitable for use with the conductors to be installed.
   4. Notify Engineer of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.4 SUBMITTALS

A. Product Data: Provide manufacturer's standard catalog pages and data sheets for enclosed switches and other installed components and accessories.

B. Project Record Documents: Record actual locations of enclosed switches.

C. Maintenance Data: Include information on replacement parts and recommended maintenance procedures and intervals.

1.5 QUALITY ASSURANCE

A. Comply with requirements of NFPA 70.

B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.

C. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

D. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store in a clean, dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.

B. Handle carefully in accordance with manufacturer's written instructions to avoid damage to enclosed switch internal components, enclosure, and finish.

1.7 FIELD CONDITIONS

A. Maintain ambient temperature between -22 degrees F and 104 degrees F during and after installation of enclosed switches.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Eaton Corporation: www.eaton.com/#sle.

B. Schneider Electric; Square D Products: www.schneider-electric.us/#sle.

C. Siemens Industry, Inc: www.usa.siemens.com/#sle.

D. Source Limitations: Furnish enclosed switches and associated components produced by the same manufacturer as the other electrical distribution equipment used for this project and obtained from a single supplier.

2.2 ENCLOSED SAFETY SWITCHES

A. Description: Quick-make, quick-break enclosed safety switches listed and labeled as complying with UL 98; heavy duty; ratings, configurations, and features as indicated.

B. Provide products listed, classified, and labeled as suitable for the purpose intended.

C. Unless otherwise indicated, provide products suitable for continuous operation under the following service conditions:
   1. Altitude: Less than 6,600 feet.
   2. Ambient Temperature: Between -22 degrees F and 104 degrees F.

D. Horsepower Rating: Suitable for connected load.

E. Voltage Rating: Suitable for circuit voltage.

F. Short Circuit Current Rating:
   1. Provide enclosed safety switches, when protected by the fuses or supply side overcurrent protective devices to be installed, with listed short circuit current rating not less than the available fault current at the installed location as indicated on the drawings.

G. Enclosed Safety Switches Used for Service Entrance: Listed and labeled as suitable for use as service equipment according to UL 869A.

H. Provide with switch blade contact position that is visible when the cover is open.

I. Fuse Clips for Fusible Switches: As required to accept fuses indicated.
   1. Where NEMA Class R fuses are installed, provide rejection feature to prevent installation of fuses other than Class R.

J. Conductor Terminations: Suitable for use with the conductors to be installed.

K. Provide insulated, groundable fully rated solid neutral assembly where a neutral connection is required, with a suitable lug for terminating each neutral conductor.

L. Provide solidly bonded equipment ground bus in each enclosed safety switch, with a suitable lug for terminating each equipment grounding conductor.

M. Enclosures: Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E.
   1. Environment Type per NEMA 250: Unless otherwise indicated, as specified for the following installation locations:
      a. Indoor Clean, Dry Locations: Type 1.
      b. Outdoor Locations: Type 3R.
   2. Finish for Painted Steel Enclosures: Manufacturer's standard, factory applied grey unless otherwise indicated.

N. Provide safety interlock to prevent opening the cover with the switch in the ON position with capability of overriding interlock for testing purposes.

O. Heavy Duty Switches:
   1. Comply with NEMA KS 1.
   2. Conductor Terminations:
      a. Provide mechanical lugs unless otherwise indicated.
      b. Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.
   3. Provide externally operable handle with means for locking in the OFF position, capable of accepting three padlocks.
      a. Provide means for locking handle in the ON position.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that the ratings of the enclosed switches are consistent with the indicated requirements.

C. Verify that mounting surfaces are ready to receive enclosed safety switches.

D. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Perform work in accordance with NECA 1 (general workmanship).

C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.

D. Provide required support and attachment in accordance with Section 260529.

E. Install enclosed switches plumb.

F. Except where indicated to be mounted adjacent to the equipment they supply, mount enclosed switches such that the highest position of the operating handle does not exceed 79 inches above the floor or working platform.

G. Provide grounding and bonding in accordance with Section 260526.

H. Provide fuses complying with Section 262813 for fusible switches as indicated or as required by equipment manufacturer's recommendations.

I. Identify enclosed switches in accordance with Section 260553.

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 7.5.1.1.

C. Correct deficiencies and replace damaged or defective enclosed safety switches or associated components.

3.4 ADJUSTING

A. Adjust tightness of mechanical and electrical connections to manufacturer's recommended torque settings.

3.5 CLEANING

A. Clean dirt and debris from switch enclosures and components according to manufacturer's instructions.

B. Repair scratched or marred exterior surfaces to match original factory finish.

END OF SECTION 26 28 16.16

SECTION 264300 - SURGE PROTECTIVE DEVICES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Surge protective devices for service entrance locations.

1.2 ABBREVIATIONS AND ACRONYMS

A. SPD: Surge Protective Device.

1.3 REFERENCE STANDARDS

A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2010.

B. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2014.

C. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

D. UL 1449 - Standard for Surge Protective Devices; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination: Coordinate size and location of overcurrent device compatible with the actual surge protective device and location to be installed. Notify Engineer of any conflicts or deviations from Contract Documents to obtain direction prior to ordering equipment.

1.5 SUBMITTALS

A. Product Data: Include detailed component information, voltage, surge current ratings, repetitive surge current capacity, voltage protection rating (VPR) for all protection modes, maximum continuous operating voltage (MCOV), nominal discharge current (I-n), short circuit current rating (SCCR), connection means including any required external overcurrent protection, enclosure ratings, outline and support point dimensions, weight, service condition requirements, and installed features.

B. Shop Drawings: Include wiring diagrams showing all factory and field connections with wire and circuit breaker/fuse sizes.

C. Certificates: Manufacturer's documentation of listing for compliance with the following standards:

D. Manufacturer's Installation Instructions: Include application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

E. Operation and Maintenance Data: Include information on status indicators and recommended maintenance procedures and intervals.

F. Project Record Documents: Record actual connections and locations of surge protective devices.

1.6 QUALITY ASSURANCE

A. Comply with requirements of NFPA 70.

B. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.7 DELIVERY, STORAGE, AND PROTECTION

A. Store in a clean, dry space in accordance with manufacturer's written instructions.

1.8 FIELD CONDITIONS

A. Maintain field conditions within manufacturer's required service conditions during and after installation.

1.9 WARRANTY

A. Manufacturer's Warranty: Provide minimum five year warranty covering repair or replacement of surge protective devices showing evidence of failure due to defective materials or workmanship.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Field-installed, Externally Mounted Surge Protective Devices:
   1. ABB/GE: www.geindustrial.com/#sle.
   2. Advanced Protection Technologies, Inc (APT): www.aptsurge.com/#sle.
   3. Schneider Electric; Square D Brand Surgelogic Products; www.surgelogic.com/#sle.

B. Factory-installed, Internally Mounted Surge Protective Devices:
   1. Same as manufacturer of equipment containing surge protective device, to provide a complete listed assembly including SPD.

2.2 SURGE PROTECTIVE DEVICES - GENERAL REQUIREMENTS

A. Description: Factory-assembled surge protective devices (SPDs) for 60 Hz service; listed, classified, and labeled as suitable for the purpose intended; system voltage as indicated on the drawings.

B. Unless otherwise indicated, provide field-installed, externally-mounted or factory-installed, internally-mouonted SPDs.

C. List and label as complying with UL 1449, Type 1 when connected on line side of service disconnect overcurrent device and Type 1 or 2 when connected on load side of service disconnect overcurrent device.

D. Protected Modes:
   1. Wye Systems: L-N, L-G, N-G, L-L.

E. UL 1449 Voltage Protection Ratings (VPRs):
   1. 208Y/120V System Voltage: Not more than 1,000 V for L-N, L-G, and N-G modes and 1,200 V for L-L mode.
   2. 480Y/277V System Voltage: Not more than 1,500 V for L-N, L-G, and N-G modes and 2,000 V for L-L mode.

F. UL 1449 Maximum Continuous Operating Voltage (MCOV): Not less than 115% of nominal system voltage.

G. Enclosure Environment Type per NEMA 250: Unless otherwise indicated, as specified for the following installation locations:
   1. Indoor clean, dry locations: Type 1.

H. Mounting for Field-installed, Externally Mounted SPDs: Unless otherwise indicated, as specified for the following locations:
   1. Provide surface-mounted SPD where mounted in non-public areas or adjacent to surface-mounted equipment.

2.3 SURGE PROTECTIVE DEVICES FOR SERVICE ENTRANCE LOCATIONS

A. Surge Protective Device - Basis of Design: Surge Suppression, LLC (SSI); Advantage Series; Model SSLA (100 kA/phase, Type 2, I-n = 10 kA); www.surgesuppression.com/#sle.
   1. Voltage: As indicated on drawings.
   2. Features: Discrete "all-mode" protection (10 modes for 3-phase wye circuits); component-level thermal fusing; internal circuit board-mounted overcurrent fusing; 200 kAIC SCCR; 25 year warranty.

B. Products - Field-installed, Externally Mounted Surge Protective Devices.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that the service voltage and configuration marked on the SPD are consistent with the service voltage and configuration at the location to be installed.

C. Verify system grounding and bonding is in accordance with Section 260526, including bonding of neutral and ground for service entrance and separately derived systems where applicable. Do not energize SPD until deficiencies have been corrected.

D. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

A. Perform work in accordance with NECA 1 (general workmanship).

B. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.

C. Do not energize SPD until bonding of neutral and ground for service entrance and separately derived systems is complete in accordance with Section 260526 where applicable. Replace SPDs damaged by improper or missing neutral-ground bond.

3.3 FIELD QUALITY CONTROL

A. Procure services of a qualified manufacturer's representative to observe installation and assist in inspection, testing, and adjusting. Include manufacturer's reports with field quality control submittals.

3.4 CLEANING

A. Repair scratched or marred exterior surfaces to match original factory finish.

END OF SECTION 26 43 00

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SECTION 26 51 00 - INTERIOR LIGHTING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Interior luminaires.

B. Emergency lighting units.

C. Exit signs.

D. Drivers.

1.2 REFERENCE STANDARDS

A. 47 CFR 15 - Radio Frequency Devices; current edition.

B. IEEE C62.41.2 - Recommended Practice on Characterization of Surges in Low-Voltage (1000 V and less) AC Power Circuits; 2002 (Cor 1, 2012).

C. IES LM-79 - Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products; 2008.

D. IES LM-80 - Approved Method: Measuring Luminous Flux and Color Maintenance of LED Packages, Arrays, and Modules; Illuminating Engineering Society; 2015.

E. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2010.

F. NECA/IESNA 500 - Standard for Installing Indoor Commercial Lighting Systems; 2006.

G. NEMA 410 - Performance Testing for Lighting Controls and Switching Devices with Electronic Drivers and Discharge Ballasts; 2011.

H. NEMA LE 4 - Recessed Luminaires, Ceiling Compatibility; 2012.

I. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

J. NFPA 101 - Life Safety Code; 2015.

K. UL 1598 - Luminaires; Current Edition, Including All Revisions.

L. UL 8750 - Light Emitting Diode (LED) Equipment for Use in Lighting Products; Current Edition, Including All Revisions.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate the installation of luminaires with mounting surfaces installed under other sections or by others. Coordinate the work with placement of supports, anchors, etc. required for mounting. Coordinate compatibility of luminaires and associated trims with mounting surfaces at installed locations.
2. Coordinate the placement of luminaires with structural members, ductwork, piping, equipment, diffusers, fire suppression system components, and other potential conflicts installed under other sections or by others.
3. Coordinate the placement of exit signs with furniture, equipment, signage or other potential obstructions to visibility installed under other sections or by others.
4. Notify Engineer of any conflicts or deviations from Contract Documents to obtain direction prior to proceeding with work.

1.4 SUBMITTALS

A. Product Data: Provide manufacturer's standard catalog pages and data sheets including detailed information on luminaire construction, dimensions, ratings, finishes, mounting

requirements, listings, service conditions, photometric performance, installed accessories, and ceiling compatibility; include model number nomenclature clearly marked with all proposed features.

1. LED Luminaires:
    a. Include estimated useful life, calculated based on IES LM-80 test data.
    b. Include IES LM-79 test report upon request.

B. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

C. Operation and Maintenance Data: Instructions for each product including information on replacement parts.

D. Maintenance Materials: Furnish the following for Nanuet Union Free School District's use in maintenance of project.

1. Extra Lenses and Louvers: Two percent of total quantity installed for each type, but not less than one of each type.
2. Extra Drivers: Two percent of total quantity installed for each type, but not less than one of each type.

1.5 QUALITY ASSURANCE

A. Comply with requirements of NFPA 70.

B. Conform to requirements of NFPA 70 .

C. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

D. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.6 DELIVERY, STORAGE, AND PROTECTION

A. Receive, handle, and store products according to NECA/IESNA 500 (commercial lighting) and manufacturer's written instructions.

B. Keep products in original manufacturer's packaging and protect from damage until ready for installation.

1.7 FIELD CONDITIONS

A. Maintain field conditions within manufacturer's required service conditions during and after installation.

1.8 WARRANTY

A. Provide five year manufacturer warranty for all LED luminaires, including drivers and light engines.

B. Provide five year pro-rata warranty for batteries for emergency lighting units.

C. Provide ten year pro-rata warranty for batteries for self-powered exit signs.

PART 2 PRODUCTS

2.1 LUMINAIRE TYPES

A. Furnish products as indicated in luminaire schedule included on the drawings.

2.2 LUMINAIRES

A. Provide products that comply with requirements of NFPA 70.

B. Provide products that are listed and labeled as complying with UL 1598, where applicable.

C. Provide products that comply with requirements of NFPA 70 and NFPA 101.

D. Provide products listed, classified, and labeled as suitable for the purpose intended.

E. Unless otherwise indicated, provide complete luminaires including lamp(s) and all sockets, ballasts, reflectors, lenses, housings and other components required to position, energize and protect the lamp and distribute the light.

F. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, hardware, supports, trims, accessories, etc. as necessary for a complete operating system.

G. Provide products suitable to withstand normal handling, installation, and service without any damage, distortion, corrosion, fading, discoloring, etc.

H. Provide LED fixtures from a single manufacturer.

I. All Lighting Fixtures must be DLC or Energy Star Rated.

J. Recessed Luminaires:
   1. Ceiling Compatibility: Comply with NEMA LE 4.
   2. Luminaires Recessed in Insulated Ceilings: Listed and labeled as IC-rated, suitable for direct contact with insulation and combustible materials.

K. LED Luminaires:
   1. Components: UL 8750 recognized or listed as applicable.
   2. Tested in accordance with IES LM-79 and IES LM-80.
   3. LED Estimated Useful Life: Minimum of 50,000 hours at 70 percent lumen maintenance, calculated based on IES LM-80 test data.

L. Luminaires Mounted in Continuous Rows: Provide quantity of units required for length indicated, with all accessories required for joining and aligning.

2.3 DRIVERS

A. Ballasts/Drivers - General Requirements:
   1. Provide drivers containing no polychlorinated biphenyls (PCBs).
   2. Minimum Efficiency/Efficacy: Provide drivers complying with all current applicable federal and state efficiency/efficacy standards.
   3. Electronic Drivers: Inrush currents not exceeding peak currents specified in NEMA 410.

B. Dimmable LED Drivers:
   1. Dimming Range: Continuous dimming from 100 percent to 1 percent (unless noted otherwise in schedule) relative light output unless dimming capability to lower level is indicated, without flicker.
   2. Control Compatibility: Fully compatible with the dimming controls to be installed.

2.4 ACCESSORIES

A. Stems for Suspended Luminaires: Steel tubing, minimum 1/2" size, factory finished to match luminaire or field-painted as directed.

B. Threaded Rods for Suspended Luminaires: Zinc-plated steel, minimum 1/4" size, field-painted as directed.

C. Provide accessory plaster frames for luminaires recessed in plaster ceilings.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate conductors in accordance with NFPA 70.

C. Verify that suitable support frames are installed where required.

D. Verify that branch circuit wiring installation is completed, tested, and ready for connection to luminaires.

E. Verify that conditions are satisfactory for installation prior to starting work.

3.2 PREPARATION

A. Provide extension rings to bring outlet boxes flush with finished surface.

B. Clean dirt, debris, plaster, and other foreign materials from outlet boxes.

3.3 INSTALLATION

A. Coordinate locations of outlet boxes provided under Section 260533.16 as required for installation of luminaires provided under this section.

B. Install products in accordance with manufacturer's instructions.

C. Install luminaires securely, in a neat and workmanlike manner, as specified in NECA 1 (general workmanship).

D. Provide required support and attachment in accordance with Section 260529.

E. Install luminaires plumb and square and aligned with building lines and with adjacent luminaires.

F. Suspended Ceiling Mounted Luminaires:
   1. Do not use ceiling tiles to bear weight of luminaires.
   2. Do not use ceiling support system to bear weight of luminaires unless ceiling support system is certified as suitable to do so.
   3. Secure surface-mounted and recessed luminaires to ceiling support channels or framing members or to building structure.
   4. Secure pendant-mounted luminaires to building structure.
   5. Secure lay-in luminaires to ceiling support channels using listed safety clips at four corners.
   6. In addition to ceiling support wires, provide two galvanized steel safety wire(s), minimum 12 gauge, connected from opposing corners of each recessed luminaire to building structure.

G. Recessed Luminaires:
   1. Install trims tight to mounting surface with no visible light leakage.
   2. Non-IC Rated Luminaires: Maintain required separation from insulation and combustible materials according to listing.

H. Suspended Luminaires:
   1. Install using the suspension method indicated, with support lengths and accessories as required for specified mounting height.
   2. Provide minimum of two supports for each luminaire equal to or exceeding 4 feet nominal length, with no more than 4 feet between supports.
   3. Install canopies tight to mounting surface.
   4. Unless otherwise indicated, support pendants from swivel hangers.

I. Wall-Mounted Luminaires: Unless otherwise indicated, specified mounting heights are to center of luminaire.

J. Locate recessed ceiling luminaires as indicated on reflected ceiling plan.

K. Install surface mounted luminaires and exit signs plumb and adjust to align with building lines and with each other. Secure to prevent movement.

L. Exposed Grid Ceilings: Support surface mounted luminaires in grid ceiling directly from building structure, minimum two 12 gauge support wires.

M. Install recessed luminaires to permit removal from below.

N. Install recessed luminaires using accessories and firestopping materials to meet regulatory requirements for fire rating.

O. Install clips to secure recessed grid-supported luminaires in place.

P. Install wall mounted luminaires, emergency lighting units, and exit signs at height as indicated on Drawings.

Q. Install accessories furnished with each luminaire.

R. Make wiring connections to branch circuit using building wire with insulation suitable for temperature conditions within fixture; use flexible conduit.

S. Connect luminaires and exit signs to branch circuits provided under Section 26 0537 using flexible conduit.

T. Make wiring connections to branch circuit using building wire with insulation suitable for temperature conditions within luminaire.

U. Bond products and metal accessories to branch circuit equipment grounding conductor.

V. Exit Signs:
   1. Unless otherwise indicated, connect unit to unswitched power from circuit indicated. Bypass local switches, contactors, or other lighting controls.
   2. Install lock-on device on branch circuit breaker serving units.

3.4 FIELD QUALITY CONTROL

A. Operate each luminaire after installation and connection to verify proper operation.

B. Correct wiring deficiencies and repair or replace damaged or defective products. Repair or replace excessively noisy ballasts as determined by Engineer.

3.5 ADJUSTING

A. Aim and position adjustable luminaires to achieve desired illumination as indicated or as directed by Engineer. Secure locking fittings in place.

B. Exit Signs with Field-Selectable Directional Arrows: Set as indicated or as required to properly designate egress path as directed by Engineer or authority having jurisdiction.

3.6 CLEANING

A. Clean surfaces according to NECA 500 (commercial lighting), NECA 502 (industrial lighting), and manufacturer's instructions to remove dirt, fingerprints, paint, or other foreign material and restore finishes to match original factory finish.

B. Clean electrical parts to remove conductive and deleterious materials.

C. Remove dirt and debris from enclosures.

D. Clean photometric control surfaces as recommended by manufacturer.

E. Clean finishes and touch up damage.

3.7 CLOSEOUT ACTIVITIES

A. Demonstration: Demonstrate proper operation of luminaires to Engineer, and correct deficiencies or make adjustments as directed.

3.8 PROTECTION

A. Protect installed luminaires from subsequent construction operations.

3.9 SCHEDULE - SEE DRAWINGS

END OF SECTION – 26 51 00

SECTION 27 10 00 - STRUCTURED CABLING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Communications system design requirements.

B. Communications pathways.

C. Copper cable and terminations.

D. Communications equipment room fittings.

E. Communications outlets.

F. Communications identification.

1.2 REFERENCE STANDARDS

A. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

B. TIA-568 (SET) - Commercial Building Telecommunications Cabling Standard Set; 2015.

C. TIA-568.2 - Balanced Twisted-Pair Telecommunications Cabling and Components Standards; 2009c, with Addendum (2016).

D. TIA-606 - Administration Standard for Telecommunications Infrastructure; 2017c.

E. UL 444 - Communications Cables; Current Edition, Including All Revisions.

F. UL 514C - Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers; Current Edition, Including All Revisions.

G. UL 1863 - Communications-Circuit Accessories; Current Edition, Including All Revisions.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate requirements for service entrance and entrance facilities with Communications Service Provider.
   2. Coordinate the work with other trades to avoid placement of other utilities or obstructions within the spaces dedicated for communications equipment.
   3. Coordinate arrangement of communications equipment with the dimensions and clearance requirements of the actual equipment to be installed.
   4. Notify Engineer of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.4 SUBMITTALS

A. Product Data: Provide manufacturer's standard catalog pages and data sheets for each product.

B. Shop Drawings: Show compliance with requirements on isometric schematic diagram of network layout, showing cable routings, telecommunication closets, rack and enclosure layouts and locations, service entrance, and grounding, prepared and approved by BICSI Registered Communications Distribution Designer (RCDD).

C. Evidence of qualifications for installer.

D. Field Test Reports.

E. Project Record Documents: Prepared and approved by BICSI Registered Communications Distribution Designer (RCDD).

1. Record actual locations of outlet boxes and distribution frames.
2. Show as-installed color coding, pair assignment, polarization, and cross-connect layout.
3. Identify distribution frames and equipment rooms by room number on drawings.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: At least 3 years experience manufacturing products of the type specified.

B. Installer Qualifications: A company having at least 3 years experience in the installation and testing of the type of system specified, and:
   1. Employing a BICSI Registered Communications Distribution Designer (RCDD).
   2. Supervisors and installers factory certified by manufacturers of products to be installed.

C. Products: Listed, classified, and labeled as suitable for the purpose intended.

D. All products and equipment set forth by this specification shall be installed in a neat and workmanlike manner. All methods of construction that are not specifically described or indicated in the contract documents shall be subject to the control and approval of the Owner's Representative. Equipment and materials shall be of the quality and manufacturer indicated. The equipment specified is based upon the acceptable manufacturers listed. Where "approved equal" is stated, equipment shall be equivalent in every way to that of the equipment specified and subject to approval.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Keep stored products clean and dry.

1.7 WARRANTY

A. Correct defective Work within a 2 year period after Date of Substantial Completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Cabling and Equipment:
   1. 3M Communications Technologies: solutions.3m.com.
   2. Siemon Company: www.siemon.com.
   3. TE Connectivity: www.te.com.
   4. Berk-Tek
   5. Commscope
   6. Belden

2.2 SYSTEM DESIGN

A. Provide a complete permanent system of cabling and pathways for voice and data communications, including cables, conduits and wireways, pull wires, support structures, enclosures and cabinets, and outlets.
   1. Provide fixed cables and pathways that comply with NFPA 70 and TIA-607 and are UL listed or third party independent testing laboratory certified.
   2. Provide connection devices that are rated for operation under conditions of 32 to 140 degrees F at relative humidity of 0 to 95 percent, noncondensing.
   3. In this project, the term plenum is defined as return air spaces above ceilings, inside ducts, under raised floors, and other air-handling spaces.

B. System Description:

1. Offices and Work Areas: Provide cabling in each work area as shown.

C. Cabling to Outlets: Specified horizontal cabling, wired in star topology to distribution frame located at center hub of star; also referred to as "links".

2.3 PATHWAYS

A. Conduit: As specified in Section 260533.13; Use concealed in walls or where cabling must be run exposed or is subject to damage.

B. J Hooks: Caddy Cablecat; Use above accessible ceilings.

C. Cable Hangers.
1. Provide prefabricated, zinc coated, carbon steel hangers designed specifically for UTP and Optical Fiber cable installations.
2. Hangers shall have open top, rolled edges and a 3” or 4” minimum diameter loop.
3. Provide beam clamps, rod fasteners, flange clips and brackets as job conditions require.
4. Design Make: Caddy/Erico, Garvin, B-Line, # / Cat12, Cat32, Cat64 (as required)

2.4 COPPER CABLE AND TERMINATIONS

A. Copper Horizontal Cable:
1. Description: 100 ohm, balanced twisted pair cable complying with TIA-568.2 and listed and labeled as complying with UL 444.
2. Cable Type - Voice and Data: TIA-568 Category 6 UTP (unshielded twisted pair); 23 AWG.
   a. Minimum compliance Category 6 cable is not acceptable.
3. Cable Capacity: 4-pair.
4. Cable Applications:
   a. Plenum Applications: Use listed NFPA 70 Type CMP plenum cable.
   b. General Purpose Applications: Use listed NFPA 70 Type CM/CMG general purpose cable, Type CMR riser cable, or Type CMP plenum cable.
5. Cable Jacket Color - Data and Voice Cable: Blue. Cameras: Green.
6. Product(s):
   a. CommScope; SYSTIMAX Twisted Pair Cables; GigaSPEED XL Category 6 U/UTP Cable: www.commscope.com/#sle.
   b. CommScope; Uniprise Twisted Pair Cables; CS34 Series Category 6 U/UTP Cable: www.commscope.com/#sle.
   c. General Cable Technologies Corporation; GenSPEED Cables: www.generalcable.com/#sle.
   d. Berk-Tek LANmark-1000 Category 6.
   e. ADC/Krone TrueNet/TE Connectivity Structured Category 6 Cable. ADC/Krone/TE Connectivity is now Commscope. Use equivalent cable to TE Connecivity's 630 Series Category 6 Cable.

B. Copper Cable Terminations: Insulation displacement connection (IDC) type using appropriate tool; use screw connections only where specifically indicated.

C. Jacks and Connectors: Modular RJ-45, non-keyed, terminated with 110-style insulation displacement connectors (IDC); high impact thermoplastic housing; suitable for and complying with same standard as specified horizontal cable; UL 1863 listed.
1. Performance: 500 mating cycles.
2. Voice and Data Jacks: 8-position modular jack, color-coded for both T568A and T568B wiring configurations.

D. Copper Patch Cords:

1. Description: Factory-fabricated 4-pair cable assemblies with 8-position modular connectors terminated at each end.
2. Patch Cords for Patch Panels:
   a. Quantity: One for each pair of patch panel ports.
   b. Length: 6 feet.
3. Patch Cords for Work Areas:
   a. Quantity: One for each work area outlet port.
   b. Length: 10 feet.
4. Product(s):
   a. CommScope; SYSTIMAX Category 6 U/UTP Patch Cords: www.commscope.com/#sle.
   b. CommScope; Uniprise Category 6 U/UTP Patch Cords: www.commscope.com/#sle.

2.5 COMMUNICATIONS OUTLETS

A. Outlet Boxes: Comply with Section 260533.16.
   1. Provide depth as required to accommodate cable manufacturer's recommended minimum conductor bend radius.
   2. Minimum Size, Unless Otherwise Indicated:
      a. Voice Only Outlets: 4 inch by 2 inch by 2-1/8 inch deep (100 by 50 by 54 mm) trade size.

B. Wall Plates:
   1. Comply with system design standards and UL 514C.
   2. Accepts modular jacks/inserts.
   3. Capacity:
      a. Voice Only Outlets: 1 ports.
      b. Data or Combination Voice/Data Outlets: 2 ports.
   4. Wall Plate Material/Finish - Flush-Mounted Outlets: Match wiring device and wall plate finishes specified in Section 262726.

2.6 IDENTIFICATION PRODUCTS

A. Comply with TIA-606.

2.7 SOURCE QUALITY CONTROL

A. Factory test cables according to TIA-568 (SET).

PART 3 EXECUTION

3.1 INSTALLATION - GENERAL

A. Comply with Communication Service Provider requirements.

B. Grounding and Bonding: Perform in accordance with TIA-607 and NFPA 70.

3.2 INSTALLATION OF PATHWAYS

A. Install pathways with the following minimum clearances:
   1. 48 inches from motors, generators, frequency converters, transformers, x-ray equipment, and uninterruptible power systems.
   2. 12 inches from power conduits and cables and panelboards.
   3. 5 inches from fluorescent and high frequency lighting fixtures.
   4. 6 inches from flues, hot water pipes, and steam pipes.

B. Conduit, in Addition to Requirements of Section 260533.13:

1. Arrange conduit to provide no more than the equivalent of two 90 degree bend(s) between pull points.
2. Conduit Bends: Inside radius not less than 10 times conduit internal diameter.
3. Arrange conduit to provide no more than 100 feet between pull points.
4. Do not use conduit bodies.

C. Outlet Boxes:
1. Coordinate locations of outlet boxes provided under Section 260533.16 as required for installation of telecommunications outlets provided under this section.

3.3 INSTALLATION OF EQUIPMENT AND CABLING

A. Cabling:
1. Do not bend cable at radius less than manufacturer's recommended bend radius; for unshielded twisted pair use bend radius of not less than 4 times cable diameter.
2. Do not over-cinch or crush cables.
3. Do not exceed manufacturer's recommended cable pull tension.
4. When installing in conduit, use only lubricants approved by cable manufacturer and do not chafe or damage outer jacket.

B. Service Loops (Slack or Excess Length): Provide the following minimum extra length of cable, looped neatly:
1. At Distribution Frames: 120 inches.
2. At Outlets - Copper: 12 inches.

C. Copper Cabling:
1. Category 5e and Above: Maintain cable geometry; do not untwist more than 1/2 inch from point of termination.
2. For 4-pair cables in conduit, do not exceed 25 pounds pull tension.
3. Use T568B wiring configuration.

D. Identification:
1. All drops MUST be labeled at the classroom/office/user end and also at the closet end.
2. Use wire and cable markers to identify cables at each end.
3. Use manufacturer-furnished label inserts, identification labels, or engraved wallplate to identify each jack at communications outlets with unique identifier.
4. Use identification nameplate to identify cross-connection equipment, equipment racks, and cabinets.

3.4 FIELD QUALITY CONTROL

A. Comply with inspection and testing requirements of specified installation standards.

B. Visual Inspection:
1. Inspect cable jackets for certification markings.
2. Inspect cable terminations for color coded labels of proper type.
3. Inspect outlet plates and patch panels for complete labels.

C. Testing - Copper Cabling and Associated Equipment:
1. Test operation of shorting bars in connection blocks.
2. Category 5e and Above Links: Perform tests for wire map, length, attenuation, NEXT, and propagation delay.

D. Final Testing: After all work is complete, including installation of telecommunications outlets, and telephone dial tone service is active, test each voice jack for dial tone.

END OF SECTION 27 10 00

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SECTION 28 46 00 - FIRE DETECTION AND ALARM

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Fire alarm system design and installation, including all components, wiring, and conduit.

1.2 REFERENCE STANDARDS

A. 36 CFR 1191 - Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines; current edition.

B. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.

C. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2009, Including All Applicable Amendments and Supplements.

D. IEEE C62.41.2 - Recommended Practice on Characterization of Surges in Low-Voltage (1000 V and less) AC Power Circuits; 2002 (Cor 1, 2012).

E. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

F. NFPA 72 - National Fire Alarm and Signaling Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

G. NFPA 101 - Life Safety Code; 2015.

1.3 SUBMITTALS

A. Evidence of designer qualifications.

B. Fire Watch / Impairment Plan.

C. Design Documents: Submit all information required for plan review and permitting by authorities having jurisdiction, including but not limited to floor plans, riser diagrams, and description of operation:
   1. Copy (if any) of list of data required by authority having jurisdiction.
   2. NFPA 72 "Record of Completion", filled out to the extent known at the time.
   3. Clear and concise description of operation, with input/output matrix similar to that shown in NFPA 72 Appendix A-7-5-2.2(9), and complete listing of software required.
   4. System zone boundaries and interfaces to fire safety systems.
   5. Location of all components, circuits, and raceways; mark components with identifiers used in control unit programming.
   6. Circuit layouts; number, size, and type of raceways and conductors; conduit fill calculations; spare capacity calculations; notification appliance circuit voltage drop calculations.
   7. List of all devices on each signaling line circuit, with spare capacity indicated.
   8. Manufacturer's detailed data sheet for each component, including wiring diagrams, installation instructions, and circuit length limitations.
   9. Description of power supplies; if secondary power is by battery include calculations demonstrating adequate battery power.
   10. Certification by either the manufacturer of the control unit or by the manufacturer of each other component that the components are compatible with the control unit.
   11. Certification by the manufacturer of the control unit that the system design complies with Contract Documents.
   12. Certification by Contractor that the system design complies with Contract Documents.

D. Evidence of installer qualifications.

E. Inspection and Test Reports:
   1. Submit inspection and test plan prior to closeout demonstration.
   2. Submit documentation of satisfactory inspections and tests.
   3. Submit NFPA 72 "Inspection and Test Form," filled out.

F. Project Record Documents: Have one set available during closeout demonstration:
   1. Complete set of floor plans showing actual installed locations of components, conduit, and zones.
   2. "As installed" wiring and schematic diagrams, with final terminal identifications.
   3. "As programmed" operating sequences, including control events by device, updated input/output chart, and voice messages by event.

G. Closeout Documents:
   1. Certification by manufacturer that the system has been installed in compliance with manufacturer's installation requirements, is complete, and is in satisfactory operating condition.
   2. NFPA 72 "Record of Completion", filled out completely and signed by installer and authorized representative of authority having jurisdiction.

1.4 QUALITY ASSURANCE

A. Designer Qualifications: NICET Level III or IV (3 or 4) certified fire alarm technician or registered fire protection engineer, employed by fire alarm control panel manufacturer, Contractor, or installer, with experience designing fire alarm systems in the jurisdictional area of the authorities having jurisdiction.

B. Installer Qualifications: Firm with minimum 3 years documented experience installing fire alarm systems of the specified type and providing contract maintenance service as a regular part of their business.
   1. Authorized representative of control unit manufacturer; submit manufacturer's certification that installer is authorized; include name and title of manufacturer's representative making certification.
   2. Installer Personnel: At least 2 years of experience installing fire alarm systems.
   3. Supervisor: NICET level III or IV (3 or 4) certified fire alarm technician; furnish name and address.
   4. Licensed in The State in which the Work is to be performed. as fire alarm installer.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Fire Alarm Control Units and Accessories - Refer to drawings for each locations existing fire alarm system manufacturer..

B. Initiating Devices and Notification Appliances:
   1. Same manufacturer as control units.
   2. Provide initiating devices and notification appliances made by the same manufacturer, where possible.

2.2 FIRE ALARM SYSTEM

A. Fire Alarm System: Provide a new automatic fire detection and alarm system:
   1. Provide all components necessary, regardless of whether shown in Contract Documents or not.
   2. Protected Premises: Entire building shown on drawings.
   3. Comply with the following; where requirements conflict, order of precedence of requirements is as listed:

a. ADA Standards.
b. ICC / ANSI A117.1.
c. The requirements of the local authority having jurisdiction.
d. Applicable local codes.
e. Contract Documents (drawings and specifications).
f. NFPA 72; where the word "should" is used consider that provision mandatory; where conflicts between requirements require deviation from NFPA 72, identify deviations clearly on design documents.

4. Evacuation Alarm: Single smoke zone; general evacuation of entire premises.
5. Fire Alarm Control Unit: Existing, located at location shown on drawings.

B. Supervising Stations and Fire Department Connections:
1. Public Fire Department Notification: By remote supervising station.

C. Circuits:
1. Initiating Device Circuits (IDC): Class B, Style A.
2. Signaling Line Circuits (SLC) Within Single Building: Class B, Style 0.5.
3. Notification Appliance Circuits (NAC): Class B, Style W.

D. Power Sources:
1. Primary: Dedicated branch circuits of the facility power distribution system.
2. Secondary: Storage batteries.
3. Capacity: Sufficient to operate entire system for period specified by NFPA 72.
4. Each Computer System: Provide uninterruptible power supply (UPS).

2.3 FIRE SAFETY SYSTEMS INTERFACES

A. Supervision: Provide supervisory signals in accordance with NFPA 72 for the following:

B. Alarm: Provide alarm initiation in accordance with NFPA 72 for the following:
1. Manual fire alarm pull station.
2. Smoke detectors.
3. Heat detectors.

2.4 COMPONENTS

A. General:
1. Provide flush mounted units where installed in finish areas; in unfinished areas, surface mounted unit are acceptable.
2. Provide legible, permanent labels for each control device, using identification used in operation and maintenance data.

B. Manual Fire Alarm Stations:
1. Semi-Flush mounted, single action manual station with break-glass rod and manufacturer's standard backbox.
2. Each manual station shall store the address of that unit.

C. Analog Smoke and Heat Sensors:
1. Analog Photo Sensors:
a. Each sensor shall store the sensor address and operating characteristics in non-volatile memory at the sensor. Sensor shall use a threshold received from the control unit to determine when an alarm condition exists.
b. Each sensor shall have two alarm LED's for 360 degree viewing. The alarm LED's shall flash when communicating with the control panel and shall illuminate steady during alarm conditions.
c. Sensitivity settings for photoelectric sensors shall be set and displayed on the LCD in percent obscuration per foot.

d. Each sensor shall be capable of compensating for dust and dirt accumulation within the sensing chamber.
e. A calibrated light source shall be used to calibrate the fire level of the photoelectric sensor. Sensors which use a fixed fire level limit are not acceptable.
f. Provide two-wire detector with common power supply and signal circuits.

2. Analog Thermal Sensors:
   a. Each sensor shall store the sensor address and operating characteristics in non-volatile memory at the sensor; sensor shall use a threshold received from the control unit to determine when an alarm condition exists.
   b. Each sensor shall have two alarm LED's for 360 degree viewing. The alarm LED's shall flash when communicating with the control panel and shall illuminate steady during alarm conditions.
   c. Sensitivity settings for thermal sensors shall be set and displayed on the LCD in degrees fahrenheit. The set point for the thermal sensor shall be adjustable between 135 degrees and 200 degrees. The thermal detector shall operate on a combination rate of rise and fixed temperature principle adjustable at the fire alarm panel.
3. Analog Duct Mounted Smoke Detectors:
   a. Each sensor shall store the sensor address and operating characteristics in non-volatile memory at the sensor; sensor shall use a threshold received from the control unit to determine when an alarm condition exists.
   b. Sensitivity settings for photoelectric sensors shall be set and displayed on the LCD in percent obscuration per foot.
   c. Equip duct smoke detectors with auxiliary SPDT relay contact and indication of detector actuation via an in duct-mounted housing and remote indicator indicating Normal and Alarm conditions.
   d. Duct sampling tubes extending width of duct.
   e. Provide two-wire detector with common power supply and signal circuits.

D. Peripheral Fire Alarm Equipment:
1. Fast Response Contact Module:
   a. Contact modules shall provide monitoring of dry contacts as initiating devices.
   b. Each module shall store the sensor address and operating characteristics in non-volatile memory at the module.
   c. Mount module to a standard junction box and provide visual indication of status via a status LED. Optional mounting shall be available to allowing mounting the module in a junction box with a monitored contact.
2. Supervised Output Module:
   a. Each supervised output module shall be rated to operate listed notification appliances.
   b. Circuit shall be rated for 2.0 amps at 24 VDC.
   c. Each module shall store the sensor address and operating characteristics in non-volatile memory at the module.
   d. Each module shall operate under up to 16 different conditions occurring in the system. These conditions include combining various zones and zone states.
3. Dual Relay Module:
   a. Module shall provide two independently operating and configurable relays.
   b. Each relay shall be rated for 2.0 amps at 24 VDC.
   c. Each module shall store the sensor address and operating characteristics in non-volatile memory at the module.
   d. Each module shall operate under up to 16 different conditions occurring in the system. These conditions include combining various zones and zone states.
   e. Module shall operate both relays without requiring a separate power source.

E. Fire Alarm Notification Appliances:
   1. Strobes: NFPA 72 lamp and flasher with red lettered "FIRE" on clear clear lens.
      a. Meeting requirements of NFPA/ANSI standards and ADA Accessibility Guidelines.
      b. Minimum rating of 15 candela field adustable up to 110 candela including 30, 60, and 75 candela.
         1) Slash ratings such as 15/30 15/75 shall not be acceptable, device must carry full rating in both viewing directions.
      c. 177 candela for "sleeping roooms".
   2. Horns: NFPA 72 Flush type fire alarm horn.
      a. Minimum rating of 85 decibels, field adjustable up to 95 decibels.
   3. Horn/Strobes.
      a. Combination units with minimum ratings of horn and strobe units specified.

F. Fire Alarm Wire and Cable.
   1. Fire Alarm Power Branch Circuits: Building wire as specified in Section 16123.
   2. Initiating Device and Indicating Appliance Circuits: Power limited fire-protective signaling cable classified for fire and smoke characteristics, copper conductor, 300 volts insulation rated 105 degrees C, suitable for use in air handling ducts, hollow spaces used as ducts, and plenums.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install in accordance with applicable codes, NFPA 72, NFPA 70, and Contract Documents.

B. Conceal all wiring, conduit, boxes, and supports where installed in finished areas.

C. Obtain Nanuet Union Free School District's approval of locations of devices, before installation.

D. Install instruction cards and labels.

3.2 INSPECTION AND TESTING FOR COMPLETION

A. Notify Nanuet Union Free School District 7 days prior to beginning completion inspections and tests.

B. Notify authorities having jurisdiction and comply with their requirements for scheduling inspections and tests and for observation by their personnel.

C. Provide the services of the installer's supervisor or person with equivalent qualifications to supervise inspection and testing, correction, and adjustments.

D. Prepare for testing by ensuring that all work is complete and correct; perform preliminary tests as required.

E. Provide all tools, software, and supplies required to accomplish inspection and testing.

F. Perform inspection and testing in accordance with NFPA 72 and requirements of local authorities; document each inspection and test.

G. Correct defective work, adjust for proper operation, and retest until entire system complies with Contract Documents.

3.3 CLOSEOUT

A. Closeout Demonstration: Demonstrate proper operation of all functions to Nanuet Union Free School District.
   1. Be prepared to conduct any of the required tests.

2. Have at least one copy of operation and maintenance data, preliminary copy of project record drawings, input/output matrix, and operator instruction chart(s) available during demonstration.
3. Have authorized technical representative of control unit manufacturer present during demonstration.
4. Demonstration may be combined with inspection and testing required by authority having jurisdiction; notify authority having jurisdiction in time to schedule demonstration.
5. Repeat demonstration until successful.

END OF SECTION 28 46 00

SECTION 31 10 00 – SITE CLEARING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes

1. Protecting existing trees and vegetation to remain.
2. Removal of trees, shrubs, designated plant life and vegetation.
3. Removal of topsoil and subsoil, rough grading and site contouring.
4. Clearing and grubbing.

1.2 SUBMITTALS

A. Pre-Construction photographs sufficiently detailed, of existing conditions of trees, adjoining construction, and site improvements. Submit before work begins.

B. Submit plan indicating proposed trees to be removed or trimmed to Owner and Construction Manager for review prior to commencement of work.

1.3 RELATED WORK SPECIFIED ELSEWHERE

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

B. Section 31 20 00: Earth Moving

C. Section 31 25 00: Erosion and Sedimentation Controls

1.4 QUALITY ASSURANCE

A. Comply with hauling and disposal regulations of authorities having jurisdiction.

1.5 DEFINITIONS

A. Topsoil: Natural or cultivated surface-soil layer containing organic matter and sand, silt, and clay particles; friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than 2 inches in diameter; and free of subsoil and weeds, roots, toxic materials, or other non-soil.

B. Clearing: Removal of trees, shrubs, bushes, and other organic matter found at or above original ground level.

C. Remove: Remove existing items from site and legally dispose of them off-site, unless indicated to be removed and reinstalled. Removal shall be completed daily.

D. Existing to Remain: Existing items that are not to be removed and that are not otherwise indicated to be removed or removed and reinstalled.

1.6 PROJECT CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from the Owner and authorities having jurisdiction.

2. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.

3. Provide clear and appropriate signage for alternate routes and proper notice to people.

B. Maintain access to existing adjacent areas of the building, walkways, roads, and other adjacent occupied or used facilities.

1. This is an active facility and phasing of the work will be required and with agreement of Owner to minimize disruptions to the existing operations.

2. Do not close or obstruct adjacent areas of the building, walkways, roads, or other occupied or used facilities without agreement with the Owner and written permission from authorities having jurisdiction.

C. Utility Locator Service: Notify utility locator service (UDig New York – 811 or 800-962-7962) or retain services of a private utility locating firm for area where Project is located before site clearing.

D. Hazardous Materials:

1. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials shall be removed as per the characterization of hazard and disposed of in accordance with NYSDEC requirements.

E. Storage of removed items or materials on-site will not be permitted, unless indicated to be removed and stockpiled on site.

F. Utility Service: Maintain existing utilities in service and protect them against damage during selective demolition operations.

G. Do not commence site clearing and demolition operations until temporary erosion and sedimentation control measures are in place.

1.7 MATERIAL OWNERSHIP

A. Except for items or materials indicated to be stockpiled, reused, reinstalled, or otherwise indicated to remain on the Owner's property, demolished materials shall become Contractor's property and shall be removed from Project site.

B. Stripped topsoil shall be removed and disposed of off-site by Contractor.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 PREPARATION AND PROTECTION

A. Protect and maintain benchmarks and survey control points from disturbance during construction. Damaged or lost benchmark, monuments and survey control points shall be replaced by a licensed New York State Registered Land Surveyor at the Contractor's expense.

B. Survey existing conditions and correlate with requirements indicated to determine extent of site clearing required.

C. Protect existing site improvements to remain from damage during construction.

1. Restore damaged improvements to their original condition, as acceptable to Owner.

D. Identify trees to be removed and trimmed and confirm with Owner and Engineer prior to any demolition.

E. When unanticipated conflicts with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Engineer.

F. Site Access and Temporary Controls: Conduct site clearing operations to ensure minimum interference with adjacent areas of the building, roads, streets, walks, walkways, and other adjacent occupied and used facilities.

1. Do not close or obstruct adjacent areas of the building, streets, walks, walkways, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.

2. Erect temporary protection, such as walks, ramps, fences, and railings where required to permit safe passage of people and vehicles.

3. Protect existing building elements, appurtenances, and items to remain.

G. Identify and protect existing utilities to remain.

H. Locate, identify, disconnect, and seal or cap utilities indicated to be removed.

1. Arrange with utility companies to shut off indicated utilities.

2. Owner will arrange to shut off indicated utilities when requested by Contractor.

I. Interrupting Existing Utilities: 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 Engineer not less than two days in advance of proposed utility interruptions.

2. Do not proceed with utility interruptions without Engineer's written permission.

J. Tree Protection: Erect and maintain a temporary fence around drip line of individual trees or around perimeter drip line of groups of trees to remain. Remove fence when construction is complete.

1. Do not store construction materials, debris, or excavated material within drip line of remaining trees.

2. Do not permit vehicles, equipment, or foot traffic within drip line of remaining trees.

3. Do not excavate within drip line of trees, unless otherwise indicated.

K. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people, damage to buildings and facilities to remain.

1. Provide protection to ensure safe passage of people around selective demolition area.

3.2 CLEARING AND GRUBBING

A. Install erosion control measures at the limits of clearing and grubbing or as indicated on the Contract Drawings prior to commencement of clearing and grubbing. Repair and or replace erosion control devices immediately if damaged during clearing and grubbing.

B. Remove obstructions, grass, and other vegetation to permit installation of new construction. Removal includes digging out stumps and obstructions and grubbing roots.

C. Do not remove trees, shrubs, and other vegetation unless indicated to be removed.

D. Completely remove stumps, roots, obstructions, and debris extending to a depth of 18 inches below exposed subgrade.

E. Carefully grub within drip line of remaining trees.

F. Fill depressions caused by clearing and grubbing operations with satisfactory soil material, unless further excavation or earthwork is indicated.

1. Place fill material in horizontal layers not exceeding 8-inch loose depth, and compact each layer to a density equal to adjacent original ground.

3.3 REMOVAL AND DISPOSAL

A. Removal:

1. Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials, including trash and debris, and legally dispose of them off Owner's property.

B. Burning: Do not burn demolished materials.

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

D. Dumping: No dumping shall be allowed in any stream, corridor, wetlands, surface waters, or at unspecified locations or at locations not approved by the Engineer or regulatory agencies.

3.4 SITE IMPROVEMENTS

A. Remove existing above- and below-grade improvements as indicated and as necessary to facilitate new construction. The Contractor shall temporarily relocate existing mailboxes, road signs, fences, landscaping, etc. during construction and re-install them at their original location once the Work is completed.

B. Remove slabs, paving, curbs, gutters, and aggregate base as indicated.

1. Unless existing full-depth joints coincide with line of demolition, neatly saw-cut length of existing pavement, slabs, sidewalks, curbs, and gutters to remain before removing existing pavement. Saw-cut faces vertically

3.5 ROUGH GRADING

A. Identify required lines, levels, contours, and datum.

B. Identify known underground, above ground, and aerial utilities. Stake and flag locations.

C. Notify utility companies to paint out utility locations.

D. Excavate topsoil and subsoil from areas to be further excavated, re-landscaped, or re-graded.

E. Dispose of stockpiled topsoil off-site.

F. Stockpiled topsoil may be re-used on site if meeting the specifications for suitable material as defined in Section 31 20 00.

END OF SECTION 31 10 00

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SECTION 31 20 00 – EARTH MOVING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes

1. Preparing subgrades for structures, walks, pavements, grasses and plants.
2. Subbase course for concrete slabs, walks and asphalt pavement.
3. Excavating and backfilling trenches for utilities and structures.

1.2 SUBMITTALS

A. Material Test Reports: Classification according to ASTM D 2487, laboratory compaction curve according to ASTM D 1557 and certified gradation analysis according to ASTM C 136 for each soil material proposed for fill and backfill.

B. Product Data: Provide data on any geotextiles and warning tapes used.

C. Preexcavation Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including finish surfaces that might be misconstrued as damage caused by earth-moving operations. Submit before earth moving begins.

1.3 RELATED WORK SPECIFIED ELSEWHERE

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

B. Section 03 30 00: Cast-in-Place Concrete (Civil)

C. Section 31 23 19: Dewatering

D. Section 31 25 00: Erosion and Sedimentation Controls

E. Section 32 12 16: Asphalt Paving

F. Section 33 41 00: Storm Utility Drainage Piping

G. Section 33 49 00: Storm Drainage Structures

1.4 DEFINITIONS

A. Backfill: Soil material used to fill an excavation.

1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.

2. Final Backfill: Backfill placed over initial backfill to fill a trench.

B. Base Course: Aggregate layer placed between the subbase course and hot-mix asphalt paving.

C. Bedding Course: Aggregate layer placed over the excavated subgrade in a trench before laying pipe.

D. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.

E. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.

F. Fill: Soil materials used to raise existing grades.

G. Earth Excavation: The removal of all surface and subsurface material not classified as rock (as defined below).

H. Rock: Limestone, sandstone, shale, granite, and similar material in solid beds or masses in its original or stratified position which can be removed only by blasting operations, drilling, wedging, or use of pneumatic tools, and boulders with a volume greater than 1.0 cubic yard. Concrete building foundations and concrete slabs, not indicated, with a volume greater than 1.0 cubic yard shall be classified as rock.

1. Materials which can be loosened with a pick or backhoe, frozen materials, soft laminated shale or hardpan, pavements, curbs, and similar materials shall be classified as earth excavation.

I. Subgrade Surface: Surface upon which pavements, pads, walks, curbs, or topsoil is placed.

J. Subbase Surface: Surface above the subgrade surface.

K. Maximum Density: The dry unit weight in pounds per cubic foot of the soil at "Optimum Moisture Content" when determined by ASTM D 1557 (Method C), and ASTM D 6938 as modified by NYSDOT in Manual GTM-10.

L. Lawn Areas: Areas not covered by structures, walks, roads, paving, or parking.

M. Unauthorized Excavation: The removal of material below required elevations indicated on the Contract Drawings or beyond lateral dimensions indicated or specified without specific written direction by the Engineer.

1.5 PROJECT CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during earth-moving operations.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.

2. Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.

B. Existing Utilities: Locate existing underground utilities in area of Work before starting earthwork operations. Where utilities are to remain in place, provide adequate means of protection during earthwork operations.

1. If uncharted, or incorrectly charted, piping or other utilities are encountered during excavation, consult utility owner and Engineer immediately for directions. Cooperate with Owner, and public and private utility companies to keep their respective services and facilities in operation. Repair damaged utilities as required by utility owner.

2. Do not interrupt existing utilities serving facilities occupied by Owner or others, during occupied hours, except when permitted in writing by Engineer and then only after acceptable temporary utility services have been provided.

3. Provide minimum of 48-hour notice to Engineer and receive written notice to proceed before interrupting any utility.

4. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies for shutoff of services if lines are active.

C. Cold Weather Requirements:

1. Do not backfill with any frozen soil materials.

1.6 QUALITY ASSURANCE

A. Geotechnical Testing Agency Qualifications: Qualified according to ASTM E 329 and ASTM D 3740 for testing indicated.

B. Routine testing of existing soils and compacted material for compliance with these Specifications shall be performed by a testing agency acceptable to Engineer.

C. Compacted material that does not meet density requirements shall be removed and/or re-compacted, and retested.

1.7 DELIVERY AND STORAGE

A. Deliver and store materials in a manner to prevent contamination or segregation.

1.8 PROTECTION

A. Shoring and Sheeting: Provide shoring and bracing as required by OSHA, 29 CFR Part 1926 (Subpart P). Contractor is responsible for obtaining design of support of excavation by a licensed Engineer in the State of NY, as required.

B. Dewatering: See Section 31 23 19 Dewatering.

C. Protection and Restoration of Surfaces: Protect newly graded areas from traffic, erosion, and settlements. Repair and reestablish damaged or eroded slopes, elevations or grades and restore surface construction prior to acceptance. Protect existing streams, ditches and storm drain inlets from water-borne soil by means of straw bale dikes. Conduct work in accordance with NYS DEC requirements. Refer to Section 312500: Erosion and Sedimentation Control for more information.

1.9 PROTECTION OF PROPERTY

A. Protect structures, utilities, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

B. Perform excavation by hand within dripline of large trees to remain. Protect root systems from damage or dryout to the greatest extent possible. Maintain moist condition for root system and cover exposed roots with moistened burlap.

C. Refer to Section 02 41 19: Selective Demolition, for more information.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.

B. Satisfactory Soils: Soil Classification Groups GW, GP, GM, SW, SP, and SM according to ASTM D 2487, or a combination of these groups; free of rock or gravel larger than 3 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.

C. Unsatisfactory Soils: Soil Classification Groups GC, SC, CL, ML, OL, CH, MH, OH, and PT according to ASTM D 2487, or a combination of these groups.

1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction

D. Recycled Asphalt Pavement (RAP): Use of reclaimed asphalt pavement is not allowed for subbase and subgrade materials.

E. Suitable Material (Fill and Backfill for Landscaped Areas): Material consisting of mineral soil (inorganic), blasted or broken rock and similar materials of natural or man-made origin, including mixtures thereof. Maximum particle size will not exceed 1/3 of the specified layer thickness prior to compaction. NOTE: Material containing cinders, industrial waste, sludge, building rubble, land fill, muck, and peat will be considered unsuitable for fill and backfill. Topsoil and organic silt may be used as suitable material in landscaped areas provided it is placed in the top layer of the subgrade surface.

F. NYSDOT Select Granular Fill: Material shall be a sand and gravel mixture substantially free from silt, clay, shale. The material shall not contain organic matter, frozen sections, slag, cinders, ashes, rubbish, other foreign material or deleterious matters. This soil material shall be used as a general fill where as required on the Contract Drawings. The material shall be approved by the Engineer and conform to the following gradation:

NYSDOT Select Granular Fill U.S. Sieve Designation	% by weight passing square opening
4 inch	100%
No. 40	0% - 70%
No. 200	0% - 15%

1. Magnesium Sulfate Soundness Test: Materials exceeding 30% will be rejected.

G. Pipe Bedding and Pipe Zone Backfill: Material shall be a sand or a mixture of crushed stone and gravel, free of soft, nondurable particles, elongated particles or other deleterious matters. Material shall not contain organic matter, frozen sections, slag, cinders, ashes, rubbish, or other foreign material. The material shall be approved by the Engineer and conform to the following gradation:

Sand U.S. Sieve Designation	% by weight passing square opening
3/4 inch	100%
No. 40	0% - 70%
No. 200	0% - 10%

H. Trench Backfill: Material shall be a natural run-of-bank (ROB) or processed gravel, free of soft, nondurable particles, elongated particles or other deleterious matters. Material shall not contain organic matter, frozen sections, slag, cinders, ashes, rubbish, or other foreign material. The material shall be approved by the Engineer and conform to the following gradation:

Processed Gravel U.S. Sieve Designation	% by weight passing square opening
4 inch	100%
No. 40	0% - 70%
No. 200	0% - 10%

I. NYSDOT Subbase Course Type 2: Per NYSDOT Standard Specification Section 304, approved blast furnace slag, stone, sand, and gravel, or blends of these materials with not more than 30% by weight of glass. The material shall conform to the following gradation:

U.S. Sieve Designation	% by weight passing square opening
2 inch	100%
1/4 inch	30% - 65%
No. 40	5% - 40%
No. 200	0% - 10%

1. Magnesium Sulfate Soundness Test: 20% maximum loss by weight after 4 test cycles.

2. Plasticity Index: The plasticity index of the material passing the No. 40 mesh sieve shall not exceed 5.0.

3. Elongated Particles: Not more than 30%, by weight, of the particles retained on a 2-inch sieve shall consist of flat or elongated particles. A flat or elongated particle is defined as one, which has its greatest dimension more than 3 times its least dimension.

J. NYSDOT No. 1 Crushed Stone per NYSDOT Standard Specification Table 703-4: Crushed stone shall be washed. Material shall be substantially free from silt, clay and organic matter. It shall not contain frozen sections, slag, cinders, ashes, rubbish, other foreign material and deleterious matters. The material shall be approved by the Engineer and conform to the following gradation:

U.S. Sieve Designation	% by weight passing square opening
1 inch	100%
1/2 inch	90% - 100%
1/4 inch	0% - 15%
No. 200	0% - 1%

K. NYSDOT No. 2 Crushed Stone per NYSDOT Standard Specification Table 703-4: Crushed stone shall be washed. Material shall be substantially free from silt, clay and organic matter. It shall not

contain frozen sections, slag, cinders, ashes, rubbish, other foreign material and deleterious matters. The material shall be approved by the Engineer and conform to the following gradation:

U.S. Sieve Designation	% by weight passing square opening
1 1/2 inch	100%
1 inch	90% - 100%
1/2 inch	0% - 15%
No. 200	0% - 1%

L. NYSDOT No. 3 Crushed Stone per NYSDOT Standard Specification Table 703-4: Crushed stone shall be washed. Material shall be substantially free from silt, clay and organic matter. It shall not contain frozen sections, slag, cinders, ashes, rubbish, other foreign material and deleterious matters. The material shall be approved by the Engineer and conform to the following gradation:

U.S. Sieve Designation	% by weight passing square opening
2 1/2 inch	100%
2 inch	90% - 100%
1 1/2 inch	35%-70%
1 inch	0% - 15%
No. 200	0% - 0.7%

M. NYSDOT No. 4 Crushed Stone per NYSDOT Standard Specification Table 703-4: Crushed stone shall be washed. Material shall be substantially free from silt, clay and organic matter. It shall not contain frozen sections, slag, cinders, ashes, rubbish, other foreign material and deleterious matters. The material shall be approved by the Engineer and conform to the following gradation:

U.S. Sieve Designation	% by weight passing square opening
4 inch	100%
3 inch	90% - 100%
2 inch	0% - 15%
No. 200	0% - 0.7%

N. Pea Gravel: Comply with DOT Article 703-02 for screened gravel. The material shall be approved by the Engineer and conform to the following gradation:

U.S. Sieve Designation	% by weight passing square opening
1/2 inch	100%
1/4 inch	90% - 100%
1/8 inch	0% - 15%
No. 200 Sieve	0% - 1%

2.2 GEOTEXTILES:

A. Stabilization Fabric: Mirafi, Inc. 500X, or approved equivalent, or as indicated on drawings.

B. Separation Fabric: Mirafi, Inc. 140N or approved equivalent, or as indicated on drawings.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth moving operations.

B. Protect and maintain erosion and sedimentation controls during earth moving operations.

C. Protect subgrades and foundation soils from freezing temperatures and frost. Remove temporary protection before placing subsequent materials.

3.2 EXCAVATION, GENERAL

A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rippable rock, soil materials, and obstructions which can be removed with a Late Model, Track-mounted hydraulic excavator, equipped with a 42” wide short tip radius rock bucket, rated not less than 150hp flywheel power. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions defined as unclassified excavation.

1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.

2. Earth excavation includes excavating pavements and obstructions visible on surface; underground structures, utilities, and other items indicated to be removed; together with soil, boulders, and other materials not classified as rock.

B. Classified Excavation: Excavate to subgrade elevations. Material to be excavated will be classified as rock. Do not excavate rock until it has been classified, measured and examined by Engineer or Construction Manager. The Contract Sum will be adjusted for rock excavation according to unit prices included in the Contract Documents. Changes in the Contract Time may be authorized for rock excavation.

3.3 EXCAVATION FOR STRUCTURES, WALKS AND PAVEMENTS

A. Excavate surfaces under structures, walks and pavements to indicated lines, cross sections, elevations, and subgrades.

3.4 EXCAVATION FOR UTILITY TRENCHES

A. Excavate trenches to indicated gradients, lines, depths, and elevations.

1. Beyond building perimeter, excavate trenches to allow installation of top of pipe below frost line, or as shown in the Contract Documents.

B. Excavate trenches to uniform widths to provide the following clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit unless otherwise indicated.

1. Clearance: 12 inches each side of pipe or conduit.

C. Trench Bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove projecting stones and sharp objects along trench subgrade.

1. For pipes and conduit less than 6 inches in nominal diameter, hand-excavate trench bottoms and support pipe and conduit on an undisturbed subgrade.

2. For pipes and conduit 6 inches or larger in nominal diameter, shape bottom of trench to support bottom 90 degrees of pipe or conduit circumference. Fill depressions with tamped sand backfill.

3. For flat-bottomed, multiple-duct conduit units, hand-excavate trench bottoms and support conduit on an undisturbed subgrade.

4. Excavate trenches 6 inches deeper than bottom of pipe and conduit elevations, or as shown in the Contract Drawings, to allow for bedding course. Hand-excavate deeper for bells of pipe

3.5 SUBGRADE INSPECTION

A. Notify Engineer or Inspector when excavations have reached required subgrade.

B. If Engineer or Inspector determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.

C. Proof-roll subgrade below the building slabs and pavements with a pneumatic-tired and loaded 10-wheel, tandem-axle dump truck weighing not less than 15 tons to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.

1. Completely proof-roll subgrade in one direction, repeating proof-rolling in direction perpendicular to first direction. Limit vehicle speed to 3 mph.

2. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Engineer or Inspector, and replace with compacted backfill or fill as directed.

D. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Engineer, without additional compensation.

3.6 UNAUTHORIZED EXCAVATION

A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill, with 28-day compressive strength of 2500 psi, may be used when approved by Engineer.

1. Fill unauthorized excavations under other construction, pipe, or conduit as directed by Engineer.

3.7 STORAGE OF SOIL MATERIALS

A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.

1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

2. Maintain erosion control measures as described in Section 312500: Erosion and Sedimentation Controls.

3.8 BACKFILL

A. Place and compact backfill in excavations promptly, but not before completing the following:

1. Construction below finish grade including, where applicable, subdrainage, dampproofing, waterproofing, and perimeter insulation.

2. Surveying locations of underground utilities for Record Documents.

3. Testing and inspecting underground utilities.

4. Removing concrete formwork.

5. Removing trash and debris.

6. Removing temporary shoring and bracing, and sheeting as specified by pertinent OSHA regulations and in conformance with any approved SOE designs.

7. Installing permanent or temporary horizontal bracing on horizontally supported walls.

B. Place backfill on subgrades free of mud, frost, snow, or ice.

3.9 UTILITY TRENCH BACKFILL

A. Place backfill on subgrades free of mud, frost, snow, or ice.

B. Place and compact pipe bedding course on trench bottoms and where indicated. Shape pipe bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.

C. Backfill voids with satisfactory soil while removing shoring and bracing.

D. Place and compact initial pipe zone backfill, free of particles 3/4 inch or larger, to a height of 12 inches over the pipe or conduit.

1. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.

E. Place and compact final trench backfill to final subgrade elevation.

F. Install detectable warning tape directly above utilities, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

3.10 SOIL FILL

A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.

B. Place and compact fill material in layers to required elevations as indicated on plans:

1. Under grass and planted areas, use satisfactory soil material.

2. Under walks and pavements, use select granular fill soil material.

C. Place soil fill on subgrades free of mud, frost, snow, or ice.

3.11 SOIL MOISTURE CONTROL

A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.

1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.

2. Remove and replace, or scarify and air dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

3.12 COMPACTION OF SOIL BACKFILLS AND FILLS

A. Place backfill and fill soil materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 6 inches in loose depth for material compacted by hand-operated tampers.

B. Place backfill and fill soil materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.

C. Compact each layer of fill and backfill for the following area classifications to the percentage of maximum density specified below and at a moisture content suitable to obtain the required densities, but at not less than 3 percent drier or more than 2 percent wetter than the optimum content as determined by ASTM D1557 (Modified Proctor), at the following test intervals.

1. Concrete Slabs and Steps: 95 percent, (1) test per lift for every 2,000 sf.

2. Landscaped Areas: 90 percent, (1) test per lift for every 10,000 sf.

3. Pavements and Walks: 95 percent, (1) test per lift for every 2,000 sf.

4. Pipe Bedding: 95 percent, (1) test per lift for every 100 linear foot of pipe.

5. Pipe Zones: 95 percent, refer to appropriate area for testing frequency.

3.13 DEWATERING

A. See Section 312319: Dewatering.

3.14 ROCK REMOVAL

A. Rock removal (bedrock) is not anticipated for the project.

B. If bedrock is encountered the contractor shall notify the Owner's Representative.

3.15 GRADING

A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.

1. Provide a smooth transition between adjacent existing grades and new grades.

2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.

B. Site Rough Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:

1. Grass or Unpaved Areas: Plus or minus 1 inch.

2. Pavements: Plus or minus 1/2 inch.

3.16 SUBBASE COURSE UNDER PAVEMENTS AND WALKS

A. Place subbase course on subgrades free of mud, frost, snow, or ice.

B. On prepared subgrade, place subbase course under pavements and walks as follows:

1. Install separation geotextile on prepared subgrade according to manufacturer's written instructions, overlapping sides and ends, or as shown in the Contract Drawings.

2. Place base course material over subbase course under hot-mix asphalt pavement.

3. Shape subbase course to required crown elevations and cross-slope grades.

4. Place subbase course 6 inches or less in compacted thickness in a single layer.

5. Place subbase course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.

6. Compact subbase course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum dry unit weight according to ASTM D 1557.

3.17 FIELD QUALITY CONTROL

A. Special Inspections: The Owner shall engage a qualified special inspector shall perform the following special inspections:

1. Determine prior to placement of fill that site has been prepared in compliance with requirements.

2. Determine that fill material and maximum lift thickness comply with requirements.

3. Determine, at the required frequency, that in-place density of compacted fill complies with requirements.

B. Testing Agency: A qualified geotechnical engineering testing agency (in accordance with ASTM E 329 and ASTM D 3740) shall perform tests and inspections.

C. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earth moving only after test results for previously completed work comply with requirements.

D. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil materials to depth required; recompact and retest until specified compaction is obtained.

3.18 PROTECTION

A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.

1. Scarify or remove and replace soil material to depth as directed by Engineer; reshape and recompact.

C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.

1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.19 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Transport surplus satisfactory soil to designated storage areas on Owner's property. Stockpile or spread soil as directed by Engineer.

1. Remove waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property. Comply with hauling and disposal regulations of authorities having jurisdiction.

END OF SECTION 31 20 00

SECTION 31 23 19 – DEWATERING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Construction dewatering.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference with Construction Manager at project site.

1.3 ACTION SUBMITTALS

A. Shop Drawings: For dewatering system, prepared by or under the supervision of a qualified professional engineer.

B. Dewatering Plan: Submit to Engineer for review and approval.

1.4 INFORMATIONAL SUBMITTALS

A. Field Quality-Control Submittals:

1. Field quality-control reports.

1.5 QUALITY ASSURANCE

A. Qualifications:

1. Installer: An experienced installer that has specialized in design of dewatering systems and dewatering work.

2. Land Surveyor: A professional land surveyor who is legally qualified to practice in state where Project is located.

1.6 FIELD CONDITIONS

A. Survey Work: Engage a qualified land surveyor or professional engineer to survey adjacent existing buildings, structures, and site improvements; establish exact elevations at fixed points to act as benchmarks. Clearly identify benchmarks and record existing elevations.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Dewatering Performance: Design, furnish, install, test, operate, monitor, and maintain dewatering system of sufficient scope, size, and capacity to control hydrostatic pressures and to lower, control, remove, and dispose of groundwater and permit excavation and construction to proceed on dry, stable subgrades.

B. Regulatory Requirements: Comply with governing EPA notification regulations before beginning dewatering. Comply with water- and debris-disposal regulations of authorities having jurisdiction.

PART 3 - EXECUTION

3.1 PREPARATION

A. Provide temporary grading to facilitate dewatering and control of surface water.

B. Protect and maintain temporary erosion and sedimentation controls, which are specified on the drawings, during dewatering operations.

3.2 INSTALLATION

A. Install dewatering system utilizing wells, well points, or similar methods complete with pump equipment, standby power and pumps, filter material gradation, valves, appurtenances, water disposal, and surface-water controls.

1. Space well points or wells at intervals required to provide sufficient dewatering.

2. Use filters or other means to prevent pumping of fine sands or silts from the subsurface.

B. Place dewatering system into operation to lower water to specified levels before excavating below groundwater level.

C. Provide sumps, sedimentation tanks, and other flow-control devices as required by authorities having jurisdiction.

D. Provide standby equipment on-site, installed and available for immediate operation, to maintain dewatering on continuous basis if any part of system becomes inadequate or fails.

3.3 OPERATION

A. Operate system continuously until drains, sewers, and structures have been constructed and fill materials have been placed or until dewatering is no longer required.

B. Operate system to lower and control groundwater to permit excavation, construction of structures, and placement of fill materials on dry subgrades. Drain water-bearing strata above and below bottom of foundations, drains, sewers, and other excavations.

1. Do not permit open-sump pumping that leads to loss of fines, soil piping, subgrade softening, and slope instability.

2. Reduce hydrostatic head in water-bearing strata below subgrade elevations of foundations, drains, sewers, and other excavations.

3. Maintain piezometric water level a minimum of 24 inches below bottom of excavation.

C. Remove dewatering system from Project site on completion of dewatering. Plug or fill well holes with sand or cut off and cap wells a minimum of 36 inches below overlying construction.

END OF SECTION 31 23 19

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SECTION 31 25 00 – EROSION AND SEDIMENTATION CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes:

1. Furnish, install, inspect, maintain, and remove soil erosion and sediment control measures during construction as shown on the Contract Documents prepared for this project.

2. Minimize the potential short-term adverse environmental impacts associated with construction activity in environmentally sensitive areas.

3. Assure the quantity and quality of stormwater runoff is not substantially altered due to construction activities.

4. Stabilize slopes and protect offsite areas by the installation and maintenance of stabilization and erosion control measures.

5. Based on the project parameters, it is anticipated that coverage under the NYSDEC SPDES General Permit for Stormwater Discharge from Construction Activities will not be required.

1.2 SUBMITTALS

A. Product Data: Manufacturer's catalog cuts, specifications and installation instructions.

B. Contingency Action Plan for prompt remedial action in the event spillage of petroleum products or other pollutants should occur. Contingency Action Plan shall be submitted to the Engineer for acceptance prior to the start of construction.

C. Name and location of all material suppliers.

D. Certificate of compliance with the standards specified above for each source of each material.

E. List of disposal sites for waste and unsuitable materials and all required permits for use of those sites.

1.3 RELATED WORK SPECIFIED ELSEWHERE

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

B. Section 311000: Site Clearing

C. Section 31 20 00: Earth Moving

D. Section 31 23 19: Dewatering

1.4 REFERENCE STANDARDS

A. New York Standards and Specifications for Erosion and Sediment Control, NYSDEC, latest edition.

B. NYSDEC: New York State Stormwater Management Design Manual, latest edition.

C. 6 NYCRR Parts 611 – 613 and all additions.

D. OSHA 40 CFR Part 258 and all additions. New York State: Standards and Specifications for Erosion and Sediment Control, latest edition.

1.5 DEFINITIONS

A. Critical Environmental Areas: Those areas, conditions, or features which, when disturbed by construction activities, create an adverse environmental impact. These areas include, but are not necessarily limited to, densely wooded areas, swales, wetland areas, streams, brooks, ocean, and steep slopes.

B. Stabilized Construction Entrance: A stabilized pad of aggregate underlain with geotextile where traffic enters a construction site to reduce or eliminate tracking of sediment to public roads.

C. Dust Control: Prevent surface and air movement of dust from disturbed soil surfaces.

D. Silt Fence: A barrier of geo-textile fabric installed on contours across the slope to intercept runoff by reducing velocity. Replace after 1 year.

E. Storm Drain Inlet Protection: A semi-permeable barrier installed around storm inlets to prevent sediment from entering a storm drainage system.

1.6 ACCIDENT PREVENTION MEASURES

A. All preventative measures shall be taken to avoid spillage of pollutants and the release of sediment.

B. Every precaution shall be taken to prevent the possibility of accidentally starting fires. Construction programs should include fire prevention planning, training of personnel in firefighting, and a fire prevention inspection program.

C. Pollutant control, erosion control devices, and sedimentation control devices shall be inspected as outlined on the Contract Drawings and necessary repairs made accordingly.

D. Additional controls shall be implemented if field conditions warrant, and/or as directed.

1.7 SUMMARY

A. Furnish all labor, equipment and materials required to complete all work associated with providing erosion and sedimentation control grading, site grading and preparation of pavement and structure subgrade, and other related and incidental work as required to complete the work on the Contract Drawings and specified herein.

B. All excavations shall be in conformity with the lines, grades, and cross sections shown on the Drawings or established by the Engineer.

C. The Contractor shall conduct all construction activities in such a manner as to minimize erosion of disturbed areas and off-site sedimentation.

D. All work under this Contract shall be done in conformance with and subject to the limitations of the New York Standards and Specifications for Erosion and Sedimentation Control.

E. The following excerpts from the regulations are particularly important:

1. ...slopes left exposed will, within 21 working days of completion of any phase of grading, be planted or otherwise provided with ground cover, devices, or structures sufficient to restrain erosion...

2. ...a ground cover sufficient to restrain erosion must be planted or otherwise provided within 21 working days on that portion of the tract (disturbed area) upon which further active construction is not being undertaken...

F. Due to the nature of the work required by this Contract, it is anticipated that the location and nature of the erosion and sedimentation control devices may be adjusted on several occasions to reflect the current phase of construction. Erosion and sedimentation control devices shall be established prior to or concurrent with the clearing operations in a given area. Where such practice is not feasible, the erosion and sedimentation control device(s) shall be established immediately following completion of the clearing operation.

G. The construction schedule adopted by the Contractor will impact the placement and need for specific devices required for the control of erosion. The Contractor shall develop and implement such additional techniques as may be required to minimize erosion and off-site sedimentation. The location and extent of erosion and sedimentation control devices shall be revised at each phase of construction that results in a change in either the quantity or direction of surface runoff from constructed areas. All deviations from the erosion and sedimentation control provisions shown on the Contract Drawings shall have the prior acceptance of the Engineer.

H. Erosion and sedimentation controls applicable to this project shall include but not be limited to the following items of work:

1. Erect silt fence at locations shown on the Contract Drawings and at other locations indicated by the Engineer.

2. Provide temporary sedimentation basins or dewatering bags for the settling of water pumped from the excavations or intercepted by drainage ditches for keeping water out of the excavations or to protect existing structures. The Contractor shall remove trapped sediments from the basins or tanks as necessary to maintain their effectiveness or as indicated by the Engineer. Sediment material removed from the basins shall be disposed off site by the Contractor at no additional cost to the Owner.

3. Provide temporary or permanent ground cover adequate to restrain erosion on erodible slopes or other areas that will be left un-worked for periods exceeding 21 calendar days.

4. Temporary soil stockpiles.

5. Dust control.

6. Provide other types of erosion and sedimentation control devices at the locations shown on the Contract Drawings, or as specified herein.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Silt fence sedimentation barrier as shown on contract drawings.

B. Filter fabric inlet protection as shown on contract drawings.

C. Inlet protection in pavement as shown on contract drawings.

D. Construction entrance stone material as shown on contract drawings.

E. Concrete washout materials as shown on contract drawings.

PART 3 - EXECUTION

3.1 PREPARATION

A. All construction details outlined herein and shown on the Contract Drawings shall be implemented to insure minimum damage to the environment during construction and for the long term.

B. Prior to any construction activities, install temporary erosion and sediment control barriers or measures as indicated on the Contract Drawings.

C. Staging of Earthwork Activities: All earthwork shall be scheduled so that the smallest possible areas will be unprotected from erosion for the shortest time feasible.

D. All construction details shall meet environmental objectives and constraints specified herein, outlined in permits, or directed by the Owner to protect the natural resources within the Project Area.

E. Temporary, permanent, or unspecified alteration of the flow line of any stream or watercourse will be prohibited.

F. Vegetation adjacent to or outside of access roads or rights-of-way shall not be damaged.

G. Disposal of spoil material shall not be in any flood plain, wetland, stream, brook, or sensitive environmental area. The Contractor shall dispose of spoils within staging areas and provide sediment control barriers accordingly.

H. Contractor shall replace any tree or shrubs damaged in kind to the satisfaction of the Owner.

I. Installation of erosion and sediment control products shall be installed as per manufacturer’s specifications.

J. Vegetation shall be established to control sedimentation and erosion on slopes, long term stockpile areas, or any other erosion sensitive area.

K. No more than 1 acre shall be exposed (not stabilized) at any time during the construction process.

L. The Contractor is fully responsible for maintaining, repairing, and protecting his work throughout the Project, at no additional cost to the Owner, until the Owner accepts the Work.

3.2 CLEARING

A. See Section 311000: Site Clearing.

3.3 EROSION AND SEDIMENT CONTROL

A. Prior to commencement of construction, the Engineer shall conduct an assessment of the site and certify that the appropriate erosion and sediment control structures as shown on the Contract Drawings have been adequately installed and implemented. The Contractor shall contact the Engineer once the erosion and sediment control structures have been installed.

B. The Contractor shall, at the direction of the Engineer, use necessary methods to minimize erosion within access roads, especially in areas that drain to watercourse areas.

C. Cuts, fills, and other disturbed areas will be maintained to prevent erosion until adequate vegetative/impervious cover is established.

D. Water, resulting from dewatering operations that will reduce the quality of receiving waters shall not be directly discharged. The Contractor shall provide, install, and maintain sump pits where necessary to dewater operations as detailed on the plans. Stone used within the sump pits shall be washed clean stone. The Contractor shall provide, install and maintain dewatering bags, as deemed necessary to control sediment deposits at critical environmental areas. Lifting straps shall be placed under the unit to facilitate removal after use. Dewatering bags shall be placed on stabilized areas over grass. Discharge hose from pump shall be inserted a minimum of six inches and tightly secured with attached strap to prevent water from flowing out of the unit without being filtered. Water from dewatering operations shall be treated to eliminate the discharge of sediment and other pollutants to streams and watercourses. The unit shall be replaced when it is half full of sediment or when the sediment has reduced the flow rate of the pump discharge to an impractical rate. Remove and dispose of sediment and dewatering bag off-site.

E. Silt fence, where identified on plans, shall be installed at down gradient locations to control sediment deposits off-site at critical environmental areas. The silt fence shall be staked (unless noted otherwise), anchored and set as per manufactures specifications. The silt fence shall be inspected on a daily basis and after a rain fall event and repaired as necessary.

F. A stabilized construction entrance shall be installed and maintained for vehicular access on and off site. The entrance shall be constructed of 2” stone, or approved equal, and shall have a minimum length of 50 feet. The condition of the entrance shall be inspected daily and repaired as necessary.

G. Dust control shall be controlled by the use of water, or calcium chloride application. Water application shall be applied at a rate where mud is not produced. The rate of application of the calcium chloride shall not exceed Federal, State and Local application rates or manufactures recommendations. Dust control shall be applied on adjacent public streets.

H. Paved areas within access corridors and parking areas shall be swept on a regular basis (minimum twice per week) as needed to minimize sediment and dust tracked from the Work area. Should sediment and dust be tracked off-site, Contractor shall be responsible for sweeping public streets.

I. During the final site restoration, the Contractor shall remove all sediment and debris deposited in the temporary and permanent erosion and sediment control barriers or measures including but not limited to all culverts and drainage swales, at no additional cost to the Owner.

J. When all disturbed areas are stable, all temporary erosion and sediment control measures shall be removed per the approval of the Owner's Representative. The measures are temporary, and shall be removed and the areas restored to its original condition when they are no longer required, at no additional cost to the Owner.

END OF SECTION 31 25 00

SECTION 32 12 16 – ASPHALT PAVING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes:

1. Hot-mixed asphalt pavement for roads and walkways.
2. Hot-mixed asphalt patching.

1.2 RELATED WORK SPECIFIED ELSEWHERE

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

B. Section 31 20 00: Earth Moving

1.3 SUBMITTALS

A. General: Submit the following in accordance with the Contract Document requirements.

1. Job-mix designs for each job mix proposed for the work.
2. Product data for each type; include technical data and tested physical and performance properties.
3. Job-mix designs; certification by authorities having jurisdiction, of approval of each job mix proposed for work.

B. Material certificates signed by material producer and Contractor, certifying that each item complies with or exceeds specified requirements.

C. Qualification Data: For manufacturer and testing agency.

D. Field quality-control reports.

1.4 PROJECT CONDITIONS

A. Do not apply asphalt materials if sub-grade is wet or excessively damp or if the following conditions are not met:

1. Prime and Tack Coats: Minimum surface temperature of 60 deg F.
2. Asphalt Binder Course: Minimum surface temperature of 40 deg F and rising at time of placement.
3. Asphalt Surface Course: Minimum surface temperature of 60 deg F at time of placement.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: A paving-mix manufacturer registered with and approved by authorities having jurisdiction or the NYSDOT.

B. Testing Agency Qualifications: Qualified according to ASTM D 3666 for testing indicated.

C. Regulatory Requirements: Comply with materials, workmanship, and other applicable requirements of the NYSDOT for asphalt paving work.

1. Measurement and payment provisions and safety program submittals included in NYSDOT Standard Specifications do not apply to this Section.

PART 2 - PRODUCTS

2.1 AGGREGATES

A. Coarse Aggregate: Shall conform to ASTM D 692, sound; angular crushed stone, crushed gravel.

B. Fine Aggregate: Shall conform to ASTM D 1073 or AASHTO M 29, sharp-edged natural sand or sand prepared from stone, gravel.

2.2 ASPHALT MATERIALS

A. Hot Mix Asphalt (HMA): Dense, hot laid asphalt plant mixes produced at a NYSDOT approved facility, designed in accordance with NYSDOT Material Methods (MM), and complying with NYSDOT Section 403 Hot Mix Asphalt (HMA) for municipalities. The following mixes are utilized for this project:

1. Roads and Walkways

a. Top Course: NYSDOT, 12.5mm F3 (Type 6) HMA Superpave, 80 series compaction.

b. Binder Course: NYSDOT, 19mm F9 (Type 3) HMA Superpave, 80 series compaction.

c. Asphalt Cement Tack Coat: Material shall conform to NYSDOT Section 407 – Tack Coat.

d. Prime Coat: Cut-back asphalt type, ASTM D 2027; MC-30, MC-70 or MC-250.

2. Basketball Court

a. Top Course: NYSDOT, 12.5mm F3 (Type 7) HMA Superpave, 80 series compaction.

b. Binder Course: NYSDOT, 19mm F9 (Type 3) HMA Superpave, 80 series compaction.

c. Asphalt Cement Tack Coat: Material shall conform to NYSDOT Section 407 – Tack Coat.

d. Prime Coat: Cut-back asphalt type, ASTM D 2027; MC-30, MC-70 or MC-250.

2.3 AUXILIARY MATERIALS

A. Sand: ASTM D 1073 or AASHTO M 29, Grade Nos. 2 or 3.

B. Joint Sealant: ASTM D 3405 or AASHTO M 301, hot-applied, single-component, polymer-modified bituminous sealant.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that sub-grade is dry and in suitable condition to support paving and imposed loads.

B. Proceed with paving only after unsatisfactory conditions have been corrected.

3.2 PATCHING

A. Hot-Mix Asphalt Pavement: Saw cut perimeter of patch and excavate existing pavement section to sound base. Extend top course removal 12 inches into adjacent sound pavement, unless otherwise indicated. Cut excavation faces vertically, excavate rectangular or trapezoidal patches. Remove excavated material. Re-compact existing unbound-aggregate base course to form new sub-grade.

B. Tack Coat: Apply uniformly to vertical surfaces abutting or projecting into new, hot-mix asphalt paving at a rate of 0.05 to 0.15 gal./sq. yd.

1. Allow tack coat to cure undisturbed before applying hot-mix asphalt paving.

2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.

C. Patching: Partially fill excavated pavements with hot-mix asphalt base mix and, while still hot, compact. Cover asphalt base course with compacted, hot-mix surface layer finished flush with adjacent surfaces.

3.3 REPAIRS

A. Leveling Course: Install and compact leveling course consisting of hot-mix asphalt surface course to level sags and fill depressions deeper than 1 inch in existing pavements.

B. Crack and Joint Filling: Remove existing joint filler material from cracks or joints to a depth of 1/4 inch.

1. Clean cracks and joints in existing hot-mix asphalt pavement.

2. Use emulsified-asphalt slurry to seal cracks and joints less than 1/4 inch wide. Fill flush with surface of existing pavement and remove excess.

3.4 SURFACE PREPARATION

A. General: Immediately before placing asphalt materials, remove loose and deleterious material from substrate surfaces.

B. Prepare and proof roll existing subgrade in accordance with DOT Section 203-3.14, Proof Rolling in Cut Sections.

C. If Selected Fill is required, place and compact fill in accordance with contract specification 31 20 00 – Earth Moving.

D. Place and compact subbase material in accordance with contract specification 310000 – Earthwork.

E. Prepare existing surfaces in accordance with DOT Section 403-3.02, conditioning of existing surface.

F. Tack Coat all surfaces to receive paving and allow to cure undisturbed before applying hot-mix asphalt paving. Tack Coat prior to placement of any layer of HMA regardless of time between lifts.

G. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.

3.5 HOT-MIX ASPHALT PLACING

A. Place Hot Mix Asphalt (HMA) to the required grade, cross section and compacted thickness. Promptly correct surface irregularities in paving course.

B. Spread mix at a minimum temperature of 250 degrees F (121 degrees C).

C. Offset horizontal paving joints in successive layers by a minimum of 24” perpendicular to the joint.

3.6 COMPACTION

A. General: Begin compaction as soon as placed hot-mix paving will bear roller weight without excessive displacement. Compact hot-mix paving with hot, hand tampers or vibratory-plate compactors in areas inaccessible to rollers. Complete compaction before mix temperature cools to 185 deg F.

B. Breakdown Rolling: Complete breakdown or initial rolling immediately after rolling joints and outside edge. Examine surface immediately after breakdown rolling for indicated crown, grade, and smoothness. Correct laydown and rolling operations to comply with requirements.

C. Intermediate Rolling: Begin intermediate rolling immediately after breakdown rolling while hot-mix asphalt is still hot enough to achieve specified density. Continue rolling until HMA course has been uniformly compacted to a minimum of 92 percent of reference maximum theoretical density according to ASTM D 2041.

D. Finish Rolling: Finish roll paved surfaces to remove roller marks while hot-mix asphalt is still warm.

E. Edge Shaping: While surface is being compacted and finished, trim edges of pavement to proper alignment. Bevel edges while asphalt is still hot; compact thoroughly.

F. Repairs: Remove paved areas that are defective or contaminated with foreign materials and replace with fresh, hot-mix asphalt. Compact by rolling to specified density and surface smoothness.

G. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.

H. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

I. Once pavement cures for a minimum of 24 hours, apply pavement markings with mechanical equipment to a minimum wet film thickness of 15 mils.

3.7 FIELD QUALITY CONTROL

A. Special Inspections: Contractor shall engage a qualified special inspector to perform the following special inspections:

B. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

C. Thickness: In-place compacted thickness of hot-mix asphalt courses shall be determined according to ASTM D 3549.

D. Surface Smoothness: Finished surface of each hot-mix asphalt course shall be tested for compliance with smoothness tolerances.

E. In-Place Density: Testing agency shall take samples of uncompacted paving mixtures and compacted pavement according to ASTM D 979.

F. Reference maximum theoretical density shall be determined by averaging results from four samples of hot-mix asphalt-paving mixture delivered daily to site, prepared according to ASTM D 2041, and compacted according to job-mix specifications.

G. In-place density of compacted pavement shall be determined by testing core samples according to ASTM D 1188 or ASTM D 2726.

H. One core sample shall be taken for every 1000 sq. yd or less of installed pavement, with no fewer than three cores taken.

I. Field density of in-place compacted pavement may also be determined by nuclear method according to ASTM D 2950 and correlated with ASTM D 1188 or ASTM D 2726.

J. Replace and compact hot-mix asphalt where core tests were taken.

K. Remove and replace or install additional hot-mix asphalt where test results or measurements indicate that it does not comply with specified requirements.

3.8 INSTALLATION TOLERANCES

A. Thickness: Compact each course to produce the thickness indicated within the following tolerances:

1. Binder Course: Plus or minus 1/2 inch.

2. Top Course: Plus 1/4 inch, no minus.

B. Surface Smoothness: Compact each course to produce a surface smoothness within the following tolerances as determined by using a 10-foot straightedge applied transversely or longitudinally to paved areas:

1. Base Course: 1/4 inch.

2. Top Course: 1/8 inch.

3. Crowned Surfaces: Test with crowned template centered and at right angle to crown. Maximum allowable variance from template is 1/4 inch.

3.9 DISPOSAL

A. Remove excavated materials from Project site and legally dispose of them in a NYSDEC approved landfill.

1. Do not allow excavated materials to accumulate on-site.

END OF SECTION 32 12 16

SECTION 32 13 00 – CONCRETE PAVING

PART 1 - GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

A. Section 033000: Cast-In-Place Concrete (CIVIL)

B. Section 310000: Earth Moving

C. Section 321373: Concrete Paving Joint Sealants

1.2 REFERENCES

A. Comply with American Concrete Institute Specifications for Structural Concrete, ACI 301-16, for the Work of this Section unless otherwise indicated on the drawings or specified.

1.3 SUBMITTALS

A. Product Data:

1. Concrete Design Mix: Submit proposed concrete design mix together with name and location of batching plant at least 28 days prior to the start of concrete work.

2. Portland Cement: Brand and Manufacturer's name.

3. Air-entraining Admixture: Brand and manufacturer's name.

4. Water-reducing or High Range Water-reducing Admixture: Brand and manufacturer's name.

5. Curing and Anti-Spalling Compound: Manufacturer's specifications and application instructions.

6. ADA Detectable Warning Surface: Manufacturer's specifications, product data, test reports, method of installation, and maintenance instructions.

1.4 QUALITY ASSURANCE

A. Concrete batching plants shall be currently approved as concrete suppliers by the New York State Department of Transportation.

1.5 DELIVERY

A. Batch Ticket Information: Indicate on the delivery ticket the type, brand, and amount of fibrous concrete reinforcement material added to each batch of concrete.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cast-In-Place Concrete: See Section 03 30 00: Cast-In-Place Concrete (CIVIL)

B. Chemical Curing and Anti-Spalling Compound: ASTM C-309, Type 1D, Class B, with minimum 18 percent total solids content. No thinning of material allowed. The volatile organic compound (VOC) content of concrete curing compounds shall meet requirements of the EPA national AIM VOC regulations.

1. SureCure Emulsion, Kaufman Products, Inc. 3811 Curtis Avenue, Baltimore, MD 21226, (800) 637-6372.

2. Cure & Seal by Symons Corp., 200 East Touhy Ave., PO Box 5018, Des Plaines, IL 60017-5018, (847) 298-3200.

3. Kure-N-Seal by Sonneborn/ BASF Building Systems, 889 Valley Park Dr., Shakopee, MN 55379, (800) 433-9517.

4. Day-Chem Cure & Seal UV 26 percent (J-22 UV) by Dayton Superior Corp., 721 Richard St., Miamisburg, OH 45342, (800) 745-3700.

5. Acrylseal HS by Master Builders/ BASF Building Systems, 23700 Chagrin Blvd., Cleveland, OH 44122, (800) 628-9990.

C. Bar Reinforcement: ASTM A 615, Grade 60, deformed steel bars.

D. Bar Supports: Galvanized steel or AISI Type 430 stainless steel, and without plastic tips.

E. Plain-steel Welded-Wire Reinforcement: ASTM A 185, fabricated from as-drawn steel wire into flat sheets.

F. Tie Wire: Black annealed wire, 16-1/2 gage or heavier.

G. Joint Filler: See Section 32 13 73: Concrete Paving Joint Sealants.

H. ADA Detectable Warning Surface: Precast or prefabricated paving units or detectable Warning plate with a non-slip texture on the travel surface. Color shall be a shade of brick red. There shall be a minimum of 70 percent contrast in light reflectance between the detectable warning surface and the adjoining surfaces. Material used to provide visual warning shall be an integral part of the detectable warning surface. Visual contrast to meet the existing ADAAG A4.2.9.2.

1. Detectable Warning Plate Model R-4984 by Neenah Foundry, 2121 Brooks Avenue, Neenah, WE 54956, (800) 558-5075, www.nfco.com., or approved equivalent.

2.2 JOINTS AND EMBEDDED ITEMS (Amendments to ACI 301, Section 5.3.2.6):

A. Obtain bond at construction joints by the use of bonding agent (adhesive) in accordance w/section 5.2.1.7 or the use of cement grout.

PART 3 - EXECUTION

3.1 PREPARATION

A. Do not use items of aluminum for mixing, chuting, conveying, forming, or finishing concrete. However, magnesium alloy tools may be used for finishing.

B. Set forms true to line and grade and anchor rigidly in position.

C. Space expansion joints equally at not more than 50'-0" on center unless otherwise indicated. Place expansion joints to isolate sidewalk from other structures and fixed objects.

D. Place joint filler at expansion joints and where new concrete abuts existing concrete paving and fixed structures or appurtenances. Protect the top edge of the joint filler during concrete placement with a temporary cap and remove after concrete has been placed.

3.2 PLACING BAR REINFORCEMENT (Amendments to ACI 301, Section 3):

A. At the time concrete is placed, reinforcement shall be free of mud, oil, loose rust, loose mill scale, and other materials or coatings that may adversely affect or reduce the bond.

B. Unless otherwise shown differently on the Drawings, all reinforcement to be placed per ACI 301-16.

3.3 PLACING CONCRETE

A. Consolidate concrete by spading, rodding, forking, or using an approved vibrator eliminating all air pockets, stone pockets, and honeycombing. Work and float concrete surface so as to produce a uniform texture.

B. Locate construction joints, if any, at expansion joints.

3.4 CONCRETE WALKS AND PADS FINISHING AND CURING

A. Wait until bleeding is stopped before final finishing operations.

B. Keep surface damp but not wet between initial strike off and final finish.

1. Utilize a fog spray, evaporative inhibitor, or midrange water reducer that is compatible with supplementary cementing materials to help control the amount of surface drying of the fresh concrete.

C. Use minimal working of the surface during finishing.

D. Utilize a magnesium or wood float.

E. Avoid the use of steel finishing trowels and utilize a concrete finishing machine when possible.

F. Finish edges of walk and expansion and control joints with a 1/4 inch radius edging tool.

G. Provide broom finish for walk surfaces.

H. Apply curing and anti-spalling compound in accordance with the manufacturer's printed instructions.

I. Apply curing immediately after final finish.

J. Hot Weather Concreting: Comply with ACI 305R whenever the atmospheric temperature or the form surface temperature is at or above 90 degrees F., or climatic conditions of wind and/or low humidity will cause premature drying of the concrete.

K. Curing Temperature: Maintain the temperature of the concrete at 50 degrees F. or above during the curing period. Keep the concrete temperature as uniform as possible and protect from rapid atmospheric temperature changes. Avoid temperature changes in concrete which exceeds 5 degrees F. in any one hour and 50 degrees F. in any 24-hour period.

L. Saw control joints (CJ) one inch deep after the concrete has set. Complete sawcuts within 18 hours after slab is placed. Space control joints equally between expansion joints at approximately 5’-0” on center, except where a different spacing is shown on the drawings.

M. Provide tooled control joints one inch deep. Space control joints equally between expansion joints approximately 5’-0” on center, except where a different spacing is shown on the drawings.

3.5 PLACING ADA DETECTABLE WARNING SURFACE

A. The ADA detectable warning surface shall be installed behind the edge of the curb.

B. Domes shall be aligned on a square grid in the predominant direction of travel to permit wheels to roll between the domes.

C. Install in accordance with the manufacturer’s printed instructions.

D. The curb, ADA detectable warning surface, and sidewalk shall be flush with the elevation of the road surface.

END OF SECTION 32 13 00

SECTION 32 13 17 – CONCRETE PAVING JOINT SEALANTS

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.

B. Section 03 30 00: Cast-In-Place Concrete

C. Section 32 13 00: Concrete Paving

1.2 SUBMITTALS

A. Product Data: Catalog sheets, specifications, and installation instructions for each product specified except miscellaneous materials.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

B. Product Testing: Test joint sealants using a qualified testing agency.

C. Container Labels: Include manufacturer’s name, trade name of product, kind of material, expiration date and packaging date or batch number.

1.4 FIELD CONDITIONS

A. Do not proceed with installation of joint sealants under the following conditions:

1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F.

2. When joint substrates are wet.

3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.

4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Compatibility: Provide joint sealants, backing materials, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.

2.2 JOINT SEALANTS

A. Type 1B Sealant:

1. For Horizontal Joints: One-part, self-leveling silicone or polyurethane sealant for traffic bearing construction; Bostik Chem-Calk 955-SL, Tremco Vulkem 45, Pecora Urexpan NR-201, Pecora 300-SL, Pecora 310-SL, Sika Sikaflex-1CSL, Dow Corning CCS.

2. For Vertical Joints: One-part, non-sag silicone or polyurethane sealant; Tremco Vulkem 116, Pecora Dynatrol I, Sika Sikaflex Textured Sealant, Dow Corning CCS or CWS, Pecora 301-NS, Pecora 311-NS.

2.3 JOINT FILLERS

A. Cork Joint Filler: Resilient, non-extruding type pre-molded cork units; ASTM D 1752 Type II.

B. Closed Cell Polyurethane Joint Filler: Resilient, compressible, semi-rigid; W.R. Meadows' Ceramar or A.C. Horn's Closed Cell Plastic Foam Filler, Code 5401.

C. Self-Expanding Cork Joint Filler: Resilient, non-extruding type pre-molded cork units; ASTM D 1752, Type III.

2.4 MISCELLANEOUS MATERIALS

A. Joint Primer/Sealer/Conditioner: As recommended by the sealant manufacturer for the particular joint surface materials and conditions.

B. Backer Rod: Compressible rod stock or expanded, extruded polyethylene.

C. Bond Breaker Tape: Polyethylene or other plastic tape as recommended by the sealant manufacturer; non-bonding to sealant.

D. Cleaning Solvents: Oil free solvents as recommended by the sealant manufacturer. Do not use re-claimed solvents.

E. Masking Tape: Removable paper or fiber tape, self-adhesive, non-staining.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning of Joints: Before installing joint sealants, clean out joints immediately to comply with joint-sealant manufacturer's written instructions.

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.

B. Joint Priming: Prime joint substrates where indicated or where recommended in writing by joint-sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

3.3 JOINT FILLER INSTALLATION

A. Set joint fillers at proper depth and position as required for installation of bond breakers, backer rods and sealants. Do not leave voids or gaps between the ends of joint filler units.

1. Smooth Edged Joints: For joints between two concrete slabs or where new concrete abuts smooth edged materials use either filler as specified.

2. Irregular Edged Joints: For joints where new concrete abuts granite curbs or other irregular edges use closed cell polyurethane joint filler.

3.4 BACKER ROD AND BOND BREAKER TAPE INSTALLATION

A. Install bond breaker tape in relaxed condition as it comes off the roll. Do not stretch the tape. Lap individual lengths.

B. Provide backer rod of sufficient size to fill the joint width at all points in a compressed state. Compress backer rod at the widest part of the joint by a minimum of 25 percent. Do not cut or puncture the surface skin of the rod.

3.5 JOINT SEALANT INSTALLATION

A. Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated unless more stringent requirements apply.

B. Joint-Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions.

C. Install joint-sealant backings to support joint sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

1. Do not leave gaps between ends of joint-sealant backings.

2. Do not stretch, twist, puncture, or tear joint-sealant backings.

3. Remove absorbent joint-sealant backings that have become wet before sealant application and replace them with dry materials.

D. Install joint sealants immediately following backing installation, using proven techniques that comply with the following:

1. Place joint sealants so they fully contact joint substrates.

2. Completely fill recesses in each joint configuration.

3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

E. Tooling of Nonsag Joint Sealants: Immediately after joint-sealant application and before skinning or curing begins, tool sealants according to the following requirements to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint:

1. Remove excess joint sealant from surfaces adjacent to joints.

2. Use tooling agents that are approved in writing by joint-sealant manufacturer and that do not discolor sealants or adjacent surfaces.

F. Provide joint configuration to comply with joint-sealant manufacturer's written instructions unless otherwise indicated.

3.6 CLEANING AND PROTECTION

A. Clean off excess joint sealant as the Work progresses, by methods and with cleaning materials approved in writing by joint-sealant manufacturers.

B. Protect joint sealants, during and after curing period, from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately and replace with joint sealant so installations in repaired areas are indistinguishable from the original work.

END OF SECTION 32 13 73

SECTION 32 16 13 – CAST IN PLACE CONCRETE CURBS

PART 1 - GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

A. Section 033000: Cast In Place Concrete (CIVIL)

B. Section 312000: Earth Moving

C. Section 321373: Concrete Pavement Joint Sealants.

1.2 REFERENCES

A. Except as shown or specified otherwise, the Work of this Section shall conform to the requirements of American Concrete Institute (ACI) and American Society for Testing and Materials (ASTM) documents.

1. ACI 304.2R-96: Placing Concrete by Pumping Methods.
2. ACI 305R-10: Hot Weather Concreting.
3. ACI 306R-10: Cold Weather Concreting.
4. ACI 308.1-11: Standard Specification for Curing Concrete.
5. ASTM C 94/C 94M – 11b: Standard Specification for Ready- Mixed Concrete.
6. ASTM C 494/C 494M - 11: Standard Specification for Chemical Admixtures for Concrete.

1.3 DEFINITIONS

A. ACI 301, Section 1.2 - Definitions:

1. Add the following definitions:

a. Cementitious Material: Cementitious materials include cement, ground blast furnace slag and fly ash.

b. Corrosion Inhibitor Admixture: A liquid admixture, calcium nitrite that inhibits corrosion of concrete-embedded steel in the presence of chloride ions.

c. Pumped Concrete: Concrete that is conveyed by pumping pressure through rigid pipe or flexible hose.

d. Water-to-Cementitious Ratio (w/c): An ratio representing quantity in pounds of free moisture available for cement hydration divided by quantity of cementitious materials in pounds per cubic yard concrete.

1.4 SUBMITTALS

A. Submittals Package: Submit product data for design mix(es) and materials for concrete specified below at the same time as a package.

B. Product Data:

1. Mix Design: Submit proposed concrete design mix(es) together with name and location of batching plant at least 28 days prior to the start of concrete work.

a. Include test results of proposed concrete proportions based on previous field experience or laboratory trial batches in accordance with ACI 301, Section 4.

b. Pumped Concrete: Include test results of proposed design mix(es) tested under actual field conditions with the maximum horizontal run and vertical lift required for this project.

2. Portland Cement: Brand and manufacturer's name.

3. Fly Ash: Name and location of source, and DOT test numbers.

4. Air-entraining Admixture: Brand and manufacturer's name.

1.5 QUALITY ASSURANCE

A. Qualifications of Crew Pumping Concrete: Workers pumping concrete shall have had at least one year of experience pumping concrete.

B. Concrete batching plants shall be currently approved as concrete suppliers by the New York State Department of Transportation.

C. Truck mixers for concrete shall be currently approved by the New York State Department of Transportation.

D. Pumping equipment for pumped concrete shall be subject to the approval of the Director.

E. Fly ash supplier shall be on the New York State Department of Transportation's current "Approved List of Suppliers of Fly Ash".

F. Source Quality Control: The Director reserves the right to inspect and approve the following items, at their own discretion, either with their own forces or with a designated inspection agency:

1. Batching and mixing facilities and equipment.

2. Sources of materials.

G. ACI 301, Section 1.3 Reference standards and cited publications:

1. Add the following to the list of ASTM Standards:

a. C 311-77 Standard Methods of Sampling and Testing Fly Ash or Natural Pozzolans For Use As A Mineral Admixture in Portland Cement Concrete.

H. Performance Criteria: The following criteria are required for the products included in this section:

1. Cast-in-place Concrete shall contain post-industrial and/or post-consumer recycled content as follows:

a. Fly Ash: Concrete shall incorporate fly ash as a replacement for 15 percent (by weight) of the Portland cement. All design mixes are subject to review and approval by the Director.

b. GGBF (Ground Granulated Blast Furnace) Slag: Concrete shall incorporate GGBF slag as a replacement for at least 20 percent (by weight) of the Portland cement. All design mixes are subject to review and approval by the Director.

c. Certification of recycled content shall be in accordance with the SUBMITTALS Article above.

2. Concrete manufactured within 500 miles (by air) of the project site shall be documented in accordance with the SUBMITTALS Article above.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Concrete: See Section 03 30 00: Cast-In-Place Concrete (CIVIL)

PART 3 - EXECUTION

3.1 INSTALLATION

A. Set approved forms true to line and grade. Cast curb in 10 foot long sections. If curbs will abut existing pavement, locate construction joints opposite existing pavement joints as directed.

B. Provide cut to size joint filler between 10 foot sections and where curb abuts existing concrete paving and fixed structures or appurtenances. The joints between segments are not to exceed ¼" in width. Protect the top edge of the joint filler during concrete placement with a temporary cap and remove after concrete has been placed.

C. Consolidate concrete by spading, rodding, forking, or using an approved vibrator eliminating all air pockets, stone pockets, and honeycombing. Remove forms and rub exposed face of curb to a smooth rubbed finish. The forms are to be left in place until the concrete has hardened sufficiently to permit removal without damage to the curb. No plastering will be permitted.

3.2 JOINTS

A. General: Construct control joints and construction joints true-to-line with face perpendicular to surface of the concrete, unless otherwise indicated.

B. Control Joints: Provide control joints, sectioning concrete into areas as shown on the drawings or every ten linear feet for curbs. Construct control joints for a depth equal to at least 1/4 of the concrete thickness.

C. Sawed Joints: Form control joints using powered saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut joints into hardened concrete as soon as surface will not be torn, abraded or otherwise damaged by cutting action.

D. Construction Joints: Place construction joints at end of all pours and at locations where placement operations are stopped for a period of more than ½ hour, except where such pours terminate at expansion joints.

3.3 CURING AND PROTECTION

A. Hot Weather Concreting: Comply with ACI 305R whenever the atmospheric temperature or the form surface temperature is at or above 90 degrees F., or climatic conditions of wind and/or low humidity will cause premature drying of the concrete.

B. Curing Temperature: Maintain the temperature of the concrete at 50 degrees F. or above during the curing period. Keep the concrete temperature as uniform as possible and protect from rapid atmospheric temperature changes. Avoid temperature changes in concrete which exceeds 5 degrees F. in any one hour and 50 degrees F. in any 24-hour period.

C. Cover and cure for a minimum of seven days in accordance with ACI 301.

3.4 REPAIRS AND PROTECTIONS

A. Repair or replace broken or defective concrete, as directed by the Director’s Representative.

END OF SECTION 32 16 13

SECTION 32 17 23 – PAVEMENT MARKINGS

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 RELATED SECTIONS

A. Section 321216 – Asphalt Paving.

1.3 SUMMARY

A. Section includes painted markings applied to asphalt pavement.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include technical data and tested physical and performance properties.

1.5 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with materials, workmanship, and other applicable requirements of the NYSDOT for pavement-marking work.

1.6 FIELD CONDITIONS

A. Environmental Limitations: Proceed with pavement marking only on clean, dry surfaces and at a minimum ambient or surface temperature of 40 deg F for alkyd materials, 55 deg F for water-based materials, and not exceeding 95 deg F.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Paint: DOT Section 640-2, yellow, white or blue, as indicated.

B. Rapid Dry Paint:

1. Aexcel Corp., www.aexcelcorp.com, 12W-D310 White, 12Y-D330 Yellow, 72L-A002 Blue

2. Sherwin-Williams, www.swpavementmarkings.com, TM5126 White, TM5127 Yellow

3. Franklin Paint Company, Inc., www.franklinpaint.com, 2040 White, 2041 Yellow, 2254 Blue.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that pavement surface is dry and in suitable condition to begin pavement marking according to manufacturer's written instructions.

B. Proceed with pavement marking only after unsatisfactory conditions have been corrected.

3.2 PAVEMENT MARKING

A. Do not apply pavement-marking paint until layout, colors, and placement have been verified with Engineer.

B. Allow paving to age for a minimum of 30 days before starting pavement marking.

C. Sweep and clean surface to eliminate loose material and dust.

D. Apply paint with mechanical equipment to produce pavement markings, of dimensions indicated, with uniform, straight edges. Apply at manufacturer's recommended rates to provide a minimum wet film thickness of 20 mils.

1. Apply graphic symbols and lettering with paint-resistant, die-cut stencils, firmly secured to pavement. Mask an extended area beyond edges of each stencil to prevent paint application beyond the stencil. Apply paint so that it cannot run beneath the stencil.

3.3 PROTECTING AND CLEANING

A. Protect pavement markings from damage and wear during remainder of construction period.

B. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 32 17 23

SECTION 32 31 13 – CHAIN LINK FENCES AND GATES

PART 1 - GENERAL

1.1 SUBMITTALS

A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finished for chain link fences and gates

1. Fence and gate posts, rails, and fittings.

2. Chain link fabric, reinforcements, and attachments.

3. Gates and hardware.

B. Shop Drawings: Show locations of fences, gates, posts, rails, tension wires, or other operation, hardware, and accessories. Indicate materials, dimensions, sizes, weights, and finishes of components. Include plans, gate elevations, sections, details of post anchorage, attachment, bracing, and other required installation/operational clearances.

1. For structural performance of chain-link fence and gate frameworks, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

C. Product certifications: For each type of chain link fence, and gate, signed by product manufacturer.

1. Strength test results for framing according to ASTM F1043.

1.2 QUALITY ASSURANCE

A. Special Warranty: Installer agrees to repair or replace components of chain link fences and gates that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 CHAIN LINK FENCE FABRIC

A. General: Provide fabric in one-piece heights measured between top and bottom of outer edge of knuckle. Comply with ASTM A392, CLFMI CLF 2445, and requirements indicated below:

1. Fabric Height: As indicated on Drawings.

2. Steel Wire for Fabric: 9 gauge (0.114 in), core-wire.

a. Mesh Size: 2 inches

b. Total Weight: 6 gauge, including coating and wire.

c. Type A zinc coating.

3. Color: PVC Coated, Green

2.2 FENCE FRAMEWORK

A. Posts and Rails: ASTM F1043 for framework, including rails, braces, and line; terminal; and corner posts. Provide members with minimum dimensions and wall thickness according to ASTM F1043 or ASTM F1083 based on the following:

1. Fence Height: As indicated on Drawings.

2. Heavy-Industrial-Strength Material: Group IA, round steel pipe, Schedule 40.

   a. End Posts: Sizes as indicated on the contract drawings.

3. Horizontal Framework Members: Intermediate, top, and bottom rails according to ASTM F1043.

4. Metallic Coating for Steel Framework:

   a. Type A zinc coating.

5. Finish: Galvanized Steel

2.3 TENSION WIRE

A. Steel Wire: 7-gauge (0.1440-inch diameter), core-wire, tension wire according to ASTM F1664, Class 2b, over zinc-coated steel wire

B. Type A zinc coating.

2.4 SWING GATES

A. General: ASTM F900 for gate posts and single and double swing gate types.

1. Gate Leaf Width: As indicated on Contract Drawings.

2. Framework Member Sizes and Strength: Based on gate fabric height as indicated.

B. Pipe and Tubing:

1. Zinc-Coated Steel: ASTM F1043 and ASTM F1083; protective coating and finish to match fence framework.

2. Gate Posts: Round tubular steel.

3. Gate Frames and Bracing: Round tubular steel.

4. Finish: Galvanized Steel

C. Frame Corner Construction: Welded

D. Hardware:

1. Hinges: 180-degree swing.

2. Latch: As indicated on drawing

2.5 FITTINGS

A. Provide fittings according to ASTM F626.

B. Finish:

1. Metallic Coating for Pressed Steel or Cast Iron: Not less than 1.2 oz./sq. ft. (366 g/sq. m) of zinc.

2.6 GROUT AND ANCHORING CEMENT

A. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C1107/C1107M. Provide grout, recommended in writing by manufacturer, for exterior applications.

B. Anchoring Cement: Factory-packaged, nonshrink, nonstaining, hydraulic-controlled expansion cement formulation for mixing with water at Project site to create pourable anchoring, patching, and grouting compound. Provide formulation that is resistant to erosion from water exposure without needing protection by a sealer or waterproof coating, and that is recommended in writing by manufacturer for exterior applications.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Do not begin installation before final grading is completed unless otherwise permitted by Engineer.

3.2 PREPARATION

A. Stake locations of fence lines, gates, and terminal posts. Do not exceed intervals of 500 feet or line of sight between stakes. Indicate locations of utilities, lawn sprinkler system, underground structures, benchmarks, and property monuments.

3.3 CHAIN LINK FENCE INSTALLATION

A. Install chain-link fencing according to ASTM F567 and more stringent requirements specified.

B. Post Excavation: Drill or hand-excavate holes for posts to diameters and spacings indicated, in firm, undisturbed soil.

C. Post Setting: Set posts in concrete at indicated spacing into firm, undisturbed soil.

1. Verify that posts are set plumb, aligned, and at correct height and spacing, and hold in position during setting with concrete or mechanical devices.

2. Concrete Fill: Place concrete around posts to dimensions indicated and vibrate or tamp for consolidation. Protect aboveground portion of posts from concrete splatter.

a. Exposed Concrete: Extend 2 inches above grade; shape and smooth to shed water.

D. Terminal Posts: Install terminal end and gate posts according to ASTM F567 and terminal pull posts at changes in horizontal or vertical alignment of as indicated on Drawings. For runs exceeding 500 feet, space pull posts an equal distance between corner or end posts.

E. Line Posts: Space line posts uniformly at 8 feet o.c., max.

F. Tension Wire: Install according to ASTM F567, maintaining plumb position and alignment of fence posts. Pull wire taut, without sags. Fasten fabric to tension wire with 0.120-inch-diameter hog rings of same material and finish as fabric wire, spaced a maximum of 18 inches o.c. Install tension wire in locations indicated before stretching fabric. Provide horizontal tension wire at the following locations:

1. Extended along bottom of fence fabric.

G. Chain-Link Fabric: Apply fabric to outside of enclosing framework. Leave 2-inch bottom clearance between finish grade or surface and bottom selvage unless otherwise indicated. Pull fabric taut and tie to posts, rails, and tension wires. Anchor to framework so fabric remains under tension after pulling force is released.

3.4 ADJUSTING

A. Gates: Adjust gates to operate smoothly, easily, and quietly, free of binding, warp, excessive deflection, distortion, nonalignment, misplacement, disruption, or malfunction, throughout entire operational range. Confirm that latches engage accurately and securely without forcing or binding.

END OF SECTION 32 31 13

SECTION 32 32 24 - SEGMENTAL RETAINING WALLS

PART 1 - GENERAL

1.1 SCOPE

A. Work includes furnishing and installing modular concrete block retaining wall units, geogrid reinforcement and backfill to the lines and grades designated on the construction drawings and as specified herein.

1.2 REFERENCE STANDARDS

A. ASTM C1372 Standard Specification for Segmental Retaining Wall Units.

B. ASTM C1262 Evaluating the Freeze thaw Durability of Manufactured CMU’s and Related concrete Units

C. ASTM D698 Moisture Density Relationship for Soils, Standard Method

D. ASTM D422 Gradation of Soils

E. ASTM C140 Sample and Testing concrete Masonry Units

F. ASTM D4595 - Tensile Properties of Geotextiles by the Wide-Width Strip Method

G. ASTM D5262 - Test Method for Evaluating the Unconfined Creep Behavior of Geogrids

H. ASTM D6638 Grid Connection Strength (SRW-U1)

I. ASTM D6916 SRW Block Shear Strength (SRW-U2)

J. GRI-GG4 - Grid Long Term Allowable Design Strength (LTADS)

K. ASTM D6706 - Grid Pullout of Soil

1.3 DELIVERY, STORAGE, AND HANDLING

A. Contractor shall check the materials upon delivery to assure proper material has been received.

B. Contractor shall prevent excessive mud, cementitious material, and like construction debris from coming in contact with the materials.

C. Contractor shall protect the materials from damage. Damaged material shall not be incorporated in the project (ASTM C1372).

D. Geogrid shall be stored above -10 F (-23 C).

1.4 CONTRACTOR REQUIREMENTS

A. Contractors shall be trained and certified by local manufacturer or equivalent accredited organization.

PART 2 - MATERIALS

2.1 MODULAR WALL UNITS

A. Wall units shall be Allan Block Retaining Wall units as produced by a licensed manufacturer.

B. Wall units shall have minimum 28-day compressive strength of 3000 psi (20.7 MPa) in accordance with ASTM C1372. The concrete units shall have adequate freeze-thaw protection with an average absorption rate in accordance with ASTM C1372 or an average absorption rate of 7.5 lb./ft³ (120 kg/m³) for northern climates and 10 lb./ft³ (160 kg/m³) for southern climates.

C. Exterior dimensions shall be uniform and consistent. Maximum dimensional deviations on the height of any two units shall be 0.125 in. (3 mm).

D. Wall units shall provide a minimum of 110 lbs total weight per square foot of wall face area (555 kg/m²). Hollow cores to be filled with wall rock and compacted by using plate compactor on top of wall units (see section 3.4). Unit weight of wall rock in cores may be less than 100% depending on compaction levels.

E. Exterior face shall be textured. Color as specified by owner.

F. Freeze Thaw Durability: Like all concrete products, dry-cast concrete SRW units are susceptible to freeze-thaw degradation with exposure to de-icing salts and cold temperature. This is a concern in northern tier states or countries that use deicing salts. Based on good performance experience by several agencies, ASTM C1372, or equivalent governing standard or public authority, Standard Specification for Segmental Retaining Wall Units should be used as a model, except that, to increase durability, the compressive strength for the units should be increased to a minimum of 4,000 – 5,800 psi (28 - 40 MPa) unless local requirements dictate higher levels. Also, maximum water absorption should be reduced and requirements for freeze-thaw testing increased.

1. Require a current passing ASTM C1262 or equivalent governing standard or public authority, test report from material supplier in northern or cold weather climates.

2. See the Best Practices for SRW Design document for detailed information on freeze thaw durability testing criteria and regional temperature and exposure severity figures and tables to define the appropriate zone and requirements for the project.

2.2 WALL ROCK

A. Material must be well-graded compactable aggregate, 0.25 in. to 1.5 in., (6 mm - 38 mm) with no more than 10% passing the #200 sieve. (ASTM D422)

B. Material behind and within the blocks may be the same material.

2.3 INFILL SOIL

A. Infill material shall be site excavated soils when approved by the on-site soils engineer unless otherwise specified in the drawings. Unsuitable soils for backfill (heavy clays or organic soils) shall not be used in the reinforced soil mass. Fine grained cohesive soils (ϕ less than 31° (Ref)) may be used in wall construction, but additional backfilling, compaction and water management efforts are required. Poorly graded sands, expansive clays and/or soils with a plasticity index (PI) greater than 20 or a liquid limit (LL) greater than 40 should not be used in wall construction.

B. The infill soil used must meet or exceed the designed friction angle and description noted on the design cross sections and must be free of debris and consist of one of the following inorganic USCS soil types: GP, GW, SW, SP, GP-GM or SP-SM meeting the following gradation as determined in accordance with ASTM D422.

Sieve Size	Percent Passing
1 inch (25 mm)	100 – 75
No. 4 (4.75 mm)	100 – 20
No. 40 (0.425 mm)	0 - 60
No. 200 (0.075 mm)	0 - 35

C. Where additional fill is required, contractor shall submit sample and specifications to the wall design engineer, or the onsite soils engineer for approval and the approving engineer must certify that the soils proposed for use has properties meeting or exceeding original design standards.

2.4 GEOGRID

A. Geogrid products shall be of high-density polyethylene or polyester yarns encapsulated in a protective coating specifically fabricated for use as a soil reinforcement material.

B. Geogrid shall be the type as shown on the drawings having the property requirements as described within the manufacturer's specifications.

PART 3 - WALL CONSTRUCTION

3.1 EXCAVATION

A. Contractor shall excavate to the lines and grades shown on the construction drawings. Contractor shall use caution not to over-excavate beyond the lines shown, or to disturb the base elevations beyond those shown.

B. Contractor shall verify locations of existing structures and utilities prior to excavation. Contractor shall ensure all surrounding structures are protected from the effects of wall excavation.

3.2 FOUNDATION SOIL PREPARATION

A. Foundation soil shall be defined as any soils located beneath a wall.

B. Foundation soil shall be excavated as dimensioned on the plans and compacted to a minimum of 95% of Standard Proctor (ASTM D698) prior to placement of the base material.

C. Foundation soil shall be examined by the on-site soils engineer to ensure that the actual foundation soil strength meets or exceeds assumed design strength. Soil not meeting the required strength shall be removed and replaced with acceptable material.

3.3 BASE

A. The base material shall be the same as the Wall Rock material (Section 2.2) or a low permeable granular material.

B. Base material shall be placed as shown on the construction drawing. Top of base shall be located to allow bottom wall units to be buried to proper depths as per wall heights and specifications.

C. Base material shall be installed on undisturbed native soils or suitable replacement fills compacted to a minimum of 95% Standard Proctor (ASTM D698).

D. Base shall be compacted at 95% Standard Proctor (ASTM D698) to provide a level hard surface on which to place the first course of blocks. The base shall be constructed to ensure proper wall embedment and the final elevation shown on the plans. Well-graded sand can be used to smooth the top 1/2 in. on the base material.

E. Base material shall be a 4 in. minimum depth for walls under 4 ft. and a 6 in. minimum depth for walls over 4 ft.

F. Base material should be installed to allow for a minimum of one buried block to be extended into the slope to prevent erosion.

3.4 UNIT INSTALLATION

A. Install units in accordance with the manufacturer's instructions and recommendations for the specific concrete retaining wall unit, and as specified herein.

B. Ensure that units are in full contact with base. Proper care shall be taken to develop straight lines and smooth curves on base course as per wall layout.

C. Fill all cores and cavities and a minimum of 12 in. behind the base course with wall rock. Use infill soils behind the wall rock and approved soils in front of the base course to firmly lock in place. Check again for level and alignment. Use a plate compactor to consolidate the area behind the base course. All excess material shall be swept from top of units.

D. Install next course of wall units on top of base course. Position blocks to be offset from seams of blocks below. Perfect "running bond" is not essential, but a 3 in. minimum offset is recommended. Check each block for proper alignment and level. Fill all cavities in and around wall units and to a minimum of 12 in. depth behind block with wall rock. Block, wall rock and infill soil placed in uniform lifts not exceeding 8 in. Compaction requirements for all soils in areas in, around and behind the reinforced mass shall be compacted to 95% of maximum Standard Proctor dry density (ASTM D698) with a moisture content control of +1% to -3% of optimum.

E. For taller wall applications, structural fill should be specified for a minimum bottom 1/3 to 1/2 of the reinforced fill. If structural fill is not utilized in the reinforced mass, the depth of wall rock behind the block should be increased. See the Best Practices for SRW Design document for more information.

F. The consolidation zone shall be defined as 3 ft behind the wall. Compaction within the consolidation zone shall be accomplished by using a hand operated plate compactor and shall begin by running the plate compactor directly on the block and then compacting in parallel paths from the wall face until the entire consolidation zone has been compacted. A minimum of two passes of the plate compactor are required with maximum lifts of 8 in. Expansive or fine-grained soils may require additional compaction passes and/or specific compaction equipment such as a sheepsfoot roller. Maximum lifts of 4 in. may be required to achieve adequate compaction within the consolidation zone. Employ methods using lightweight compaction equipment that will not disrupt the stability or batter of the wall. Final compaction requirements in the consolidation zone shall be established by the engineer of record.

G. Install each subsequent course in like manner. Repeat procedure to the extent of wall height. Individual course height may vary due to allowable block manufacturing tolerances per ATSM C1372. Contractor must verify wall height, if noted as being critical, prior to completion of construction to ensure the elevation of the top of the wall or the controlling elevation matches

desired plan elevation, if noted as critical. Contractor must follow this method for single walls or walls that branch off into a terraced orientation.

H. As with any construction work, some deviation from construction drawing alignments will occur. Variability in construction of SRWs is approximately equal to that of cast-in-place concrete retaining walls. As opposed to cast-in-place concrete walls, alignment of SRWs can be simply corrected or modified during construction. Based upon examination of numerous completed SRWs, the following recommended minimum tolerances can be achieved with good construction techniques.

Vertical Control - ±1.25 in. max over 10 ft. distance
Horizontal Location Control - straight lines ±1.25 in. over a 10 ft. distance
Rotation - from established plan wall batter: ±2.0°

3.5 FILL PLACEMENT

A. Infill soil shall be placed, spread and compacted in such a manner that minimizes the development of slack or movement of the geogrid.

B. Only hand-operated compaction equipment shall be allowed within the consolidation zone. Compaction in this zone shall begin by running the plate compactor directly on the block and then compacting in parallel paths from the wall face back, until the entire consolidation zone has been compacted. A minimum of two passes of the plate compactor are required with maximum lifts of 8 in.

C. When fill is placed and compaction cannot be defined in terms of Standard Proctor Density, then compaction shall be performed using ordinary compaction process and compacted so that no deformation is observed from the compaction equipment or to the satisfaction of the engineer of record or the site soils engineer.

D. Tracked construction equipment shall not be operated directly on the geogrid. A minimum fill thickness of 6 in. is required prior to operation of tracked vehicles over the geogrid. Turning of tracked vehicles should be kept to a minimum to prevent tracks from displacing the fill and damaging the geogrid.

E. Rubber-tired equipment may pass over the geogrid reinforcement at slow speeds, less than 10 mph. Sudden braking and sharp turning shall be avoided.

F. The infill soil shall be compacted to achieve 95% Standard Proctor (ASTM D698). Soil tests of the infill soil shall be submitted to the on-site soils engineer for review and approval prior to the placement of any material. The contractor is responsible for achieving the specified compaction requirements. The on-site soils engineer may direct the contractor to remove, correct or amend any soil found not in compliance with these written specifications.

G. An independent testing firm should be hired by the owner to provide services.

H. Independent firm to keep inspection log and provide written reports at predetermined intervals to the owner.

I. Testing frequency should be set to establish a proper compaction protocol to consistently achieve the minimum compaction requirements set by the design requirements. If full time inspection and testing at 8 inch lifts is not provided, then the following testing frequency should be followed:

1. One test for every 8 inches of vertical fill placed and compacted, for every 25 lineal feet of retaining wall length, starting on the first course of block.

2. Vary compaction test locations to cover the entire area of reinforced zone; including the area compacted by the hand-operated compaction equipment.

3. Once protocol is deemed acceptable, testing can be conducted randomly at locations and frequencies determined by the on-site soils engineer.

J. Slopes above the wall must be compacted and checked in a similar manner.

3.6 GEOGRID INSTALLATION

A. Install Allan Block wall to designated height of first geogrid layer. Backfill and compact the wall rock and infill soil in layers not to exceed 8 in. lifts behind wall to depth equal to designed grid length before grid is installed.

B. Cut geogrid to designed embedment length and place on top of the Allan Block units to back edge of the raised front lip or within 1 in. of the concrete retaining wall face when using AB Fieldstone. Extend away from wall approximately 3% above horizontal on compacted infill soils.

C. Lay geogrid at the proper elevation and orientations shown on the construction drawings or as directed by the wall design engineer.

D. Correct orientation of the geogrid shall be verified by the contractor and on-site soils engineer. Strength direction is typically perpendicular to wall face.

E. Follow manufacturer's guidelines for overlap requirements. In curves and corners, layout shall be as specified in in Design Detail: Using Grid with Corners and Curves, in the AB Spec Book.

F. Place next course of Allan Block on top of grid and fill block cores with wall rock to lock in place. Remove slack and folds in grid and stake to hold in place.

G. Adjacent sheets of geogrid shall be butted against each other at the wall face to achieve 100 percent coverage.

H. Geogrid lengths shall be continuous. Splicing parallel to the wall face is not allowed.

3.7 ADDITIONAL CONSTRUCTION NOTES

A. When one wall branches into two terraced walls, it is important to note that the soil behind the lower wall is also the foundation soil beneath the upper wall. This soil shall be compacted to a minimum of 95% of Standard Proctor (ASTM D698) prior to placement of the base material. Achieving proper compaction in the soil beneath an upper terrace prevents settlement and deformation of the upper wall. One way is to replace the soil with wall rock and compact in 8 in. (200 mm) lifts. When using on-site soils, compact in maximum lifts of 4 in. (100 mm) or as required to achieve specified compaction.

B. Vertical filter fabric use is not suggested for use with cohesive soils. Clogging of such fabric creates unacceptable hydrostatic pressures in soil reinforced structures. When filtration is deemed necessary in cohesive soils, use a three-dimensional filtration system of clean sand or filtration aggregate. Vertical filter fabric may be used to separate wall rock zone from fine grained, sandy infill soils if the design engineer deems it necessary based on potential water migration from above or below grade, through the reinforced zone into the wall rock on the project. Horizontal filter fabric should be placed above the wall rock column to prevent soils from above migrating into the wall rock column.

C. Embankment protection fabric is used to stabilize rip rap and foundation soils in water applications and to separate infill materials from the retained soils. This fabric should permit the passage of fines to preclude clogging of the material. Embankment protection fabric shall be a high strength polypropylene monofilament material designed to meet or exceed typical NTPEP specifications; stabilized against ultraviolet (UV) degradation and typically exceeding the values in Section 3, Table 1 in the AB Spec Book.

D. Water management is of extreme concern during and after construction. Steps must be taken to ensure that drainpipes are properly installed and vented to daylight or connected to an underground drainage system and a grading plan has been developed that routes water away from the retaining wall location. Site water management is required both during construction of the wall and after completion of construction.

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SECTION 32 91 20 -TOPSOIL

PART 1 - GENERAL

1.1 SUBMITTALS

A. Samples:

1. Topsoil for Testing: In the presence of the Owner's Representative, take a 5 lb sample from each 1000 cu yds of topsoil to be used on the project. Submit to the Owner's Representative the laboratory test results for the organic matter, pH value, and gradation. These tests will be performed and signed by a certified soils laboratory.

1.2 QUALITY ASSURANCE

A. Topsoil used on this project shall be tested and approved before placement.

B. Secure approval before stripping topsoil from a borrow area or delivering topsoil to the project site.

PART 2 - PRODUCTS

2.1 TOPSOIL

A. Source: Provide topsoil from areas from which no topsoil has been taken previously and from areas which are producing, or have produced, fair to good yield farm crops without unusual fertilization for a minimum period of 10 years, or from arable or cultivable areas supplied with good normal drainage.

B. Provide import topsoil meeting requirements of specification from outside source, when existing topsoil is insufficient.

C. Source: Provide topsoil from existing stockpiles stripped from the project site and approved by the Owner's Representative. Existing topsoil may be re-used on site provided that the Contractor submit soil testing results and amend as necessary to meet project specifications.

D. Provide topsoil conforming to the following:

1. Original loam topsoil, well drained homogeneous texture and of uniform grade, without the admixture of subsoil material and entirely free of dense material, hardpan, sod, or any other objectionable foreign material.

2. Containing not less than 4 percent nor more than 20 percent organic matter in that portion of a sample passing a 1/4 inch sieve when determined by the wet combustion method on a sample dried at 105 degrees C.

3. Containing a pH value within the range of 6.5 to 7.5 on that portion of the sample which passes a 1/4 inch sieve.

4. Containing the following gradations:

SIEVE DESIGNATION	PERCENT PASSING
1 inch	100
1/4 inch	97 - 100
No. 200	20 - 65 (of the 1/4 inch sieve)

2.2 LIMESTONE

A. Provide ground limestone in the producer's standard bags containing not less than 90 percent of calcium and magnesium carbonates equivalent to not less than 45 percent of the mixed oxides of calcium and magnesium and conforming to the following gradations:

SIEVE DESIGNATION	PERCENT PASSING
No. 100	50 - 100
No. 20	100

PART 3 - EXECUTION

3.1 PREPARATION

A. Grub out and remove all vegetation in the area of the approved topsoil source.

3.2 SPREADING TOPSOIL

A. Perform topsoil spreading operations only during dry weather.

B. To ensure a proper bond with the topsoil, harrow or otherwise loosen the subgrade to a depth of 3 inches before spreading topsoil.

C. Spread topsoil directly upon prepared subgrade to a minimum depth measuring 4 inches after natural settlement in areas to be seeded. In sodded areas the thickness of the topsoil after natural settlement plus the sod shall equal 4 inches. Smooth out unsightly variations, bumps, ridges, and depressions which will hold water. Remove stones, litter, or other objectionable material. Finished surfaces shall conform to the contour lines and elevations indicated on the drawings or fixed by the Owner's Representative.

3.3 SPREADING LIMESTONE

A. Spread ground limestone evenly over the topsoiled surface. Incorporate limestone within the top 2 inches of soil prior to finish raking.

B. Apply limestone at the following rate per 1000 sq ft of topsoil area, corresponding to the hydrogen ion concentration (Ph) shown by the soil chemical analysis:

PH	RATE (pounds)
4.5 to 5.0	150
5.0 to 5.5	100
5.5 to 6.0	50
6.0 to 6.8	25
over 6.8	0

END OF SECTION 32 91 20

SECTION 32 92 00 – SEEDING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes:

1. Lawn.
2. Soil Amendments and Fertilizers.
3. Mulches.
4. Lawn Restoration.
5. Maintenance.

1.2 RELATED WORK SPECIFIED ELSEWHERE

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

B. Section 31 20 00: Earth Moving

C. Section 32 91 20: Topsoil.

1.3 SUBMITTALS

A. Product Certification: Certification signed by manufacturers certifying that their products comply with specified requirements.

1. Manufacturer’s certified analysis for standard products.
2. Analysis for other materials by a recognized laboratory made according to methods established by the Association of Official Analytical Chemists, where applicable.

B. Certification of grass seed from seed vendor stating the botanical and common name and percentage by weight of each species and variety, and percentage of purity, germination, and weed seed. Include the year of production and date of packaging.

C. Material test reports from qualified independent testing agency indicating and interpreting test results relative to compliance of the following materials with requirements indicated. Include percentages of organic matter, inorganic matter (silt, clay, and sand), deleterious material, pH, and mineral and plant-nutrient content.

1. Analysis of existing surface soil.
2. Analysis of imported topsoil.

D. Report suitability of existing surface soil and imported topsoil for lawn and plant growth. State recommended quantities of soil amendments to be added to produce satisfactory results.

1.4 DEFINITIONS

A. Weeds: Vegetative species other than specified species to be established in given area.

B. Planting Soil: Standardized topsoil; existing, native surface topsoil; existing, in-place surface soil; imported topsoil; or manufactured topsoil that is modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.

1.5 CLOSEOUT SUBMITTALS

A. Before expiration of required maintenance periods, Contractor is to submit maintenance instructions recommending procedures to be performed by Owner for maintenance of landscape during an entire year.

1.6 QUALITY ASSURANCE

A. Provide seed mixture in containers showing percentage of seed mix, germination percentage, inert matter percentage, weed percentage, year of production, net weight, date of packaging, and location of packaging.

1.7 QUALIFICATIONS

A. Seed Supplier: Company specializing in manufacturing Products specified in this section with minimum three years documented experience.

B. Installer: Company specializing in performing work of this section with minimum three years documented experience and a record of successful landscape establishment.

1. Installer’s Field Supervision: Require Installer to maintain an experienced full-time supervisor on the Project site during times that work of this section is in progress.

C. Testing Agency: To qualify for acceptance, an independent testing agency must demonstrate to Owner’s satisfaction, based on evaluation of agency-submitted criteria conforming to ASTM E 699, that it has the experience and capability to satisfactorily conduct the testing indicated without delaying the work.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver packaged materials in sealed containers showing weight, analysis, and name of manufacturer.

B. Protect materials from deterioration during delivery and while stored at site.

1.9 PROJECT CONDITIONS

A. Excavation: When conditions detrimental to lawn growth are encountered, such as rubble fill, adverse drainage conditions, or obstructions, notify the Engineer before planting.

1.10 COORDINATION AND SCHEDULING

A. Coordinate with other site operations to avoid conflict and damage to new work.

B. Planting season for seeded areas: March 15 to June 15, and August 15 to October 15.

1.11 WARRANTY

A. General: The special warranty specified in this Section shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.

B. Special Warranty: Warrant lawns and seeded areas for a period of one year after date of Substantial Completion, against defects including death and unsatisfactory growth, except for defects resulting from incidents that are beyond Contractor's control.

1.12 LAWN MAINTENANCE

A. Begin maintenance immediately after each area is planted and continue until acceptable lawns and plants are established, but for not less than the following periods:

1. Lawns and Seeded Areas: 120 days after date of Substantial Completion.

2. When full maintenance period has not elapsed before end of planting season, or if lawn is not fully established at that time, continue maintenance during the next planting season.

B. Maintain and establish seeded areas by watering, weeding, replanting, and other operations. Roll, re-grade, and replant bare or eroded areas and re-mulch to produce a uniformly smooth surface.

C. Watering: Provide and maintain temporary piping, hoses, and watering equipment to convey water from sources and to keep grass uniformly moist to a depth of 4 inches. Schedule watering to prevent wilting, puddling, erosion, and displacement of seed or mulch. Lay out temporary watering system to avoid walking over muddy or newly planted areas.

1. Water all seeded areas at the minimum rate of 1 inch per week.

D. Mow lawns as soon as there is enough top growth to cut with mower set at specified height for principal species planted. Repeat mowing as required to maintain specified height without cutting more than 40 percent of the grass height. Remove no more than 40 percent of grass-leaf growth in initial or subsequent mowings. Do not delay mowing until grass blades bend over and become matted. Do not mow when grass is wet. Schedule initial and subsequent mowings to maintain a grass height of 1½ to 2½ inches.

PART 2 - PRODUCTS

2.1 TOPSOIL

A. See specification section 32 91 20 – Topsoil.

2.2 SOIL AMENDMENTS

A. Lime: ASTM C 602, Class T, agricultural limestone containing a minimum 85 percent calcium carbonate equivalent, with a minimum 90 percent passing a No. 10 mesh sieve and a minimum 50 percent passing a No. 100 mesh sieve.

1. Provide lime in the form of dolomitic limestone.

B. Aluminum Sulfate: Commercial grade, unadulterated.

C. Herbicides: EPA registered and approved, of type recommended by manufacturer.

D. Sand: Clean, washed, natural or manufactured, free of toxic materials.

E. Compost: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through 3/4-inch sieve; soluble salt content of 5 to 10 decisiemens/m; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings; and as follows:

1. Organic Matter Content: 50 to 60 percent of dry weight.

2.3 FERTILIZER

A. Application of any fertilizer is prohibited between December 1st and April 1st and cannot be applied within 20’ of a water body.

B. Fertilizer: Mixed commercial fertilizers shall contain total nitrogen, available phosphoric acid and soluble potash in the ratio of 10-0-4 (50% N/UF). 50% of total nitrogen shall be derived from ureaform furnishing a minimum of 3.5% water insoluble nitrogen (3.5% WIN). The balance of the nitrogen shall be present as methylene urea, water-soluble urea, nitrate and ammoniacal compounds.

C. Other fertilizers meeting DOT Specification Section 713-03 Fertilizer can be used.

2.4 MULCH

A. Dry Application, Straw: Stalks of oats, wheat, rye or other approved crops that are free of noxious weed seeds. Weight shall be based on a 15 percent moisture content.

B. Hydro Application: Colored wood cellulose fiber product specifically designed for use as a hydro-mechanical applied mulch. Acceptable Product: Conwed Hydro Mulch, Conwed Fibers, 231 4th Street SW, Hickory, NC.

2.5 SEED - LAWN

A. Furnish fresh, clean, new-crop seed mixed in the proportions specified for species and variety, and conforming to Federal and State Standards.

B. Acceptable material in a seed mixture other than pure live seed consists of nonviable seed, chaff, hulls, live seed of crop plants and inert matter. The percentage of weed seed shall not exceed 0.1 percent by weight.

C. All seed will be rejected if the label or test analysis indicates any of the following contaminates: Timothy, Orchard Grass, Sheep Fescue, Meadow Fescue, Canada Blue Grass, Alta Fescue, Kentucky 31 Fescue, and Bent Grass.

D. Provide seed mixture equal to Scotts Pure Premium Sun and Shade North Grass Seed Mixture, comprised of the following:

SEED MIXTURE			
AMOUNT BY WEIGHT IN MIXTURE	SPECIES OR VARIETY *	PERCENTAGE	
		Purity	Germination
30%	FENWAY RED FESCUE	97%	80%
30%	ABBEY KENTUCKY BLUEGRASS BLEND	95%	80%
20%	DEVINE PERENNIAL RYE	98%	85%
20%	ENCHANTED PERENNIAL RYE	98%	85%

*Variety may be altered depending on availability of seed from manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas to receive landscaping for compliance with requirements and for conditions affecting performance of work of this Section. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PLANTING SOIL PREPARATION

A. Before mixing, clean topsoil of roots, plants, sods, stones, clay lumps, and other extraneous materials harmful to plant growth.

B. Mix soil amendments and fertilizers with topsoil as necessary to meet applicable ASTM standards.

C. For lawns, mix planting soil either prior to planting or apply on surface of topsoil and mix thoroughly before planting.

1. Mix lime with dry soil prior to mixing fertilizer. Prevent lime from contacting roots of acid-tolerant plants.

3.3 LAWN AREA PLANTING PREPARATION

A. Limit sub-grade preparation to areas that will be planted in the immediate future.

B. Loosen sub-grade to a minimum depth of 4 inches. Remove stones larger than 1-1/2 inches in any dimension and sticks, roots, rubbish, and other extraneous materials.

C. Spread topsoil to depth (4 inches minimum) required to meet the thickness, grades, and elevations shown, after light rolling and natural settlement. Do not spread if planting soil or sub-grade is frozen.

1. Place approximately 1/2 the thickness of planting soil mixture required. Work into top of loosened sub-grade to create a transition layer and then place remainder of planting soil mixture.

D. Grade lawn and grass areas to a smooth, even surface with loose, uniformly fine texture. Roll (112 pound roller maximum) and rake, remove ridges, and fill depressions to meet finish grades. Limit fine grading to areas that can be planted in the immediate future. Remove trash, debris, stones larger than 1-1/2 inches in any dimension, and other objects that may interfere with planting or maintenance operations.

E. Moisten prepared lawn and grass areas before planting when soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

F. Restore prepared areas if eroded or otherwise disturbed after fine grading and before planting.

3.4 FERTILIZING

A. The soil shall be tested for pH and lime added as necessary. All amendments shall be checked and approved by the Landscape Architect before amendments are made.

B. Apply fertilizer at a rate of 6 lb. / 1,000 SF.

3.5 SEEDING - LAWN

A. Assume all risks when seed is sowed before approval of seed analysis.

B. Sow seed with a spreader or a seeding machine. Do not broadcast or drop seed when wind velocity exceeds 5 mph. Evenly distribute seed by sowing equal quantities in 2 directions at right angles to each other.

1. Do not use wet seed or seed that is moldy or otherwise damaged in transit or storage.

2. Do not sow immediately following rain, when ground is too dry, or during windy periods.

C. Sow seed at the following rates:

1. Lawn Seed Mix, Seeding Rate: 6 to 8 lbs per 1000 sq. ft.

2. Temporary Cover Seed Mix, Seeding Rate: 3 to 4 lb per 1000 sq. ft.

D. Rake seed lightly into top 1/8 inch of topsoil, roll lightly, and water with fine spray, immediately after each area has been mulched. Saturate to 4 inches of soil.

E. Protect seeded areas with slopes less than 1:3 against erosion by spreading mulch after completion of seeding operations.

1. Mulch rates.

2. Oat or wheat straw applied at a minimum rate of 2 tons per acre to form a continuous blanket 1 1/2 inches loose depth over seeded areas. Spread by hand, blower, or other suitable equipment.

3. Apply slurry uniformly to all areas to be seeded in a one-step process. Apply mulch at a minimum rate of 1500-lb/acre dry weight but not less than the rate required to obtain specified seed-sowing rate.

F. Anchor mulch by spraying with asphalt-emulsion tackifier at the rate of 10 to 13 gal. per 1000 sq. ft. Take precautions to prevent damage or staining of structures or other plantings adjacent to mulched areas. Immediately clean damaged or stained areas.

3.6 LAWN RESTORATION

A. Renovate existing lawn within work limit.

B. Renovate existing lawn damaged by Contractor's operations, such as storage of materials or equipment and movement of vehicles.

C. Reestablish lawn where settlement or washouts occur or where minor regrading is required.

1. Install new planting soil as required.

D. Remove lawn from diseased or unsatisfactory existing lawn areas; do not bury in soil.

E. Remove topsoil containing foreign materials such as oil drippings, fuel spills, stones, gravel, and other construction materials resulting from Contractor's operations, and replace with new planting soil.

F. Where substantial lawn remains, mow, dethatch, core aerate, and rake. Remove weeds before seeding.

G. Remove weeds before seeding. Where weeds are extensive, apply selective herbicides as required. Do not use pre-emergence herbicides.

H. Remove waste and foreign materials, including weeds, soil cores, grass, vegetation, and lawn, and legally dispose of them off Owner's property.

I. Till stripped, bare, and compacted areas thoroughly to a soil depth of 6 inches.

J. Apply soil amendments and fertilizers required for establishing new lawn and mix thoroughly into top 4 inches of existing soil. Install new planting soil to fill low spots and meet finish grades.

K. Apply seed and protect with straw mulch as required for new lawn.

L. Provide lawn maintenance as required for new lawn.

3.7 SATISFACTORY LAWNS, GRASS, AND LAWN RESTORATION

A. Satisfactory Lawns, Grass, and Lawn Restoration: At end of maintenance period, a healthy, uniform, close stand of grass has been established, free of weeds and surface irregularities, with coverage exceeding 95 percent over any 10 sq. ft. and bare spots not exceeding 5 by 5 inches.

B. Reestablish those that do not comply with requirements and continue maintenance until satisfactory.

3.8 CLEANUP AND PROTECTION

A. During landscaping, keep pavements clean and work area in an orderly condition.

B. Protect landscaping from damage due to landscape operations, operations by other contractors and trades, and trespassers. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged landscape work as directed.

3.9 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Disposal: Remove surplus soil and waste material, including excess subsoil, unsuitable soil, trash, and debris, and legally dispose of it off the Owner's property.

END OF SECTION 32 92 00